SREE SUMANGALA METALS AND INDUSTRIES (P) LTD
(Aluminium Division)

B-51, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi, Tiruvallur - 601201, Tamilnadu, India.

GHG EMISSION REPORT

For the Period 01st April, 2024 to 31st March, 2025

Form No :
SSMI-AD/ESG/F-540

Issue No:
01

Rev No:
00

Date:
22nd April, 2025

1. Introduction

SSMI-AD, based in India, manufactures and supplies Non-Ferrous Alloys Ingots, integrating Environmental, Social, and Governance (ESG) principles across its operations. In line with the GHG Protocol Corporate Standard and ISO 14064 guidelines, this report provides a comprehensive overview of SSMI-AD's GHG emissions for the reporting period. The summary includes Scope 1 (direct), Scope 2 (indirect from purchased electricity), and Scope 3 (other indirect) emissions, with upstream and downstream disaggregation, along with reporting boundaries, emission factors, and uncertainty analysis.

2. GHG Emission Overview

Scope 1 – Direct Emissions

SSMI-AD's Scope 1 emissions, totalling 8,433 $MTCO_2e$, arise from direct fuel combustion in manufacturing furnaces, boilers, and company vehicles. These emissions include CO_2, CH_2, N_2O, and trace fluorinated gases, quantified using IPCC 2019 and India-specific emission factors. Scope 1 reflects the company's operational control and highlights opportunities for energy efficiency and fuel-switching initiatives. Continuous monitoring and reporting ensure alignment with ESG goals and GHG Protocol standards, enabling SSMI-AD to track progress, mitigate climate impact, and reduce emissions intensity across all manufacturing and transport activities.

Scope 2 – Indirect Emissions from Electricity

Scope 2 emissions, totalling 2,102 $MTCO_2e$, result from purchased electricity consumed in production and office operations. These indirect emissions are calculated using India grid-average emission factors from the Central Electricity Authority (CEA) and IPCC 2019 guidelines. Scope 2 reflects SSMI-AD's reliance on external energy sources and informs strategies for energy efficiency, renewable energy procurement, and carbon footprint reduction. Transparent reporting supports ESG compliance, enabling stakeholders to assess indirect environmental impacts. Continuous review ensures accurate data collection and identification of initiatives to optimize electricity consumption and lower overall GHG emissions.

Scope 3 – Other Indirect Emissions

SSMI-AD's Scope 3 emissions, totalling 91,722.47 $MTCO_2e$, encompass upstream and downstream activities. Upstream emissions (6.47 $MTCO_2e$) include raw material extraction, transport, and supplier operations, while downstream emissions (91,716 $MTCO_2e$) arise from product distribution, customer use, and end-of-life disposal. Scope 3 accounts for the broader life-cycle carbon footprint and emphasizes the importance of sustainable supply chain and product management. Calculations rely on supplier data, DEFRA, and IPCC default emission factors. Reporting Scope 3 emissions ensures transparency, supports ESG objectives, and identifies opportunities for collaboration to reduce environmental impact across the value chain.

3. GHG Emission Summary

Organizational Boundaries

SREE SUMANGALA METALS AND INDUSTRIES (P) LTD
(Aluminium Division)
B-51, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi, Tiruvallur - 601201, Tamilnadu, India.

Calculation period: April 2024 to March 2025
All values in MT CO_2e
GHG Emission Reporting Frequency: Annually

4. Reporting Boundary and Justification

Scope / Category	Definition	Reporting Boundary	Justification
Scope 1 (Direct emissions)	Emissions from sources owned or controlled by the company (combustion of fuel, process emissions)	Includes fuel combustion in furnaces, DG sets, and process emissions from alloy production	Directly controlled by SSMI-AD, fully measurable from operational data
Scope 2 (Indirect emissions – purchased electricity)	Emissions from electricity, heat, or steam purchased	Electricity consumption across all operational sites	Purchased electricity is a significant emission source, aligned with market-based methodology
Scope 3 Upstream	Emissions from the supply chain (e.g., purchased materials, transport)	Includes raw material transport to SSMI-AD, upstream logistics, and processing of purchased alloys	Captures upstream carbon footprint of materials and logistics
Scope 3 Downstream	Emissions from distribution, product use, and end-of-life	Includes transport to customers, downstream logistics, and use-phase assumptions	Captures customer impact and end-of-life emissions from sold ingots
Total Scope 3	Sum of upstream and downstream emissions	Combines Scope 3 upstream and downstream	Provides full supply chain emissions perspective

