



Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



Title: Emission Reduction in Aluminium Recycling process by CMR Group.

Version 02

Date 14/02/2026

First CoU Issuance Period: 02 years, 11 months
Monitoring Period: 01/01/2023 to 30/11/2025





Monitoring Report (MR) CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report

Title of the project activity	Emission reduction on account of process modification at Aluminium metal recycling unit.
UCR Project Registration Number	315
Version	02
Completion date of the MR	14/02/2026
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 02 Duration of this monitoring Period: 01/01/2023 to 30/11/2025 (first and last days included)
Project participants	CMR Green Technologies Limited
Host Party	India
Applied methodologies and standardized baselines	AMS III BD – Version 01 GHG emission reduction due to supply of molten metal instead of ingots for Aluminium Castings. Standardized Methodology: Not Applicable.
Sectoral scopes	04: Manufacturing industries.
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2023: 17,130 CoUs (17,130 tCO _{2eq}) 2024: 23,028 CoUs (23,028 tCO _{2eq}) 2025: 24,333 CoUs (24,333 tCO _{2eq})
Total:	64,491 CoUs (64,491 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The project titled as “Emission Reduction in Aluminium Recycling process by CMR Group” is a grouped project activity with four aluminium recycling units of CMR Group located in Haridwar (Uttarakhand), Bawal, Gurugram & Manesar (Haryana) in India. The project units are operational with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR) under the Project ID 315. However, effective from 16-June-2023, **Unit-02 (Gurugram, Haryana)** has been permanently closed due to loss in plant output. Supporting documentation for the plant closure will be submitted as part of the project records.

The details of the project activity under carbon cycle are as follows:

Purpose of the project activity:

The project activity is promoted by “CMR Green Technologies Limited” (hereinafter also referred to as (i) project proponent or PP and (ii) CMR Group), is a manufacturer of Aluminium and Zinc based alloys. CMR Group has pride of being the biggest producer for these alloys in India. These are the four aluminium metal recycling units located in two different states in India, wherein the metal will be supplied to the casting unit in the molten state (against the traditional solid ingots). The project units supply molten Aluminium to casting units, thus molten aluminium can reduce carbon emissions compared to solid ingots due to lower energy requirements. The production of molten aluminium requires less energy than producing solid ingots. This is because the melting point of aluminium is relatively low, so less energy is needed to melt the metal than to melt it and then solidify it. In order to supply the metal in the molten state the metal recycling facilities are being established by the side of the producer of the castings. CMR being a responsible company, continuously seeks opportunities for energy conservation and other environmentally and socially benign activities; and these units are the examples of such initiative towards sustainability.

The four units included under the UCR project activity are as follows:

Unit Reference	Location Reference	Commissioning Date	Remarks
Unit 1	Haridwar (Uttarakhand)	22 Aug 2008	Represented under “CMR Green Technologies Limited”
Unit 2 ¹	Gurugram (Haryana)	30 Dec 2009	Represented under “CMR Green Technologies Limited”
Unit 3	Manesar (Haryana)	01 Aug 2013	Represented under “CMR Green Technologies Limited”
Unit 4	Bawal (Haryana)	02 Dec 2013	Represented under “CMR Nikkei India Pvt. Ltd.”

In line with the application of the carbon methodology AMS III.B.D, the emission reductions with these project units are on account of:

- (a) energy savings due to avoidance of fossil fuel usage for re-melting the ingots at casting units;
- (b) avoiding aluminium metal loss due to metal oxidation during re-melting of ingots at casting units.

¹ **Unit-02 (Gurugram, Haryana)** has been permanently closed due to loss in plant output effective from 16-June 2023. Supporting documentation for the plant closure will be submitted as part of the project records

Therefore, the purpose of the project activity can be summarized as to reduce GHG emissions by supplying metal for aluminium castings in the molten state. Prior the implementation of the project activity, the casting units procures aluminium ingots and re-melts it in in-house melting furnaces for subsequent use in die-casting of various automotive components/parts. The project activity involves supply of molten Aluminium and utilization in die-casting operation directly. Therefore, the project activity reduces the dependence on fossil fuel and avoid associated aluminium metal loss due to oxidation during re-melting of ingots; thereby, effecting an overall reduction in GHG emissions.

b) Brief description of the installed technology and equipment>>

The type of the project activity is Type III – “Other project activities”.

The project activity involves supply of molten Aluminium and thereby eliminating the consumption of fossil fuel in the furnaces for melting of Aluminium ingots prior to casting. As already prescribed in the section above, the project activity will reduce GHG emission on account of the following:

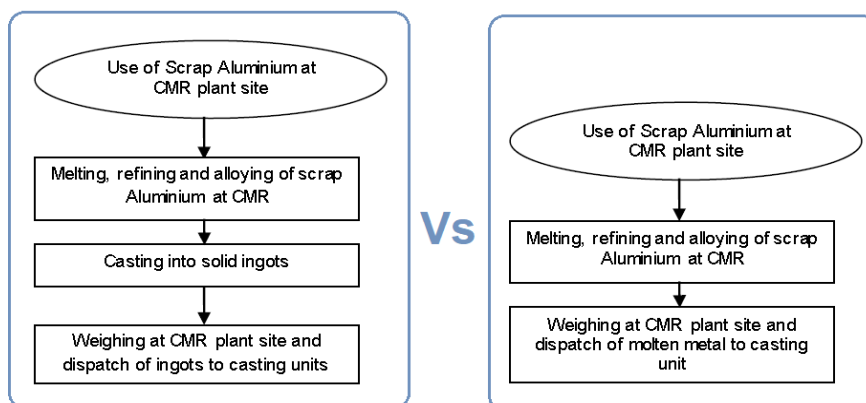
- 1) Emissions associated with the use of fossil fuel and electricity used for melting of Aluminium ingots in the casting units;
- 2) Emissions associated with virgin Aluminium production apportioned to that quantity of Aluminium metal that is lost in the form of Aluminium oxide during the process of melting the ingots at the casting units.

The technology and processes involved in the pre-project and project scenario have been explained below:

Baseline Scenario: In the pre-project scenario, CMR group was following the common process in the units i.e., supply of aluminium ingots to the casting units. The solid ingots were re-melted at the casting units for utilization in casting operations. For casting operations casting units melt solid ingots in their in-plant FO fired furnaces and use the molten Aluminium for castings. The use of fossil fuel for melting of the ingots leads to emissions of GHG. The process of melting of the ingots also leads to loss of some quantity of metal due to oxidation of the molten metal.

Project Scenario: Under the project level, the main activity that forms the carbon project is primarily saving the fuel and metal in the production process through modification of the conventional existing process in the industry. The project activity involves supply of Aluminium alloy to casting units in molten state. Processes at Aluminium recycling facility in project scenario are same as that of process at Aluminium recycling facility in the pre-project scenario and baseline case. However, in project case molten aluminium produced from scrap Aluminium is supplied to the casting units for direct use in die-casting machines. Whereas in pre-project case molten Aluminium produced from melting of scrap Aluminium is casted into H-caster moulds to produce solid ingots. Solids ingots are then supplied to die-casting facilities for subsequent use.

Aluminium recycling unit:



Molten Metal Supply Chain



01

Pouring in ATL
(Aluminum Transferring Ladle)



02

Weighing



03

Loading



04

Latching of ATL in
customised trucks



05

Transit



06

Unloading at Customer End



07

Pouring

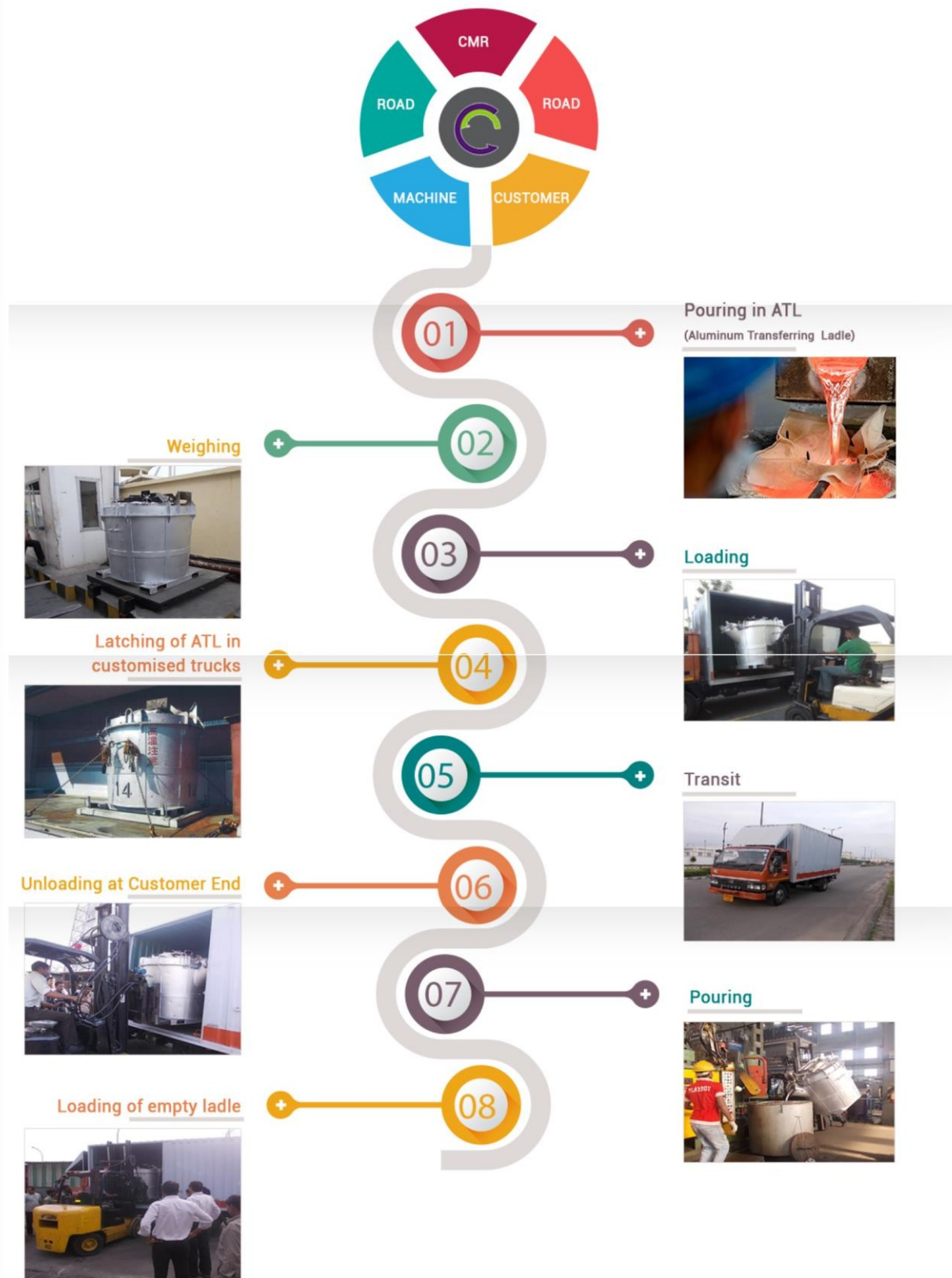


08

Loading of empty ladle



Molten Metal Supply Chain



The overall process flow value chain at CMR units are demonstrated below:

Thus, in all the units in the project activity supply molten Aluminium to casting units instead of supplying solid ingots by the Aluminium recycling unit. The technology used to produce Aluminium ingots or molten Aluminium remains the same in both the cases but it differs in the physical state in which the metal is delivered.

The major equipment used in Aluminium metal recycling unit to produce Aluminium metal are:

- Baling machine
- Nibbler Machine
- Furnaces

The key technical specifications of all the four units are provided under the Appendix to this report.

