GREAT LAKES INSTITUTE of MANAGEMENT CHENNAI

Emission Inventory Report

For Great Lakes Institute of Management

1st April 2024 to 31st March 2025


GREAT LAKES INSTITUTE OF MANAGEMENT

ACKNOWLEDGEMENT & DECLARATION

We express our sincere gratitude to Great Lakes Institute of Management (Great Lakes, Chennai) for entrusting and providing the opportunity to conduct a GHG emissions inventory.

We acknowledge and greatly appreciate the support given to us, during the data collection process, from the accreditation, finance, procurement, administration, and estate management departments of Great Lakes, Chennai.

We are also thankful to the filed staff of Great Lakes, Chennai for their coordination efforts with the supply chain vendors, service providers, and agencies in providing pertinent measurements and relevant data.

This report is made in good faith based on the information provided by the Great Lakes, Chennai. Diligent care has been taken while making data or calculation related assumptions and reasonable judgements have been made in consultation with the concerned stakeholders of Great Lakes, Chennai. All necessary professional expertise has been applied in preparing this report and the contents there of are a true representation of the facts.

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Abbreviations

AICTE	All India Council for Technical Education
AMBA	Association of MBAs
AR6	IPCC Sixth Assessment Report
BEE	Bureau of Energy Efficiency (India)
BLDC	Brushless Direct Current (motor)
BOD	Biochemical Oxygen Demand
CEA	Central Electricity Authority (India)
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CPCB	Central Pollution Control Board (India)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DG	Diesel Generator
EEIO	Environmentally Extended Input-Output
EF	Emission Factor
EFTSL	Equivalent Full-Time Student Load
FPM	Fellow Program in Management
GHG	Greenhouse Gas
GLIM	Great Lakes Institute of Management
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
INR	Indian Rupee
IPCC	Intergovernmental Panel on Climate Change
Km	Kilometres
KMPL	Kilometres Per Litre
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
MoEFCC	Ministry of Environment, Forest and Climate Change (India)
N_2O	Nitrous Oxide
NBA	National Board of Accreditation (India)
NF_3	Nitrogen Trifluoride
PFC	Perfluorocarbon
PGDM	Post Graduate Diploma in Management
PGPM-FBE	Post Graduate Program in Management – For Business Executives
PGXPM	Post Graduate Executive Program in Management
PPA	Power Purchase Agreement
RE	Renewable Energy
SAQS	South Asian Quality Assurance System
SBR	Sequencing Batch Reactor
SF_6	Sulphur Hexafluoride
STP	Sewage Treatment Plant
T&D	Transmission and Distribution
tCO_2e	Tonnes of Carbon Dioxide Equivalent
US EPA	United States Environmental Protection Agency
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
WTT	Well-To-Tank

Executive Summary

Background

As climate change escalates, higher education institutions have a pivotal role in promoting sustainability. The Great Lakes Institute of Management (Great Lakes, Chennai), Chennai, has taken a proactive step by conducting its first comprehensive Greenhouse Gas (GHG) emissions inventory for the reporting period April 2024 to March 2025. This inventory supports Great Lakes, Chennai's strategic commitment to operational sustainability and climate action.

Great Lakes, Chennai Overview

Founded in 2004, Great Lakes, Chennai is a premier Indian business school offering a wide range of academic programs. Its 30-acre Chennai campus, home to over 1,000 residential students is known for its LEED Platinum certification, cutting-edge infrastructure, and sustainability-oriented initiatives, including: 100% electric in-campus transport, 29.3% renewable energy usage, Biogas and sewage treatment systems, Rainwater harvesting and green landscaping for carbon sequestration.

Methodology and Standards used for GHG Inventorisation

The GHG inventory follows the GHG Protocol Corporate Standard, incorporating:

- Operational Control Approach (covers all on-campus operations)
- Activity data from campus records, utilities, procurement, transport logs
- Emission factors from IPCC, CEA, DEFRA, USEPA, and AR6 GWP values

A materiality-based assessment guided Scope 3 category inclusion, focusing on emissions with high relevance, influence, or reputational importance to Great Lakes, Chennai.

Organisational and Operational Boundaries

- Organisational Boundary: Great Lakes, Chennai campus only
- Operational Boundary: Scope 1 (direct), Scope 2 (purchased electricity), and material Scope 3 emissions from the upstream/downstream value chain. The Key Scope 3 categories identified include: Purchased Goods & Services, Capital Goods, Business Travel, Employee Commuting, Waste Management.