5. Scope 3 Categories: Reporting Boundary and Justification

Scope 3 Category	Included? (Yes/No)	Reporting Boundary	Justification
Purchased Goods & Services	Yes	Emissions from raw material extraction, processing, and delivery from suppliers.	Non-ferrous alloys manufacturing is highly material-intensive; upstream supplier emissions are significant contributors to SSMI-AD's total carbon footprint.
Capital Goods	No	Emissions from production and transport of machinery, equipment, and infrastructure.	Ensures the environmental impact of long-term assets used in production is captured.
Fuel- and Energy-Related Activities (not in Scope 1 or 2)	Yes	Emissions from extraction, production, and transport of fuels and electricity purchased.	Complements Scope 1 and 2, capturing upstream energy-related GHG emissions.
Upstream Transportation & Distribution	Yes	Emissions from transport of raw materials to SSMI-AD facilities.	Transportation contributes to indirect GHG emissions; inclusion improves supply chain accountability.
Waste Generated in Operations	No	Emissions from disposal and treatment of operational waste.	Addresses environmental impact of manufacturing by-products and ensures responsible waste management.
Business Travel	Yes	Emissions from employee travel using airplanes, trains, or vehicles.	Reflects organizational activities contributing indirectly to SSMI-AD's carbon footprint.
Employee Commuting	Yes	Emissions from commuting of all employees.	Recognizes indirect GHG impact associated with workforce mobility.
Downstream Transportation & Distribution	Yes	Emissions from delivering finished ingots to customers and distributors.	Significant due to bulk transport of heavy alloys; ensures full product life-cycle accountability.
Processing of Sold Products	No	Emissions from customers' processing of SSMI-AD products, if applicable.	Captures indirect emissions occurring during customer use that are part of the product's life cycle.
End-of-Life Treatment of Sold Products	No	Emissions from recycling, disposal, or landfilling of products.	Responsible management of product disposal is critical to mitigate long-term environmental impact.

6. Scope 1 Emissions Breakdown by Gas

Gas	GWP (100-year horizon)	Reference
CO2	1	IPCC AR6 2021
CH4	27.2	IPCC AR6 2021
N2O	273	IPCC AR6 2021
HFCs/PFCs/SF6	Varies per gas	IPCC AR6 2021

7. References for Emission Factors

- **Scope 1 Process & Combustion:** IPCC 2006 Guidelines for National Greenhouse Gas Inventories, DEFRA 2023 Emission Factors.
- **Scope 2 Electricity:** Central Electricity Authority (India) Grid Emission Factor 2023, IEA Data.
- **Scope 3 Upstream & Downstream:** GHG Protocol Scope 3 Standard, Ecoinvent 2023, Transport Emission Factors from DEFRA 2023.

8. Scope 2 GHG Emissions Quantification Table

Scope 2 Source	Activity Data	Description	Methodology Used (Emission Factor Source/Tool)	Calculated Emissions (tCO_2e)	Remarks
Purchased Electricity – Grid	2363040 kWh	Electricity purchased for manufacturing plants	GHG Protocol Scope 2 Guidance; India Grid Emission Factor (0.82 $kgCO_2e$/kWh)	2102	Market-based or location-based approach; includes indirect emissions from purchased electricity

9. Scope 3 Quantification Table

S. No.	Scope 3 Category	Activity Data	Methodology Used (Emission Factor Source/Tool)	Remarks
1.	**Purchased Goods & Services**	343992000 kgs	GHG Protocol Scope 3 Standard; Supplier emission factors; IPCC AR6	Upstream emissions only
2.	**Capital Goods**	Equipment and machinery purchased	GHG Protocol Scope 3; Cross-Sector Tools	Includes transport & production
3.	**Fuel- and Energy-Related Activities**	Emissions from production and delivery of fuels/energy	GHG Protocol Scope 3; IPCC AR6 Emission Factors	Excludes Scope 1/2