Attributes related to Sustainable Development Goals (SDGs):

Such industrial project can have several positive impacts on various aspects of society, the environment, and the economy. This is being a energy efficiency based project and working in one of the key sectors in the country, i.e metallurgy; hence project contributes directly contributes to natural resources conservation as well as optimization of energy usages in the process. Here are some of the positive impacts associated with the Project which has linkages to SDGs:



Explanation:

Aluminium production is energy-intensive, and enhancing energy efficiency contributes to reducing both energy consumption and greenhouse gas emissions which is the primary achievement of the project activity. Thus, it relates to **SDG 13** that calls for urgent action to combat climate change and its impacts.

SDG 1: Target 1.1: Eradicate extreme poverty for all people everywhere.

Job Creation: The project involved a significant labour force across the entire processes. As compared to regular plant, this molten metal unit is more resource intensive and also received more training and skill development across the process. Here local employment is achieved, so by providing employment, these projects can help lift people out of extreme poverty.

Income Generation: Also the vendors involved in the overall supply chain gets direct and indirect incomes. This additional income can be a crucial factor in reducing poverty levels, especially for small-scale vendors.

Local Economic Development: The establishment of such units stimulated local economic development by

attracting investments, creating supply chains, and fostering entrepreneurship, all of which can contribute to poverty reduction.

SDG 8: Target 8.5: E Achieve full and productive employment and decent work for all. The project demands technical skills for which regular training and related procedures are adopted, hence it enhances the qualitative aspects of their employment leading to decent works.

SDG 7: Affordable and Clean Energy: Improving energy efficiency in aluminium production aligns with SDG 7's goal of ensuring access to affordable, reliable, sustainable, and modern energy for all. It also promotes the use of clean and renewable energy sources, reducing the carbon footprint of energy use in the aluminium industry.

SDG 9: Industry, Innovation, and Infrastructure: Enhancing energy efficiency in the aluminium industry falls under SDG 9, which aims to build resilient and sustainable infrastructure and promote inclusive and sustainable industrialization and innovation.

SDG 11: Sustainable Cities and Communities Target 11.6: Reduced the adverse per capita environmental impact of project areas and cities.

SDG 12: Responsible Consumption and Production: Improving energy efficiency as well as utilization of scrap metal directly reduces resource consumption and contributes to sustainable consumption and production patterns, which is a key focus of SDG 12. This goal encourages industries to minimize waste, improve resource efficiency, and reduce environmental impacts.

SDG 17: Partnerships for the Goals: Achieving energy efficiency in aluminium production often requires collaboration among industry stakeholders, governments, and research institutions. SDG 17 emphasizes the importance of partnerships and cooperation to achieve sustainable development goals.

Efforts to improve energy efficiency in aluminium production can include adopting more energy-efficient technologies, optimizing production processes, and utilizing waste heat recovery systems. These measures not only reduce energy consumption but also lower production costs, increase competitiveness, and contribute to a more sustainable and environmentally friendly aluminium industry.

CMR Group is currently not claiming the positive impacts against these SDGs, however these indicators are prominent and associated with the project, hence report as generic description.

c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

UCR Project ID or Date of Authorization	: 315
Start Date of Crediting Period	: 01/01/2023
Project Commissioned	: Between 22/08/2008 to 02/12/2013 (referred under Section A.1)
Monitoring Period	: 01/01/2023 to 30/11/2025

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2023
Carbon credits claimed up to	30/11/2025
Total ERs generated (tCO _{2eq})	64,491 tCO _{2eq}
Leakage	0

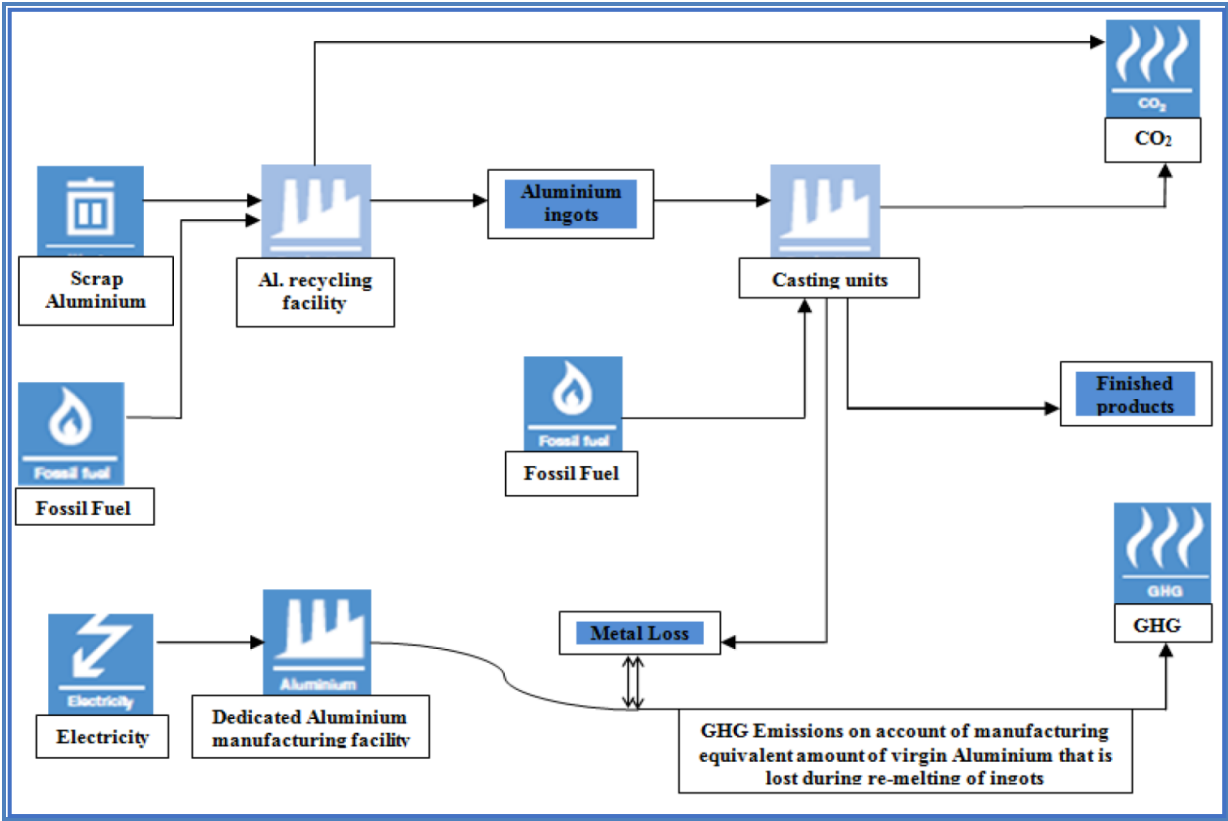
e) Baseline Scenario>>

The baseline scenario identified at the PCN stage of the project activity is:

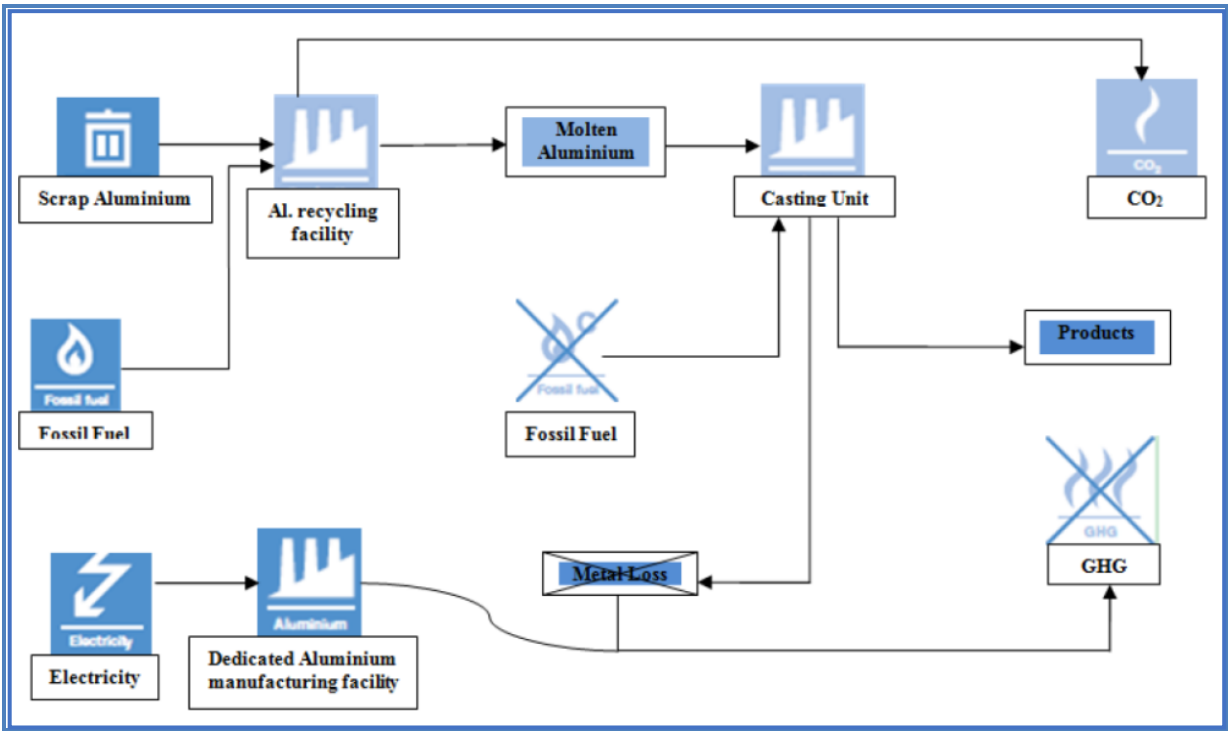
Baseline Scenario: In the pre-project scenario, CMR group was following the common process in the units i.e., supply of aluminium ingots to the casting units. The solid ingots were re-melted at the casting units for utilization in casting operations. For casting operations casting units melt solid ingots in their in-plant FO fired furnaces and use the molten Aluminium for castings. The use of fossil fuel for melting of the ingots leads to emissions of GHG. The process of melting of the ingots also leads to loss of some quantity of metal due to oxidation of the molten metal.

Project Scenario: Under the project level, the main activity that forms the carbon project is primarily saving the fuel and metal in the production process through modification of the existing process. The project activity involves supply of Aluminium alloy to casting units in molten state. Processes at Aluminium recycling facility in project scenario are same as that of process at Aluminium recycling facility in the pre-project scenario and baseline case. However, in project case molten aluminium produced from scrap Aluminium is supplied to the casting units for direct use in die-casting machines. Whereas in pre-project case molten Aluminium produced from melting of scrap Aluminium is casted into H-caster moulds to produce solid ingots. Solids ingots are then supplied to die-casting facilities for subsequent use.

A representative diagram of the pre-project scenario:



A representative diagram of the project scenario under UCR:



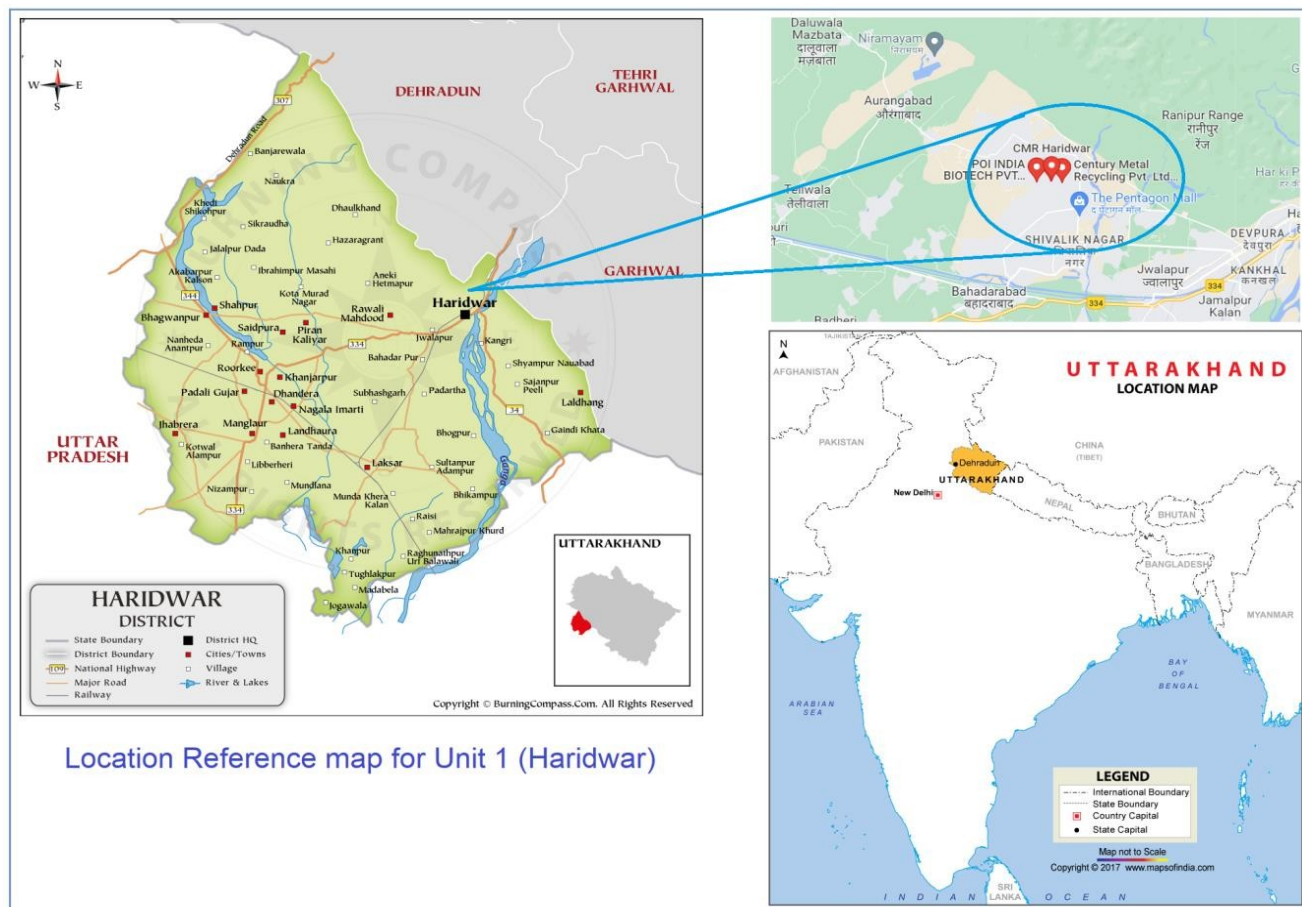
A.2. Location of project activity>>>

Country : India
District : Manesar, Gurgaon, Bawal and Haridwar
State : Haryana and Uttarakhand

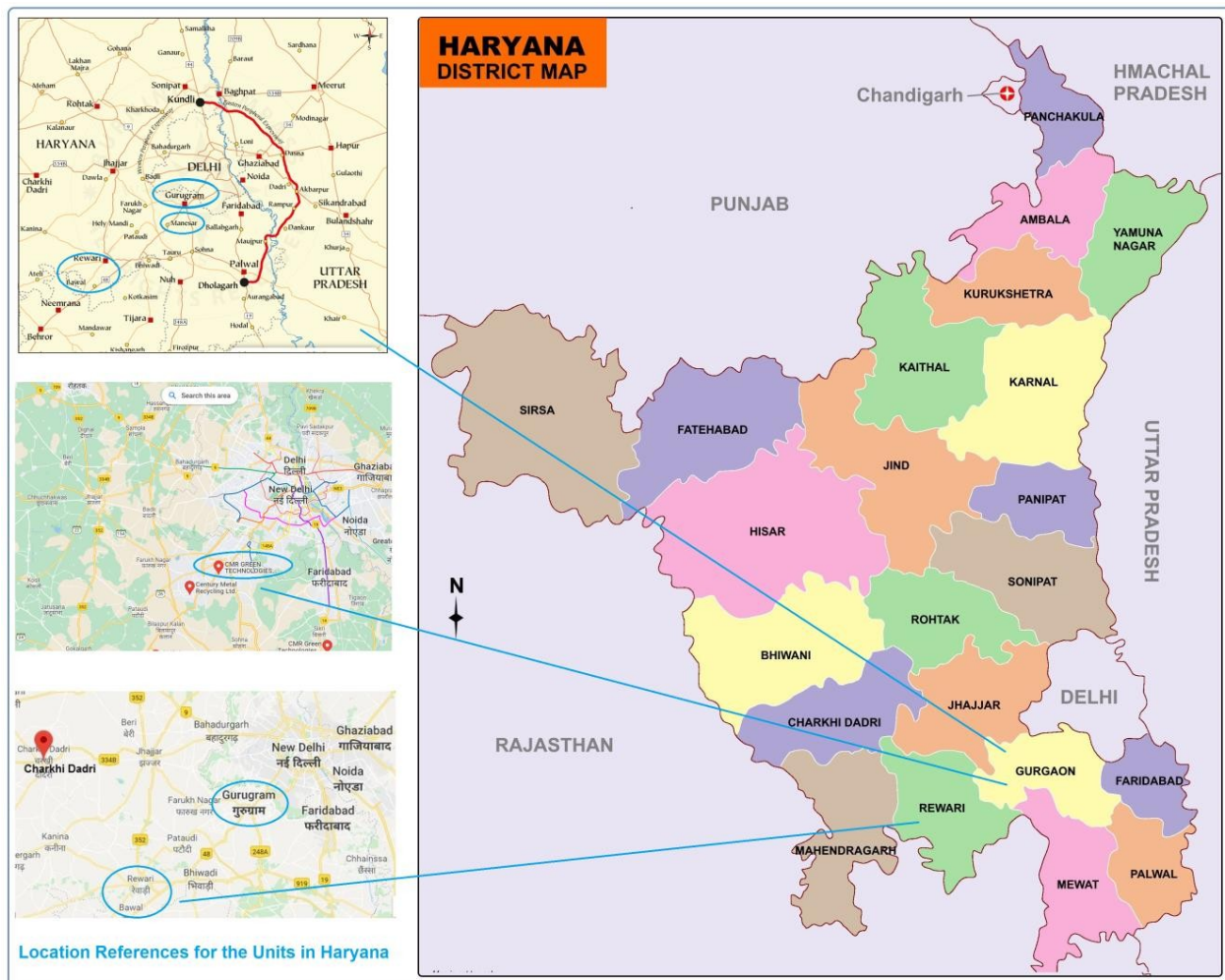
The location details of the four units are given below:

Unit Ref	Location Reference	Location Details
Unit 1	Haridwar (Uttarakhand)	Haridwar Sidcul, Plot 3/P2, Sector 10, Haridwar. Latitude: 29° 56' 44.4876", Longitude: 78° 9' 51.2928"
Unit 2	Gurugram (Haryana)	38/6, Miles Stone, Delhi-Jaipur highway, village- Narsinghpur, Dist. – Gurgaon, Haryana. Latitude: 28.3715° N, Longitude: 76.9237° E
Unit 3	Manesar (Haryana)	68F6+2CW, Tatarpur, Manesar, Haryana 121102. Latitude:28.22311° N, Longitude: 77.31163° E
Unit 4	Bawal (Haryana)	Plot No 65 Sector 15, Patuhera, Rewari, Bawal 123501. Latitude: 28.1034° N, Longitude: 76.6210° E

The representative location maps are included below:



(Image courtesy: Google maps & images)



(Image courtesy: Google maps & images)

A.3. Parties and project participants >>

Party (Host)	Participants
India	CMR GREEN TECHNOLOGIES LIMITED (formerly Century Metal Recycling Ltd.) Contact details: Contact Person: Mr. Ankur Singh Director Ph: +91 (0129) 4223050 Email: ankur.s@cmr.co.in Address: Corp. Office: 803, SSR Corporate Park, Opp NHPC Metro Station, Delhi Mathura Road, Faridabad- 121003, Haryana. India. Other Parties: Not applicable. All the four units are owned by the respective entities of CMR group, hence no additional parties are reported here.

A.4. References to methodologies and standardized baselines >>

SECTORAL SCOPE: 04, Manufacturing Industries

CATEGORY: AMS. IIL.BD. (Title: “GHG emission reduction due to supply of molten metal instead of ingots for aluminium castings”)

Standardized Baseline: Not Applicable.

Applicability of methodologies and standardized baselines >>
The scale of the activity is under the project Type-III B D. (Version 01) and the project activity remained under the limit of 15 MW every year during the crediting period. Therefore, the GHG emission reductions that are claimed remains within the limit of its type as per the applied methodologies.

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 02 years, 11 months.
Date: 01/01/2023 to 30/11/2025 (Inclusive of both dates)

A.6. Contact information of responsible persons/entities >>

Particulars	Details
Name	Mr. Ankur Singh (Director)
Project Proponent:	CMR GREEN TECHNOLOGIES LIMITED (formerly Century Metal Recycling Ltd.)

Company	CMR GREEN TECHNOLOGIES LIMITED (formerly Century Metal Recycling Ltd.)
Address	Corp. Office: 803, SSR Corporate Park, Opp NHPC Metro Station, Delhi Mathura Road, Faridabad- 121003, Haryana. India.
E-mail	ankur.s@cmr.co.in
Contact	+91 (0129) 4223050

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

a) Description of the installed Technologies, technical processes and equipment:

Reference: (Technical information given on Section – A.1.(b) & also given on appendix).

b) Information on the implementation and the actual operation of the project activity, including relevant dates:

As can be checked from the table above, the earliest date of commissioning of the units was on 22 August 2008 which is for Haridwar plant and the latest commissioning was for Bawal plant which was 02 December 2013. All units have been in continuous operation since its commissioning. Therefore, the consideration of crediting period for the project is justified as 01 January 2013.

All these plants are in continuous operation, though plant operating parameters are different and load factors are different. Therefore, overall implementation status is considered to be valid, without any design change and without any discontinuation of the operations.

In order to present an ex-ante estimated value in this Project Concept Note for all future reference, a detailed calculation has been done. Based on the primary data collected during the project design and based on all methodological parameters, the estimated annual average emission reductions are about 16,780 tCO₂e, whereas actual emission reductions accounted during the first CoU period has been estimated as 21,497 tCO₂e as annual average; is being submitted under this report as a part of second monitoring and verification.

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

PROCESS FLOW DIAGRAM

Connector Symbols



S No	Process & Description	SYMBOLS				
		Connector	Opr.	Insp.	Deci.	Trans.
10	Raw Material weighing / unloading					
20	Sampling and Inspection					
30	Sorting					
40	Weighment/ material feeding on furnace					
50	Charging					
60	Melting					
70	Drossing and Iron removal					
80	Casting Sampling for testing of raw material composition					
90	Alloying					
100	Final Sampling for testing of required customer specification					
110	Metal Pouring in ladle from furnace					
120	Ladle transfer from furnace to degassing m/c and start degasing					
130	Vacuum sample for porosity testing, K value test,density test					
140	Weighment					
150	Delivery					

B.2 Do no harm or Impact test of the project activity>>

The project does not have any negative impact on the environment or in the region, rather it has positive attributes. There are several positive impacts of a metal recycling project that focuses on recycling molten aluminium compared to solid ingots:

Energy savings: Recycling molten aluminium requires significantly less energy than producing aluminium from virgin ore. According to the Aluminum Association, recycling aluminum saves about 95% of the energy needed to produce primary aluminum from bauxite ore. This results in significant reductions in greenhouse gas emissions and other air pollutants.