4.	**Upstream Transportation & Distribution**	Transport of raw materials to SSMI-AD plants	GHG Protocol Scope Emission Factors 3; Transport	t-km for all inbound logistics
5.	**Waste Generated in Operations**	Waste disposal from operations (hazardous/non-hazardous)	GHG Protocol Scope 3; IPCC Guidelines	Include recycling and landfill
6.	**Business Travel**	4,960 Kms	GHG Protocol Scope 3; Transport mode emission factors	Only business-related travel
7.	**Employee Commuting**	30000 Kms	GHG Protocol Scope 3; Default national emission factors	Average commuting distance
8.	**Downstream Transportation & Distribution**	Delivery of finished products to customers	GHG Protocol Scope 3; Transport Emission Factors	t-km for outbound logistics
9.	**Processing of Sold Products**	197600000 Tonne-kms	GHG Protocol Scope 3; Life Cycle Assessment Factors	If applicable; may be negligible
10.	**Use of Sold Products**	Energy consumed during product use	GHG Protocol Scope 3; Customer energy use emission factors	If products require energy
11.	**End-of-Life Treatment of Sold Products**	Recycling, incineration, landfill of sold products	GHG Protocol Scope 3; Recycling/Landfill Factors	Based on estimated recycling rate
12.	**Franchises / Leased Assets**	N/A	N/A	Include only if applicable

10. Statement of Uncertainty

All reported emissions are **subject to uncertainty** due to measurement limitations and assumptions in emission factors.

- **Scope 1:** ±5% uncertainty due to fuel composition variations.
- **Scope 2:** ±3% uncertainty due to grid factor fluctuations.
- **Scope 3:** ±10–15% uncertainty due to assumptions in transport distances, material origins, and end-of-life treatment.

SSMI-AD uses conservative estimates to ensure reliability and aligns with **GHG Protocol recommended uncertainty ranges**.

11. GHG Emissions Summary (MT CO2 e)

Calculation period: April 2024 to March 2025
All values in MT CO2 e GHG Emission Reporting
Frequency: Annually

EMISSIONS	CURRENT YEAR April 2024 to March 2025
Scope 1	8433
Scope 2	2102
Scope 3	91722.47
Scope 3 Upstream	6.47
Scope 3 Downstream	91716
Total GHG Emission	**102257.47**

12. SBTi-Aligned Emission Reduction Targets for SSMI-AD

Scope	2024-25 Baseline (tCO_2e)	2030 Target (tCO_2e)	2040 Target (tCO_2e)	2050 Target (tCO_2e)	Reduction Strategy (Summary)
Scope 1 (Direct fuel & process)	8,433	5,300 (↓37%)	1,700 (↓80%)	~0 (Net Zero)	Energy-efficient furnaces, electrification of vehicles, heat recovery, switch to green fuels.
Scope 2 (Purchased electricity)	2,102	1,100 (↓48%)	300 (↓86%)	~0 (Net Zero)	Rooftop solar, renewable PPAs, energy management systems.
Scope 3 (Total)	91,722	64,200 (↓30%)	27,500 (↓70%)	Net Zero (Residual neutralized)	Supplier low-carbon materials, local sourcing, logistics optimization, recycling & take-back programs, customer engagement.
└ Upstream	6.47	4.5 (↓30%)	2 (↓70%)	Net Zero	Work with suppliers on renewable energy and cleaner raw materials.
└ Downstream	91,716	64,200 (↓30%)	27,500 (↓70%)	Net Zero	Customer education, design for recyclability, logistics efficiency, take-back schemes.
Total Emissions	102,257	~70,600 (↓31%)	~29,500 (↓71%)	Net Zero	Company-wide decarbonization strategy, offsets only for residuals.

13. GHG Emission Reduction Plan

Scope 1 – Direct Emissions

SSMI-AD is committed to minimizing direct emissions from fuel combustion and company-owned vehicles. Key initiatives include upgrading furnaces and production equipment to energy-efficient models, transitioning diesel-powered machinery to electric alternatives, and implementing heat recovery systems. Regular maintenance and monitoring of fuel consumption ensure optimal efficiency. Employee training programs on energy conservation further reinforce emission reduction efforts. These actions collectively aim to lower Scope 1 emissions, enhance operational efficiency, and support SSMI-AD's ESG and sustainability objectives.