Resource conservation: Recycling aluminium conserves natural resources like bauxite ore and reduces the need for mining, which can cause environmental damage.

Waste reduction: Recycling molten aluminum produces less waste than producing solid ingots from virgin ore. Recycling aluminum also helps to reduce landfill waste and associated environmental issues.

Cost savings: Recycling aluminum is often less expensive than producing aluminum from virgin ore, especially as the cost of energy continues to rise.

Job creation: Metal recycling projects can create new jobs in recycling, collection, and processing of aluminum scrap.

Improved sustainability: By recycling aluminum, we can move towards a more sustainable and circular economy, where resources are used more efficiently and waste is minimized. This can lead to a more sustainable future for both the environment and the economy.

Therefore, if we summarize the positive impacts as mentioned above, the overall we could mention that recycling molten aluminum can have a significant positive impact on the following broad categories:

- **Environmental**
- **Social**
- **Economical.**



The project units are already operational and all these positive attributes are achieved by the project units. Thus this project is contributing to various sustainable benefits which can be realized both in direct and indirect forms and positive impacts are realizable across the operational lifetime of the project. However, CMR is currently not claiming impacts of such SD benefits, hence specific monitoring of such indicators are not established. Whereas, some of the regular CSR activities are reported under the Appendix 2.

Additional Information on Do No Harm Assessment:

A DO NO HARM assessment is an evaluation of the potential impacts of a project on human rights, labour standards, environmental conditions, and community development. Here is an assessment of the metal recycling project that focuses on recycling molten aluminium compared to solid ingots:

1. **Human Rights:** The project is not experiencing any direct negative impacts on human rights. Generally, workers in the metal recycling industry have risks such as exposure to hazardous materials and heavy machinery. However, at CMR plants the best possible proper safety measures are taken to ensure worker safety. Hence no negative impact
2. **Labour Standards:** The project complies with labour laws and standards, including those related to working hours, wages, and worker safety. Workers are provided with appropriate protective gear and training to minimize risks. Moreover, CMR is already
3. certified as “Great Place to Work”, which certainly confirms the compliance of all labour laws as well as qualitative employment across the organization.



4. **Environmental Conditions:** Recycling molten aluminium is generally more environmentally friendly than producing solid ingots from virgin ore. While achieving this climate friendly action, CMR group also implemented appropriate environmental management practices across the plants and offices to ensure that any environmental hazards or probable risks are minimized. Moreover, the required environmental clearances and consent to operate from Pollution Control Board received in all the units, hence it ensures no direct or indirect impacts to air and water pollution, waste generation/disposal methods etc.
5. **Community Development:** The project units are already having positive impacts on the community as new jobs and local economic opportunities have been created. Also, CMR group conducts various CSR (Corporate Social Responsibility) activities for community with the active participation and involvement of the local community to ensure that their needs and concerns are considered.

Overall, the metal recycling project that focuses on recycling molten aluminium compared to solid ingots has the potential to have positive impacts on the environment, the economy, and society. However, it is important to ensure that appropriate measures are in place to mitigate any potential negative impacts on human rights, labour standards, environmental conditions, and community development. The project proponent “CMR Group” has been successfully addressing to all these areas that ensures that no negative impact or No Harm to the community and the region.

B.3. Baseline Emissions>>

Baseline is determined for the proposed project activity in accordance with paragraph 4 - applicability condition (c) of the Small-Scale Methodology AMS III.BD, Version 01.0 titled “GHG emission reduction due to supply of metal instead of ingots for Aluminium castings”.

The project activity of the CMR four units result in reduction of anthropogenic emissions of GHG by sources below those that would have occurred in the absence of the project activity under UCR. The project units aim to achieve fuel and metal saving at casting units by supplying molten Aluminium in place of solid ingots. Supply of molten Aluminium to the casting unit is less GHG emission intensive technology, whereas, supply of solid ingots is more GHG intensive technology.

There are no any National and/or Sectoral policies or Regulations that give comparative advantages to supply of solid ingots to casting units over supply of molten Aluminium to the casting units. Also, there is no National and/or sectoral policy or regulation that give comparative advantages to supply of molten Aluminium to the casting units over supply of solid ingots to casting units which is a more emissions-intensive technology.

Hence, the proposed project activity is voluntary in nature. The E+ and E- policies in accordance with “Clarifications on the Consideration of National and/or Sectoral Policies and Circumstances in Baseline Scenarios” published in CDM EB22/Annex 3 with regards to the local, national and sectoral policies have been taken into account while developing the baseline scenario.

Post implementation of the project activity the project proponent would directly supply molten Aluminium/Aluminium alloy, thereby eliminating the use of fossil fuel at casting units for melting of Aluminium ingots procured in the pre-project scenario and avoiding the metal loss that would have happened due to oxidation. In absence of the project scenario, proponent (PP) would continue the supply of Aluminium metal to the casting units in the form of solid ingots from its existing facility.

The input parameter used to estimate baseline emissions are as follows:

Parameter	Choice of data
EF _{CO₂,grid,y} - The emissions associated with grid electricity consumption	A "grid emission factor" refers to a CO ₂ emission factor (tCO ₂ /MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9tCO ₂ /MWh for the 2014 - 2020 years as a conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021 & 2022, the combined margin emission factor calculated from CEA database in India results into higher emission than this UCR default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
EF _{fossilfuel} - CO ₂ emission factor (tonCO ₂ /MJ) of the fossil fuel which would have been consumed at the casting unit to which the molten metal is being supplied.	Calculated using the “Tool to calculate Project or leakage CO ₂ emissions from fossil fuel combustion”.

Q_y - quantity of molten Aluminium alloy supplied in the year y to the casting unit (ton).	Monitored data, which will be obtained from the plant records during the verification. For the purpose of ex-ante estimation, an annual avg. value from the plant's records considered which is more realistic.
η_{furnace} - Efficiency of the furnace at the casting unit to which the molten metal is being supplied (fraction)	Efficiency value shall be taken as mentioned in paragraph 11 of the applied methodology AMS III BD (Version 01.0).
T_{amb} - Ambient temperature ($^{\circ}\text{C}$)	The ambient temperature $T_{\text{amb}} = 50.6^{\circ}\text{C}$ is prescribed as per the applied methodology AMS III BD (Version 01.0). However, for the purpose of estimation the ambient temperatures recorded in the respective units are used.
β - Percentage loss of aluminum due to oxidation during the process of re-melting of ingots.	Use of default value given in applied methodology AMS III BD (Version 01.0).
EI_{AP} - Emission factor for primary aluminum production from virgin inputs (electricity)/tonne molten aluminum	Use of conservative default value of 7.3 MWh (electricity)/tonne molten aluminum as per the guidance in paragraph 12 of the applied methodology AMS III BD (Version 01.0).

B.4. Debundling>>

This project activity is not a debundled component of a larger project activity. Instead, the overall project is bundle of four recycling units of CMR group.

Additionally, the project comes under the type-III category as per CDM methodology. The ex-ante estimated value of annual average ERs are less than the threshold limit of 60 k tCO₂e. Hence, there is no concern related to de-bundling from the project carbon accounting as well.

SECTION C. Application of methodologies and standardized baselines

C.1. References to methodologies and standardized baselines >>

SECTORAL SCOPE: 04, Manufacturing Industries

CATEGORY: AMS. III.BD. (Title: “GHG emission reduction due to supply of molten metal instead of ingots for aluminium castings”)

Standardized Baseline: Not Applicable.

C.2. Applicability of methodologies and standardized baselines >>

In accordance with Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project category is categorized as Type – III.B D. (Version 01), Sectoral Scope: 04, “GHG emission reduction due to supply of molten metal instead of ingots for aluminium castings”. The applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology is applicable to existing facilities as well as new constructions (Greenfield facilities).	The four units of the project activity were newly constructed metal recycling units. Hence, applicability condition is satisfied.
2. For facilities to qualify as existing, both the recycling unit and the casting units have a history of operation for at least three years prior to the start date of project activity and it shall be demonstrated that the baseline is the continuation of the existing practice i.e. casting units solely use ingots prior to the start date of the CDM project. The baseline emissions are established from the characteristics of the existing systems using data from the immediately prior three years. If any one of the units (recycling or casting) is a new construction it shall be considered as Greenfield.	The project units are newly constructed facilities and hence, a greenfield facility.
3. For Greenfield and existing facilities, if the estimated average annual emission reductions from the project activity is greater than 600 tCO ₂ per installation (i.e. casting unit), then mandatory investment analysis is required for identification of the baseline and demonstration of additionality of the project. The investment analysis shall take into account all costs and benefits that result from the project activity;	The estimated emission reduction achieved from the project activity is about 21,209 tCO ₂ e per year. However, demonstration of additionality is not considered to be applicable under the UCR activity. Hence, this criterion is not applicable.
4. The hot metal transport between the recycling facility and casting unit is undertaken in closed ladle all through the crediting period;	As demonstrated under the project description, the hot metal transport between the recycling facilities and casting units are undertaken in closed ladle only. This has been included in the monitoring parameter.

5. It is possible to directly measure and record the output of the recycling facility i.e. the quantity of molten aluminium metal or alloy supplied to the casting units;	Molten Aluminium produced by the recycling facility is measured at plants and the values are recorded for every trip of molten metal transfer to the casting units.
6. In order to avoid double counting of emission reductions, a contractual agreement between the recycling facility and casting unit shall indicate that only one of them will claim emission reductions;	This condition is already established as the project has required contractual agreements in place. The required declaration shall be submitted during the verification process.
7. Production outputs in baseline and project scenario remain homogenous and within a range of $\pm 10\%$ with no change in installed capacity. The methodology is not applicable to project activities for retrofit of an existing facility to increase production outputs	Production output both in baseline and project case would remain homogenous, as composition of the production output is dependent on the requirement from die-casting facility. And this requirement would remain same irrespective of the physical state in which it is supplied.
8. It shall be demonstrated that the use of hot metal in the casting unit will not increase auxiliary consumptions. Any transportation related emissions is included as project emissions	It is evident from the process description included under the section A that use of hot metal in the casting unit does not lead to any increase in auxiliary energy consumption, except for the energy consumption during transporting the hot metal from the recycling facility to the casting facility. All transportation related energy consumption has been accounted in the project emissions.
9. Measures are limited to those that result in aggregate emission reductions of less than or equal to 60 kt CO ₂ annually	The actual estimate shows that the annual average estimated ER is 21,209; hence well below the prescribed limit.

The project activity thus meets all the applicability criteria set out under the selected small-scale methodology (i.e. AMS-III.BD / Version 01.0) and hence the methodology is applicable to this project activity.

C.3 Applicability of double counting emission reductions >>

There is no double accounting of emission reductions in the project activity due to the following reasons:

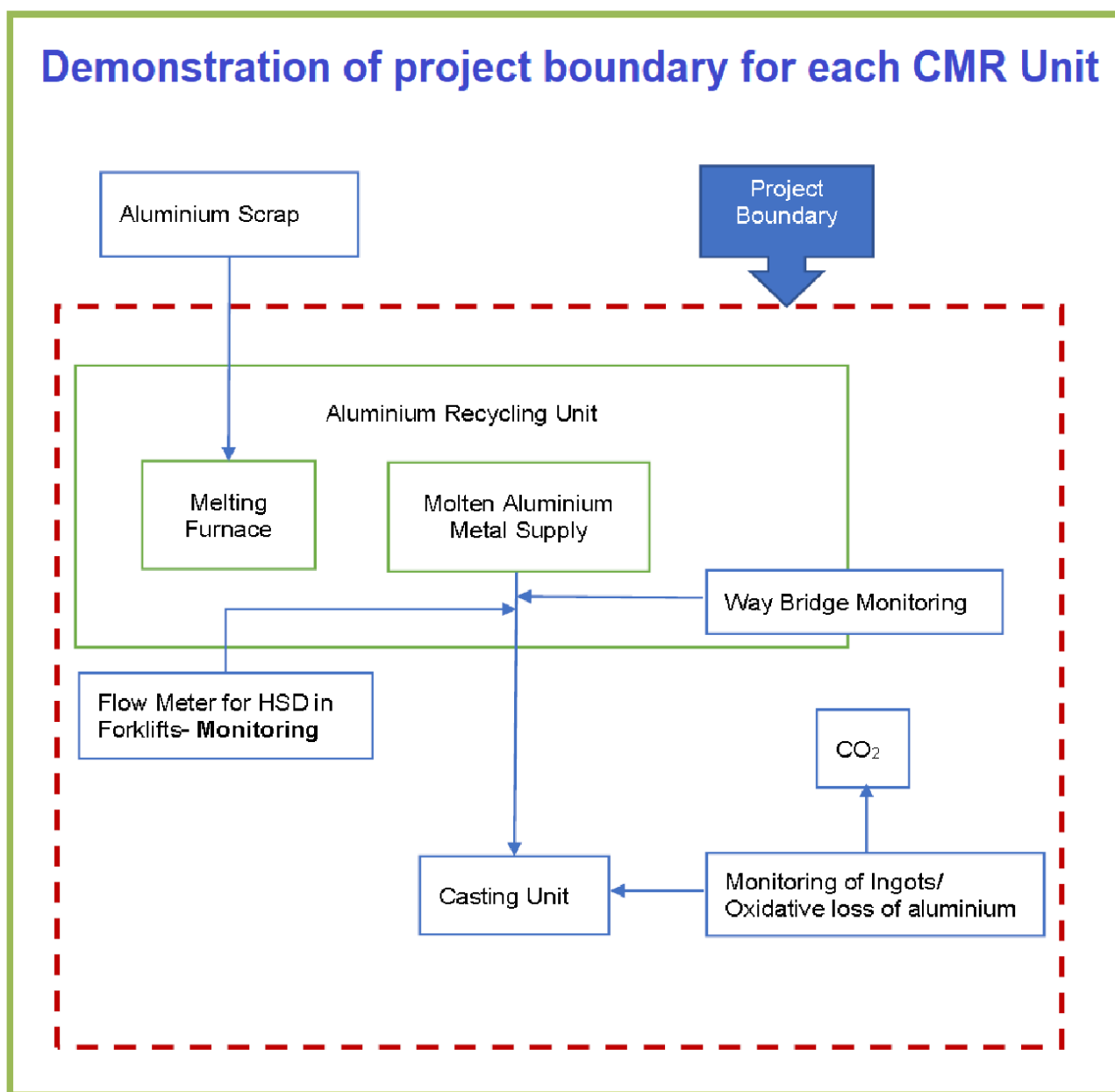
- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate of the production unit,
- Project is associated with energy meters and other measuring devices for the key parameters which are uniquely identifiable for the carbon project.

Additionally, there is no accounting of any green attributes or any form of such benefits claimed by the consumers of molten metal (i.e. clients of CMR respective plants); neither CMR group has surrendered the carbon credits to or exchanged any communication with their clients related to green attributes; hence there is no double accounting of emission reduction claims in this entire project activity.

In this regard, PP has submitted the details of all the clients associated with the CMR entities across these four plants to the audit team for independent review and assessment. Additionally, PP has signed the No-Double accounting statement and submitted to the audit team

C.4. Project boundary, sources and greenhouse gases (GHGs)>>

As per applicable methodology, the project boundary would be the physical site of the CMR units located in the state of Haryana and Uttarakhand.



The table below provides an overview of the emissions sources included or excluded from the project boundary for determination of baseline and project emissions.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected fossil fuel-based electricity generation	CO ₂	Yes	Main emission source, associated with virgin Aluminium production.
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the Project
Source		Gas	Included?	Justification/Explanation
Project	Fuel used in furnaces (Thermal energy)	CO ₂	Yes	An important emission source due to the combustion of FO
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the Project
	Fuel used in transportation on of molten Aluminium	CO ₂	Yes	An important emission source produced during Transportation
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	No other emissions are emitted from the project
	Electricity Requirement	CO ₂	No	Not applicable
		CH ₄	No	Not applicable
		N ₂ O	No	Not applicable
		Other	No	Not applicable

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

The project activity involves supply of molten Aluminium and utilization in die-casting operation directly. Therefore, the project activity reduces the dependence on fossil fuel and avoid associated aluminium metal loss due to oxidation during re-melting of ingots which is the baseline scenario; thereby, achieving an overall reduction in GHG emissions at project level.

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

Baseline is determined for the proposed project activity in accordance with paragraph 4 - applicability condition (c) of the Small-Scale Methodology AMS III.BD, Version 01.0 titled “GHG emission reduction due to supply of metal instead of ingots for Aluminium castings”.

The detailed assessment of baseline scenario has been demonstrated under the previous section A.4 and A.6; the same shall be referred for baseline establishment.

Net GHG Emission Reductions and Removals:

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline Emissions in year y ($t CO_2/y$)

PE_y = Project emissions in year y (tCO_2/y)

LE_y = Leakage emissions in year y (tCO_2/y)

Baseline Emission (BE_y)

As per the provisions in the proposed new small-scale methodology the baseline emissions are calculated as follows:

$$BE_y = BE_{fuel,y} + BE_{metal,y}$$

Where,

$BE_y =$	Baseline emissions in the year y ($tonCO_2-e$)
$BE_{fuel,y} =$	Baseline emission in the year y due to combustion of fossil fuel for melting of Aluminium ingots ($tonCO_2-e$)
$BE_{metal,y} =$	Baseline emission in the year y due to metal loss in oxidation during melting of Aluminium ingots prior to casting ($tonCO_2-e$).

GHG associated with fuel saving ($BE_{fuel,y}$), is calculated as follows:

$$BE_{fuel,y} = Q_y * [\{ 1.07 * (660 - T_{amb}) + 390 \} / \eta_{furnace}] * EF_{fossil\ fuel}$$

Where,

Q_y =	Quantity of molten Aluminium alloy supplied in the year y to the casting unit (tons).
660 =	Melting Temperature of Aluminium.
T_{amb} =	Ambient Temperature ($^{\circ}C$)
1.07 =	Specific heat of solid Aluminium metal/alloy in MJ/ ton $^{\circ}C$.
390 =	Latent heat of fusion of Aluminium (MJ/ton).
$EF_{fossil\ fuel}$	CO2 emission factor of the fossil fuel which would have been consumed at the casting unit to which the molten metal is being supplied (tonCO2/MJ),
$\eta_{furnace}$	Efficiency of the furnace at the casting unit to which the molten metal is being supplied (fraction)

GHG emission associated with Aluminium metal loss is calculated as follows:

$$BE_{metal,y} = (\beta * Q_y * EI_{AP} * EF_{CO2, grid, y}) / 100$$

Where,

$BE_{metal,y}$ =	Baseline GHG emission in year y due to metal loss during melting of Aluminium ingots (tonCO2-e)
Q_y =	Quantity of molten Aluminium alloy supplied in year y to the casting unit (ton)
β =	Percentage loss of Aluminium due to oxidation during the process of re-melting of ingots
EI_{AP} =	Energy intensity for primary aluminium production from virgin inputs (MWh/tonne aluminium). Conservative default value of 7.3 MWh (electricity)/tonne molten aluminium alloy can be applied if the host country is net exporter of aluminium. This shall be demonstrated for each crediting year using credible official documented evidence (e.g., from government and/or from industrial association). Otherwise, the emission factor shall be discounted using baseline correction factor of 0.63.3 These values shall be updated at each renewal of the crediting period, and project participants shall use the values from the latest version of the methodology at renewal of the crediting period

Here, $EF_{CO_2, \text{grid}, y}$ has been referred to the value prescribed by UCR. The reference has already been justified under the section A.6

Project emissions (PE_y):

Project Emission is calculated in accordance with paragraph 19 of the applied methodology AMS III BD, version 01. Which states that The project emissions (PE_y) on account of use of any fossil fuel/electricity consumption associated with transportation of molten metal between recycling facility and casting units and also any incremental auxiliary consumption for the use of the hot metal in casting unit.

Relevant tools such as the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” have been used. In the project case, energy is consumed in transporting the molten metal from the point of melting furnaces located at the recycling facility to the point of use i.e., die-casting machines located at the casting facility. The molten metal is transported in closed ladles carried by Forklifts. One trip of forklift carrying the molten metal comprises of travel from melting furnaces to the weight dispatch centre for weighing and recording of the molten metal in the ladle, from the load dispatch centre to the casting machine at the casting facility, return from the casting facility to the load dispatch centre for weighing and recording the empty weight of the ladle and finally to the melting furnaces to start the trip again. Energy consumption in forklifts for transportation of molten metal is the only energy consumption in the project case. There is no other auxiliary energy consumption in the project activity.

To calculate the project emissions, “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” has been used as the fuel used in the forklift is Diesel. The formula used to calculate project emission using the above referenced tool is:

$$PE_y = FC_{iy} * COEF_{iy}$$

Where

PE _y =	Project emission in year y tonCO ₂ -e
COEF _{iy} =	Is the CO ₂ emission coefficient of diesel in year y (tCO ₂ /mass or volume unit)
FC _{iy} =	Is the quantity of diesel used in forklifts during the year y (mass or volume unit/yr);
I	Type of fuel consumed in year y. Type of fuel consumed is Diesel.

The CO₂ emission coefficient COEF_{i,y} can be calculated using one of the following two Options, depending on the availability of data on the fossil fuel type i, as follows:

Option A: The CO₂ emission coefficient COEF_{i,y} is calculated based on the chemical composition of the fossil fuel type i,

Option B: The CO₂ emission coefficient COEF_{i,y} is calculated based on net calorific value and CO₂ emission factor of Diesel

Since chemical composition of the fossil fuel used i.e. Diesel, is not available, option B has been chosen, which requires NCV of the fuel.

Formula used for option B as per the mentioned tool is as follows:

$$COEF_{iy} = NCV_{iy} * EF_{CO2\ iy}$$

Where,

COEF _{i,y}	Is the CO2 emission coefficient of diesel in year y (tCO2/mass or volume unit)
NCV _{i,y}	Is the weighted average net calorific value of diesel in year y (GJ/mass or volume unit)
EFCO2 _{i,y}	Is the weighted average CO2 emission factor of diesel in year y (tCO2/GJ)
I	Are the fuel types combusted in process j during the year y. Fuel is diesel.

Leakage Emissions (LE_y):

If the energy generating equipment is transferred from another activity leakage is to be considered. However, there is no such transfer of equipment.

The net Emission Reductions:

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated net annual baseline emission reductions:

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Here,

$$BE_y = 66,054 \text{ tCO}_2\text{e}$$

$$PE_y = 1,563 \text{ tCO}_2\text{e}$$

$$LE_y = 0 \text{ tCO}_2\text{e}$$

Hence, $ER_y = 64,491 \text{ tCO}_2\text{e}$ (i.e., 21,497 CoUs/year)

The detailed calculations are referred in an ER excel file and the summary of the calculations are attached to the appendix 1 of this document.

Rational: This final value is conservative as all annualized ER values are rounded down and final sum is considered for reporting, which gives the most conservative result.

The vintage wise break up is given under the ER excel sheet and also included under the Appendix of this report.

C.6. Prior History>>

The project activity has not been registered under any other GHG program for generation or issuance of carbon offsets or credits for the said crediting period.