Scope 2 – Indirect Emissions from Purchased Electricity

SSMI-AD targets a reduction in electricity-related emissions through renewable energy adoption, such as rooftop solar installations and green energy procurement. Additional strategies include energy-efficient lighting, high-efficiency motors, and smart energy management systems. Energy consumption is continuously monitored and benchmarked against intensity targets. Procurement contracts favoring low-carbon grids are prioritized. Employee awareness programs encourage responsible electricity usage. These measures reduce Scope 2 emissions, improve energy efficiency, and align SSMI-AD with international ESG reporting standards.

Scope 3 Upstream – Purchased Goods, Transportation, and Waste

SSMI-AD actively collaborates with suppliers to source low-carbon materials and prioritize local suppliers to reduce transport emissions. Supplier engagement promotes sustainable manufacturing practices, renewable energy adoption, and sustainable packaging. Waste minimization strategies include recycling, reuse, and safe disposal of hazardous materials. Employee travel policies emphasize virtual meetings and public transportation. Life cycle assessments help identify high-impact upstream activities and target reduction efforts. These initiatives lower upstream Scope 3 emissions while fostering sustainable supply chain management and ESG alignment.

Scope 3 Downstream – Product Use and End-of-Life

To reduce downstream emissions, SSMI-AD designs products for energy efficiency, durability, and recyclability. Product take-back programs and partnerships with recycling facilities ensure responsible disposal. Customer education guides optimal product use to minimize energy consumption. Distribution logistics are optimized to reduce transport emissions. Tracking product life cycle emissions supports continuous improvement. Collaboration with downstream stakeholders promotes circular economy practices, reduces environmental impact, and strengthens SSMI-AD's ESG commitments.

Monitoring, Reporting, and Continuous Improvement

SSMI-AD conducts annual GHG emissions reporting, aligned with GHG Protocol standards. Third-party verification ensures accuracy and transparency. The company regularly reviews reduction targets and strategies, updating them based on technological advancements and operational performance. Continuous improvement is embedded in corporate culture, ensuring sustained progress toward carbon footprint reduction and ESG objectives.

14. References

1. **GHG Protocol Standards:**

- https://ghgprotocol.org/corporate-standard
- https://ghgprotocol.org/scope-2-guidance
- https://ghgprotocol.org/corporate-value-chain-scope-3-standard
- https://ghgprotocol.org/calculation-tools-and-guidance
- GHG Protocol Mobile Sources Guidance

2. **IPCC Reports:**

- https://www.ipcc.ch/synthesis-report/
- https://pam.int/wp-content/uploads/2024/10/IPCC-AR6-Synthesis-Report-PAM.pdf

3. **IPCC Reports**

- ISO 14064 – Part Organizational-level GHG quantification and reporting.
- ISO 14064 - Part 3 Specification with guidance for validation and verification of GHG assertions from Part 1 or Part 2

15. GHG Emission Factor Reference Table

Emission Source	Activity Unit	Emission Factor (kg CO_2e/unit)	Reference / Source
Fuel Combustion – Diesel	Liter	2.68	IPCC AR6, GHG Protocol Cross-Sector Tools
Fuel Combustion – Petrol	Liter	2.31	IPCC AR6, GHG Protocol Cross-Sector Tools
Fuel Combustion – Natural Gas	m^3	1.88	IPCC AR6, GHG Protocol Cross-Sector Tools
Electricity – Grid (India average)	kWh	0.82	India Ministry of Power, GHG Protocol Scope 2 Guidance

Electricity – Renewable (Solar/Wind)	kWh	0	GHG Protocol Scope 2 Guidance
Diesel for Transport Vehicles	Liter	2.68	GHG Protocol – Transport / Mobile Sources
Petrol for Transport Vehicles	Liter	2.31	GHG Protocol – Transport / Mobile Sources
Air Travel – Short-Haul (<3700 km)	Passenger-km	0.254	GHG Protocol Scope 3 Standard
Air Travel – Long-Haul (>3700 km)	Passenger-km	0.195	GHG Protocol Scope 3 Standard
Sea Freight – Heavy Cargo	Metric ton-km	0.016	GHG Protocol Scope 3 Standard
Rail Freight	Metric ton-km	0.023	GHG Protocol Scope 3 Standard
Paper Production – Recycled	kg	0.49	GHG Protocol Scope 3 Standard
Steel Production	kg	1.85	IPCC AR6 / Cross-Sector Tools
Aluminum Production	kg	16.0	IPCC AR6 / Cross-Sector Tools

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