Also, project has not been applied for any other environmental crediting or certification mechanism under any regional or national or international platforms other than UCR. Hence project will not cause double accounting of carbon credits (i.e., COUs).

C.7. Monitoring period number and duration>>

Number : First Monitoring Period

Duration : 02 years, 11 months

01/01/2023 to 30/11/2025 (inclusive of both dates)

C.8. Changes to start date of crediting period >>

There is no change in the start date of crediting period; the project is applied under UCR with its first crediting period starting from 01/01/2013.

At the time of first verification the respective date of commissioning of the CMR units (for Manesar and Bawal units) and 01/01/2013 (for Haridwar and Gurgaon) has been considered for calculation and reporting.

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

Not Applicable

C.10. Monitoring plan>>

The monitoring plan for the project activity (across all the four units) has been developed in line with the guidance provided in paragraph 17 of the methodology. According to that, quantity of Aluminium alloy supplied to the casting unit is monitored. GHG emission reduction associated with fuel and metal saving due to the project activity is calculated from monitored data, fixed data and default values. The only data that needs to be monitored is the quantity of molten Aluminium supplied to the casting units. The operational and management structure that the project participant will implement in order to monitor the quantity of molten Aluminium (Qy) supplied is explained below.

All required equipment(s) are available at the plant (such as weigh bridge, fuel consumptions, forklift operations, time requirement etc.), hence monitoring of all the required parameters are properly addressed.

The manager of the recycling unit will be responsible to prepare the daily, monthly and annual reports. These reports will be reviewed by the plant head. Quarterly this data will also be reviewed by the plant management. Since the emissions reductions mainly depend on the amount of molten metal supplied, the weigh bridge/scale becomes an important monitoring equipment. Weigh bridge shall be calibrated as per manufacturer's prescription or at least once in five years. All the monitored data and calibration certificates shall be archived and stored (electronically & hard copies) till two years beyond the crediting period.

The basic technical details and the required flow charts are included under the appendix 2, whereas all required monitoring data (both ex-ante and ex-post) are reported below:

Data and Parameters available at validation (ex-ante values):

Data / Parameter	UCR recommended emission factor
Data unit	tCO ₂ /MWh
Description	A "grid emission factor" refers to a CO ₂ emission factor (tCO ₂ /MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO ₂ /MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardNov2021updatedVer2_301121081557551620.pdf
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid

Additional Comment	The combined margin emission factor as per CEA database (latest version of 2022) results into higher emission factor. Hence for 2021-22 vintage UCR default emission factor remains conservative.
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Data / Parameter	T _{amb}			
Data unit	°C			
Description	Ambient Temperature at the casting unit.			
Source of data	Either of the options can be followed during the verification: Option 1: as per the applied Small Scale methodology AMS III BD version 01. Option 2: Take the ambient temperature T _{amb} = 100°C as a default value.			
Value applied	Unit Reference	Location Reference	Default value	
	Unit 1	Haridwar (Uttarakhand)	54	
	Unit 2	Gurugram (Haryana)	39	
	Unit 3	Manesar (Haryana)	44	
	Unit 4	Bawal (Haryana)	54	
Measurement methods and procedures	Default value, taken from credible public sources.			
Monitoring frequency	Ex-ante fixed parameter			
Purpose of Data	For the calculation of baseline emissions			
Additional Comment	The option 1 as per methodology has been prescribed as the ex-ante default value. However, during the verifications such values have been used such that the results are conservative. For example, the temp. default value for Bawal plant is considered to be 54 instead of 44 as referred in the PCN which is mainly due to achieve conservativeness as production data for this plant is highest amongst all other plants.			

Data / Parameter	El_{AP}
Data unit	MWh (electricity)/tonne molten aluminium alloy
Description	Emission factor for primary aluminium production from virgin inputs
Source of data	As per Paragraph 12 of the applied methodology AMS III BD. Conservative default value of 7.3 MWh (electricity)/tonne molten aluminium alloy can be applied if the host country is net exporter of aluminium. Here annual report 2008-09 and 2012-13 of the Ministry of Mines, Government of India has been taken to demonstrate that India has been a net exporter of primary aluminium during the year. This value shall be validated for each crediting period using credible document.

Value applied	Unit Reference	Location Reference	Default value
	Unit 1	Haridwar (Uttarakhand)	7.3
	Unit 2	Gurugram (Haryana)	7.3
	Unit 3	Manesar (Haryana)	7.3
	Unit 4	Bawal (Haryana)	7.3
Measurement methods and procedures	Default value given in Paragraph 12 of the applied methodology AMS III BD has been taken.		
Monitoring frequency	Ex-ante fixed parameter		
Purpose of Data	For the calculation of baseline emissions		
Additional Comment	In case if it cannot be demonstrated for any particular crediting year that India is a net exporter of primary Aluminium, then the value of emission factor shall be discounted using baseline correction factor of 0.63 for that year.		

Data / Parameter	η_{furnace}															
Data unit	Fraction															
Description	Efficiency of the melting furnace															
Source of data	The efficiency value of the type of furnace used has been taken from the Table 1 on efficiency of furnaces given in Paragraph 10 point number (a).															
Value applied	Values taken for respective units: <table><tr><th>Unit Reference</th><th>Location Reference</th><th>Applied value</th></tr><tr><td>Unit 1</td><td>Haridwar (Uttarakhand)</td><td>100</td></tr><tr><td>Unit 2</td><td>Gurugram (Haryana)</td><td>85.14</td></tr><tr><td>Unit 3</td><td>Manesar (Haryana)</td><td>87.3</td></tr><tr><td>Unit 4</td><td>Bawal (Haryana)</td><td>80</td></tr></table>	Unit Reference	Location Reference	Applied value	Unit 1	Haridwar (Uttarakhand)	100	Unit 2	Gurugram (Haryana)	85.14	Unit 3	Manesar (Haryana)	87.3	Unit 4	Bawal (Haryana)	80
Unit Reference	Location Reference	Applied value														
Unit 1	Haridwar (Uttarakhand)	100														
Unit 2	Gurugram (Haryana)	85.14														
Unit 3	Manesar (Haryana)	87.3														
Unit 4	Bawal (Haryana)	80														
Measurement methods and procedures	Based on plant records															
Monitoring frequency	Ex-ante fixed parameter															
Purpose of Data	For the calculation of baseline emissions															
Additional Comment	For conservative and reasonable estimation, value has been derived from the plant records, in line with the methodology para 10(a)															

Data / Parameter	B
Data unit	%
Description	Percentage loss of aluminium due to oxidation during the process of re-melting of ingots
Source of data	Based on the methodology default value, as per Para 13 (a)
Value applied	4

Measurement methods and procedures	Default value as per methodological choice.
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of baseline emissions
Additional Comment	The selected default value shall be used for the crediting period and updated at renewal of crediting period

Data and Parameters to be monitored (ex-post monitoring values):

Data / Parameter	Q _y																	
Data unit	Tons																	
Description	Quantity of molten Aluminium supplied to the casting unit in year y.																	
Source of data	Plant records																	
Measurement procedures (if any):	Primary records maintained at the plant or copy of invoice of supply of molten Aluminium alloy, and the MIS records etc.																	
Measurement Frequency:	On a continuous basis.																	
Value applied:	Annual avg. value from eachplant records considered, as follows: <table><tr><th>Unit Reference</th><th>Location Reference</th><th>Applied value in tons</th></tr><tr><td>Unit 1</td><td>Haridwar (Uttarakhand)</td><td>17,741</td></tr><tr><td>Unit 2</td><td>Gurugram (Haryana)</td><td>14,146</td></tr><tr><td>Unit 3</td><td>Manesar (Haryana)</td><td>12,924</td></tr><tr><td>Unit 4</td><td>Bawal (Haryana)</td><td>22,424</td></tr></table>			Unit Reference	Location Reference	Applied value in tons	Unit 1	Haridwar (Uttarakhand)	17,741	Unit 2	Gurugram (Haryana)	14,146	Unit 3	Manesar (Haryana)	12,924	Unit 4	Bawal (Haryana)	22,424
Unit Reference	Location Reference	Applied value in tons																
Unit 1	Haridwar (Uttarakhand)	17,741																
Unit 2	Gurugram (Haryana)	14,146																
Unit 3	Manesar (Haryana)	12,924																
Unit 4	Bawal (Haryana)	22,424																
QA/QC procedures applied:	Not applicable, primary records are considered which are available and be cross checked from the plant records (i.e. supply invoices).																	
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.																	
Any comment:	Total quantity applied under the current monitoring period across the plants are as follows: <table><tr><th>Unit Reference</th><th>Location Reference</th><th>Applied value (in tons)</th></tr><tr><td>Unit 1</td><td>Haridwar (Uttarakhand)</td><td>81,884</td></tr><tr><td>Unit 2</td><td>Gurugram (Haryana)</td><td>0</td></tr><tr><td>Unit 3</td><td>Manesar (Haryana)</td><td>52,963</td></tr><tr><td>Unit 4</td><td>Bawal (Haryana)</td><td>49,702</td></tr></table>			Unit Reference	Location Reference	Applied value (in tons)	Unit 1	Haridwar (Uttarakhand)	81,884	Unit 2	Gurugram (Haryana)	0	Unit 3	Manesar (Haryana)	52,963	Unit 4	Bawal (Haryana)	49,702
Unit Reference	Location Reference	Applied value (in tons)																
Unit 1	Haridwar (Uttarakhand)	81,884																
Unit 2	Gurugram (Haryana)	0																
Unit 3	Manesar (Haryana)	52,963																
Unit 4	Bawal (Haryana)	49,702																

Data / Parameter	EF_{fossil fuel}
Data unit	tCO ₂ /MJ
Description	Weighted average CO₂ emission factor of FO in year y CO₂ emission factor (tonCO₂/MJ) of the fossil fuel which would have been consumed at the casting unit to which the molten metal is being supplied. For the purpose of determining the fuel, it is to be considered that the fuel used at the recycling facility and the casting unit is the same. The fossil used in recycling facility is FO. As per the applied methodology AMS III BD, paragraph 9, for the purpose of determining the fuel, it is to be considered that the fuel used at the recycling facility and the casting unit is the same. Fuel used at the recycling facility is FO. Hence, the fuel used in the baseline is FO.

Source of data	IPCC default value of emission factor for FO at the upper limit of uncertainty at a 95 % confidence interval as provided in table 1.4 of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC guidelines on National Greenhouse Gas inventories. This option is applicable as option B has been applied since, emission factor value of FO is not provided by the fuel supplier in the fuel supply invoices.
Measurement procedures (if any):	Not applicable as IPCC default value is being taken
Measurement Frequency:	Not applicable
Value applied:	78.8×10^{-3}
Monitoring equipment	Not applicable
QA/QC procedures applied:	Not applicable
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	This value shall be fixed for the entire crediting period. However, in case of any future revision of the IPCC, the value shall be taken into account based on conservativeness.

Data / Parameter	FC _{iy}																	
Data unit	m ³ /yr																	
Description	Quantity of High Speed Diesel (HSD) combusted in fork lifts to transport molten Aluminium during the year y																	
Source of data	Onsite Measurements																	
Measurement procedures (if any):	Diesel used in forklifts is measured and recorded and filled in the forklifts on a daily basis. Daily records are maintained for the consumption of Diesel in the forklifts.																	
Measurement Frequency:	Continuous																	
Value applied:	Diesel consumption valuefrom each plant records considered, as follows, whereas actual avg calculated values are reported below in Comment section: <table><tr><th>Unit Reference</th><th>Location Reference</th><th>Applied value</th></tr><tr><td>Unit 1</td><td>Haridwar (Uttarakhand)</td><td>2.25 l/hr</td></tr><tr><td>Unit 2</td><td>Gurugram (Haryana)</td><td>2.5 l/hr</td></tr><tr><td>Unit 3</td><td>Manesar (Haryana)</td><td>2.5 l/hr</td></tr><tr><td>Unit 4</td><td>Bawal (Haryana)</td><td>3 l/hr</td></tr></table>			Unit Reference	Location Reference	Applied value	Unit 1	Haridwar (Uttarakhand)	2.25 l/hr	Unit 2	Gurugram (Haryana)	2.5 l/hr	Unit 3	Manesar (Haryana)	2.5 l/hr	Unit 4	Bawal (Haryana)	3 l/hr
Unit Reference	Location Reference	Applied value																
Unit 1	Haridwar (Uttarakhand)	2.25 l/hr																
Unit 2	Gurugram (Haryana)	2.5 l/hr																
Unit 3	Manesar (Haryana)	2.5 l/hr																
Unit 4	Bawal (Haryana)	3 l/hr																
Monitoring equipment	Not applicable																	
QA/QC procedures applied:	Average consumption of diesel in the forklifts can be cross checked with the mileage as rated by the forklift manufacturer.																	
Purpose of data:	The Data/Parameter is required to calculate the project emission.																	
Any comment:	For the purpose of annual value which can be used for calculation, other parameters shall be considered such as total number of trip by the fork lift, time required, density, NCV etc. The final values considered during verification process are: <table><tr><th>Unit Reference</th><th>Location Reference</th><th>Applied value (in tons)</th></tr></table>			Unit Reference	Location Reference	Applied value (in tons)												
Unit Reference	Location Reference	Applied value (in tons)																

	Unit 1	Haridwar (Uttarakhand)	30
	Unit 2	Gurugram (Haryana)	0
	Unit 3	Manesar (Haryana)	30
	Unit 4	Bawal (Haryana)	84

Data / Parameter	NCV _{k,y}
Data unit	GJ/mass or volume unit
Description	Weighted average net calorific value of diesel used in the forklifts in year y
Source of data	The fossil fuel used in running forklifts to transport molten metal is diesel. IPCC default value for NCV of diesel at the upper limit of uncertainty at a 95 % confident interval as provided in table 1.2 of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC guidelines on National Greenhouse Gas inventories. This option is applicable as option B has been applied as carbon fraction of diesel is not available in fuel invoices.
Measurement methods and procedures	Plant level records
Frequency of monitoring/recording	Sample basis
Value applied	44.3
Measurement methods and procedures	Not applicable as IPCC default value is being taken.
Purpose of Data	The Data/Parameter is required to calculate the project emission.
Comments	Applicable since option B is applied. This value shall be fixed for the entire crediting period. However, in case of any future revision of the IPCC, the value shall be taken into account based on conservativeness.

Data / Parameter	EFCO _{2iy}
Data unit	tCO ₂ /MJ
Description	Weighted average CO ₂ emission factor of diesel in year y
Source of data	The fossil used for running forklifts to transport molten metal is diesel. IPCC default value of emission factor for diesel at the upper limit of uncertainty at a 95 % confidence interval as provided in table 1.4 of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC guidelines on National Greenhouse Gas inventories. This option is applicable as option B has been applied as emission factor value of diesel is not available in the fuel supply invoices.
Measurement procedures (if any):	Not applicable as IPCC default value is being taken
Measurement Frequency:	Not applicable
Value applied:	74.8 x 10 ⁻³
Monitoring equipment	Not applicable
QA/QC procedures applied:	Not applicable

Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	This value shall be fixed for the entire crediting period. However, in case of any future revision of the IPCC, the value shall be taken into account based on conservativeness.

Thus, monitoring plan includes recording of all required parameters in line with the methodology. However, PCN has kept the provision that any amendment, addition, deletion of data/parameters required to establish the actual monitoring practices of the project units shall be reported during the first verification and required changes to the monitoring plan shall be proposed under deviations.

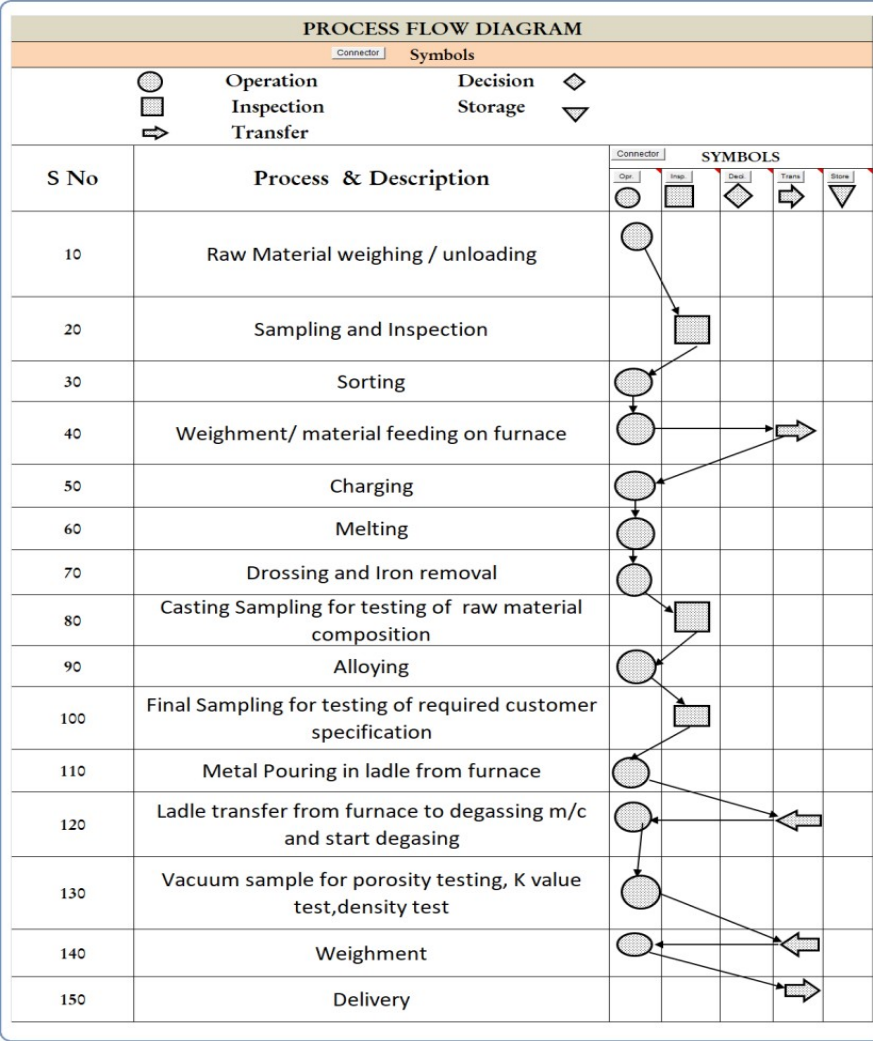
Currently, there was no such deviations applied. However, values were considered and treated into the equations to achieve the most conservative results. The summary of the overall emission reductions achieved during the entire monitoring period, as follows:

	Year 2023	Year 2024	Year 2025	Total
Plant-1 -CMR Bawal	6,870	10,449	11,851	29170
Plant-2 -CMR Gurgaon	-6	0	0	-6
Plant-3-CMR Manesar	6,439	6,214	5,986	18,639
Plant-4 -CMR Haridwar	3,827	6,365	6,496	16,688
Total	17,130	23,028	24,333	64,491
			Average:	21,497 tCOUs

Appendix 1:

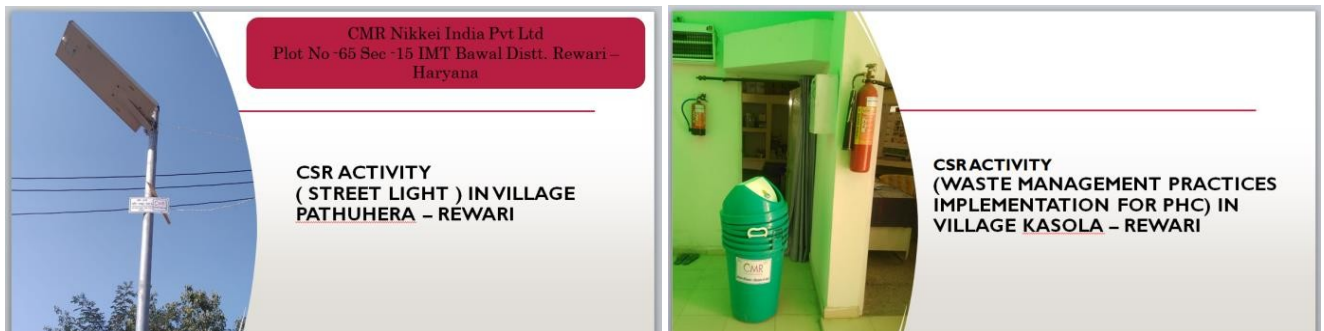
Technical specification/key technical parameters of the project plants are as follows:

References:	Unit - CMR Manesar	Unit - CMR Gurgaon	Unit - CMR Haridwar	Unit - CMR Bawal
Project Type:	Recycling of Aluminum scrap	Recycling of Aluminum scrap	Scrap Recyling Aluminum Base (non feross)	Ferrous and Non - ferrous metal extraction involving different furnaces through melting, refining, -processing, casting and alloy re making
Main Project equipment:	Melting & Holding Furnace,Bag house,Utility equipment	Melting & Holding Furnace,Bag house,Utility equipment	Melting 6MT ton 2 no's ,Melting 10 MT 2 no's & Holding 15 MT Furnace, 1 No's 8MT , D.G SET 250 KVA ,380 KVA Rotary sieve Tumbler m/c furnace charger MTS degassing caster machine ,Air screw compressor ,air dryer, ACB Panel transformer 1000 KVA	Melting Furnace,Holding Furnace,DG Set, Bag House,Caster, degassing Machine,Cooling tower & Rotary Sieve
Main Product & sub-products:	Aluminum alloy (liquid)	ss	Aluminum Alloy (Liquid+solid)	Aluminium Alloy (Molten & Solid Ingot)
Installed capacity as per commissioned documents:				
(I) Input Raw material capacity per day:	100	72 MT	110 mt/ Per Day	124.5 MT
(II) Product output against the input raw material, per day:	95% of input	95% of input	90.0%	95 % of Raw Material
Any change (addition / decrease/ increase) in original capacity:	No	no	No	No
Technical specifications:	3 Melting furnace and 3 Holding furnace 220 Kw bag house	Melting & Holding furnace	5 Melting 10 MT 2 no's,6MT 3 no's 4 Holding Furnaces 15MT,8MT,5MT 2 no's	Regenerative melting furnace, Bag house for emission control, Holding furnace Metal holding and maintaing Temperature of molten aluminum Rotary Sieve for Scrap handling & caster for Solid ingot
Raw material required per kg output of the main product?	105%	105%	1.1 kg	105% of Output Material



Appendix 2:

Some glimpses of the CSR related activities of CMR Group are presented below:



टीबी मरीजों को बांटे गए पोषाहार

हरिद्वार। सामुदायिक स्वास्थ्य केंद्र बहादुराबाद में सीएमआर ग्रीन टैक्निक्स लिमिटेड कंपनी सिडकुल रोशनाबाद ने प्रधानमंत्री टीबी मुक्त भारत अभियान से 21 टीबी मरीजों को गोद लिया है। जिन्हें बुधवार को कंपनी प्रबंधन की ओर से निक्षय मित्र बनकर पोषण आहार वितरण किया गया। चिकित्सा अधिकारी डॉ. तरुण मिश्रा, डॉ. हेमंत आर्य, प्रेरणा, सुधीर, दिनेश पंत, कंपनी प्लांट हेड महेश त्यागी रहे। संवाद

मूर्ति को तन्य, मानंद

ललिताम्बा के साथ राष्ट्रव्यापी आन्दोलन चलाया उनके आन्दोलन ने तत्कालीन सरकार को झुकाने का काम किया था। गौरक्षा आन्दोलन हेतु उन्होंने जेलयात्रा भी की।

हरिद्वार व बद्रीनाथ धाम में श्री मानव कल्याण आश्रम के माध्यम से सेवा प्रकल्पों का निरन्तर संचालन कर रहा है।

स्वामी कल्याणानन्द सरस्वती जी महाराज की छठी पुण्यतिथि के अवसर पर

देवी ट्रस्ट की कोषाध्यक्ष रेणुका बेन एल. ठक्कर, स्वामी कमलानन्द, स्वामी प्रसादानन्द, हंसानन्द सरस्वती, सुरेन्द्र मिश्रा, ब्रह्मजीत समेत अनेक गणमान्यजन उपस्थित रहे।

सीएमआर कंपनी ने अपने सीसीआर के तहत वृद्ध आश्रम रावली महदूद में प्रदान की गीजर



गोखा द्वारा बहुत साफ र से देनी

—सुखदेव सिंह

बहादुराबाद, 12 जनवरी। सिडकुल स्थित सीएमआर ग्रीन टेक्नोलॉजिज लिमिटेड कंपनी ने अपने सीएसआर फंड से रावली महदूद स्थित आश्रय गृह वृद्धाश्रम को सोलर वाटर हीटर प्रदान किया। इस अवसर पर कंपनी के प्लांट हेड महेश त्यागी व

एचआर हैड ऋषि तिवारी मौजूद रहे। कंपनी के एचआर हैड ऋषि तिवारी ने बताया कि कंपनी द्वारा समय समय पर जरूरतमंद संस्थाओं को आवश्यक वस्तुएं देती रही हैं। उन्होंने बताया कि कंपनी द्वारा औरंगाबाद गांव के प्राथमिक स्कूलों व स्वास्थ्य संस्थानों को भी आवश्यक वस्तुएं

उपलब्ध कराती रही हैं और आगे भी इसी प्रकार करवाई रहेगी। इस अवसर पर रामराज ग्रामोद्योग संस्थान के प्रोजेक्ट को ऑर्डिनेटर चंद्रप्रकाश शर्मा ने बताया कि वर्तमान में संस्थान में 25 वृद्ध निवास कर रहे हैं जिनकी समूची देखभाल संस्थान की ओर से की जाती है। उन्होंने बताया कि सीएमआर ग्रीन कंपनी द्वारा पूर्व में भी संस्थान को बेड, कूलर व अन्य आवश्यक सामग्री दी जाती रही है। उन्होंने संस्थान की ओर से कंपनी का धन्यवाद किया। इस अवसर पर संस्थान के प्रबंधक राजेन्द्र शर्मा, नेहा, भगवानदास आदि लोग उपस्थित थे।

ड़ा पहुंचकर लेमनग्रास की खेती का जायजा



हुये वहां के निदेशक ने बताया कि पहले यहां पर पथरीली जमीन थी, जिस पर काफी मेहनत करने के पश्चात, यहां पर ये पॉली हाउस स्थापित किये गये हैं। मुख्य विकास विकास अधिकारी यहां सबसे पहले सीड लैस खीरा उत्पादित करने वाले पॉली हाउस में पहुंचे, जहां एक निश्चित तापमान पर इस मौसम में भी सीडलैस खीरे की खेती की जा रही है। इसके बाद वे

सूचना
नाम परिवर्तन
सर्वसाधारण को सूचित किया जाता है कि

Appendix 3:

Summary of final net emission reductions of each plant during the current monitoring period:

(CoUs from 01/01/2023 to 30/11/2025)

	Total	Unit
Plant-1 -CMR Bawal	29170	CoUs
Plant-2 -CMR Gurgaon	-6	
Plant-3-CMR Manesar	18639	
Plant-4 -CMR Haridwar	16688	
Total	64491	

	Total (tCO2e)		
	Baseline	Project	Net
Plant-1 -CMR Bawal	29994	824	29170
Plant-2 -CMR Gurgaon	0	6	-6
Plant-3-CMR Manesar	18933	294	18639
Plant-4 -CMR Haridwar	17127	439	16688
Total	66054	1563	64491

Appendix 4: Plant wise yearly breakup:

(Commercially sensitive information are stroked-out due to confidentiality)

CMR – Bawal Unit

TABLE 2:

BASELINE EMISSION (CMR Bawal)				
$BE_{fuel,y}$				
	Plant - Bawal			
	Year 2023	Year 2024	Year 2025	Units
Q_y	19963	27291	33666	tons
T_{amb}	44	37	41	$^{\circ}C$
$\eta_{furnace}$	0.86	0.86	0.86	Fraction
β	1	1	1	%
EI_{AP}	7.8	7.8	7.8	CAMS III BD (Version 01)
$EF_{CO_2, grid,y}$	0.49	0.49	0.49	UCR Database
$EF_{fossil fuel}$	76.6	76.6	76.6	$t CO_2/TJ$
Equations applied for $BE_{fuel,y}$ & $BE_{metal,y}$:				
$BE_{fuel,y} = Q_y * [\{ 1.07 * (660 - T_{amb}) + 390 \} / \eta_{furnace}] * EF_{fossil fuel}$				
$BE_{metal,y} = (\beta * Q_y * EI_{AP} * EF_{CO_2, grid,y}) / 100$				
$BE_{fuel,y}$	2016	3042	3419	$t CO_2$
$BE_{metal,y} =$	5126	7698	8696	$t CO_2$
Basline Emission BE_y	7141	10739	12114	$t CO_2$
Total BEy 29994 tCO2e				

Annual Avg,
31190

Total
81884

$\eta_{furnace}$: Calculated average based on plant record

TABLE 3:

Project Emission PE (CMR Bawal)				
$PE_{FC,y}$				
	Year 2023	Year 2024	Year 2025	Units
FC_y	62	66	99	t
NCV_y	44.3	44.8	44.2	GJ/t
$EF_{CO_2,y}$	54.9	54.9	54.9	tCO_2 /TJ
$COEF_y$	3.31	3.31	3.31	tCO_2 /t
Project Emission $PE_{FC,y}$	244	249	266	tCO_2
Total PEy 824 tCO2e				
$PE_y = FC_{iy} * COEF_{iy}$				
$COEF_{iy} = NCV_{iy} * EF_{CO_2 iy}$				
Net ERs tCO2e =	6870	10449	11851	tCO2e
Net Emission reductions tCO2e =		29170	tCO2	

Annual Avg,
83

99645.33333

CMR – Gurgaon Unit

TABLE 2:

BASELINE EMISSION (CMR Gurgaon)						
BE _{fuel,y}						
	Plant - Gurgaon					
	Year 2023	Year 2024	Year 2025	Units	Annual Avg,	Total
Q _y	0	0	0	tons	0	0
T _{amb}	33	33	33	° C		
η _{furnace}	0.8514	0.8514	0.8514	Fraction	η _{furnace} : Calculated average based on plant record	
β	1.88	1.88	1.88	%		
EI _{AP}	7.8	7.8	7.8	CAMS III BD (Version 01)		
EF _{CO₂, grid,y}	0.98	0.98	0.98	UCR Database		
EF _{fossil fuel}	78.8	78.8	78.8	t CO ₂ /TJ		
Equations applied for BE _{fuel,y} & BE _{metal,y} :		GHG associated with fuel saving (BE _{fuel,y}), is calculated as follows:				
		BE _{metal,y} = (β * Q _y * EI _{AP} * EF _{CO₂, grid,y}) / 100				
BE _{fuel,y}	0	0	0	t CO ₂		
BE _{metal,y} =	0	0	0	t CO ₂		
Basline Emission BE _y	0	0	0	t CO ₂		
Total BE _y		0 tCO ₂ e				

TABLE 3:

TABLE 3:

Project Emission PE (CMR Gurgaon)				
$PE_{FC,y}$		$PE_y = FC_{iy} * COEF_{iy}$	$COEF_{iy} =$	$NCV_{iy} * EF_{CO_2\ iy}$

TABLE 2:

BASELINE EMISSION (CMR Manesar)				
BE _{fuel,y}				
	Plant -Manesar			
	Year 2023	Year 2024	Year 2025	Units
Q _y				tONS
T _{amb}				° C
η _{furnace}				Fraction
β				%
EI _{AP}				CAMS III ED (Version 01)
EF _{CO₂,grid,y}				LCR Database
EF _{fossil fuel}				tCO ₂ / TJ
Equations applied for BE _{fuel,y} & BE _{metal,y} :		BE _{fuel,y} = Q _y * [(1.07 * (660 - T _{amb}) + 390) / η _{furnace}] * EF _{fossil fuel}		
		BE _{metal,y} = (β * Q _y * EI _{AP} * EF _{CO₂,grid,y}) / 100		
BE _{fuel,y}	1735	1674	1607	tCO ₂
BE _{metal,y}	4814	4646	4459	tCO ₂
Baseline Emission E	6548	6320	6065	tCO₂
Total BE_y	18933	tCO ₂ e		

Annual Avg.
17323Total
52963η_{furnace} : Calculated average based on plant record

TABLE 3:

Project Emission PE (CMR Manesar)				
PE _{FC,y}				
		PE _y = FC _{iy} * COEF _{iy}		COEF _{iy} = NCV _{iy} * EF _{CO₂ iy}
	Year 2023	Year 2024	Year 2025	Units
FC _y				t
NCV _y				GWh
EF _{CO₂,y}				tCO ₂ / TJ
COEF _y				tCO ₂ / M
Project Emission P	105	100	100	tCO₂
Total PE_y	294	tCO ₂ e		
Net ERs tCO₂e =	6439	6214	5986	
Net Emission reductions tCO₂e =		18639	tCO₂	

Annual Avg.
30

CMR – Haridwar Unit

TABLE 2:

BASELINE EMISSION (CMR Haridwar)						
BE _{fact,y}						
	Plant - Haridwar					
	Year 2023	Year 2024	Year 2025	Units	Annual Avg.	Total
Q _y				tons	16567	49702
T _{amb}				°C		
η _{furnace}				Fraction	η _{furnace} : Calculated average based on plant records =	
β				%		
EI _{ap}				CAMS III ED (Version 01)		
EF _{CO₂,grid,y}				LCR Database		
EF _{fossil fuel}				tCO ₂ / tJ		
Equations applied for BE _{fact,y} & BE _{net,y} :		BE _{fact,y} = Q _y * [(1.07 * (660 - T _{amb}) + 390) / η _{furnace}] * EF _{fossil fuel}				
		BE _{net,y} = (β * Q _y * EI _{ap} * EF _{CO₂,grid,y}) / 100				
BE _{fact,y}	950	1543	1574	tCO ₂		
BE _{net,y}	3050	4956	5057	tCO ₂		
Baseline Emission B	3999	6498	6630	tCO ₂		
Total BE _y	17127	tCO ₂ e				

TABLE 3:

TABLE 6:

Project Emission PE (CMR Haridwar)					
PE _{rc,y}		$PE_y = FC_y * COEF_{ly}$		$COEF_{ly} = NCV_{ly} * EF_{CO2 ly}$	
	Year 2023	Year 2024	Year 2025	Units	Annual Avg.
FC _y				t	44
NCV _y				GWh	
EF _{CO2,y}				tCO ₂ / TJ	
COEF _y				tCO ₂ / H	
Project Emission P				tCO ₂	
Total PE _y		439 tCO ₂ e			
Net ERs tCO ₂ e =	3827	6365	6496	tCO ₂ e	
Net Emission reductions tCO ₂ e =		16688	tCO ₂		