Total GHG Emissions in FY 2024-25 by scope for Great Lakes, Chennai

GHG Emissions Scope	Emissions (tCO_2e)	Percentage
Scope 1 Emissions	245.9	6.13%
Scope 2 Emissions	2,119.8	52.82%
Scope 3 Emissions	1,647.3	41.05%
Total Emissions	4013.0	100%
RE-Based Offsets (Reported Only)	876.5	-

Scope-Wise Emissions Summary

- Scope 1 – Direct Emissions: 245.9 tCO_2e
  - Diesel generators: 96.1 tCO_2e
  - Refrigerant leakage (AC units): 142.4 tCO_2e (58% of Scope 1)
  - Biogas plant, composting, sewage: 7.4 tCO_2e
- Scope 2 – Indirect Electricity Emissions: 2,119.8 tCO_2e
  - Based on 2.9 million kWh of grid-supplied electricity
- Scope 3 – Value Chain Emissions: 1,647.3 tCO_2e
  - Purchased Goods & Services: 752.0 tCO_2e
  - Capital Goods: 512.7 tCO_2e
  - Fuel- and Energy-Related: 91.7 tCO_2e
  - Upstream Transportation: 0.7 tCO_2e
  - Waste generated in operations: 0.1 tCO_2e
  - Business Travel: 146.0 tCO_2e
  - Employee Commuting: 144.0 tCO_2e

Emission Intensity

Emission intensity metrics provide a benchmark for tracking year-on-year improvements and aligning with peer institutions. To provide a more granular view, the total campus community has been segmented into three distinct profiles and the per capita emission intensity for each segment is presented in the following table.

Campus Community Group	Headcount in FY 2024-25	Per Capita Emission Intensity (tCO_2e)
Students only	1,000	4.013
Students + Employees (on payroll)	1,147	3.499
Students + Employees + Contract Staff	1,457	2.754

1 - Introduction

As the global climate crisis accelerates, higher education institutions are uniquely positioned to lead by example in reducing their environmental footprint and promoting sustainability. Business schools, in particular, bear the responsibility of not only training future corporate leaders but also integrating sustainable practices within their own operations. Recognizing this, the Great Lakes Institute of Management, Chennai, has taken a significant step forward by undertaking a comprehensive Greenhouse Gas (GHG) emissions inventory of its Chennai campus for the reporting year April 2024 to March 2025.

This report serves as a baseline assessment of Great Lakes, Chennai's carbon footprint and is intended to support the institute's strategic approach to climate action, operational efficiency, and sustainable campus development.

1.1. Overview of Great Lakes Institute of Management

Established in 2004 by Padma Shri awardee Dr. Bala V. Balachandran, Professor Emeritus at Kellogg School of Management, the Great Lakes, Chennai has emerged as one of India's premier business schools. With campuses in Chennai and Gurgaon, the institute is known for its:

- Industry-driven Curriculum
- World-class Faculty
- Robust Alumni Network
- International collaborations with reputed global management schools such as Cornell University, Chicago Booth, Skema, University of Bordeaux, IESEG, and Frankfurt School
- Approved by AICTE and accredited by AMBA, AACSB, and SAQS

The Chennai campus hosts over 1,000 residential students and offers a diverse portfolio of programs including:

- **PGPM** – One-year full-time flagship program for high-potential professionals
- **PGDM** – Two-year full-time program for emerging young leaders
- **PGPM-FBE** – One-year program designed for family business owners and entrepreneurs
- **PGXPM** – Executive program for working professionals
- **Fellow Program in Management (FPM)** – For academic and research careers

1.1.1. Sustainability at Great Lakes

Reportedly, Great Lakes, Chennai has initiated a variety of sustainability programs across campus operations, demonstrating commitment to environmental and social responsibility. Some of the highlights include:

- **Electrification:** All intra-campus shuttles have been replaced with electric buggies, significantly reducing fossil fuel consumption for campus mobility.
- **Energy Efficiency:** The campus has adopted LED lighting, BLDC fans, BEE-rated air conditioners, and smart meters/thermostats to reduce energy use.

- **Renewable Energy:** A Power Purchase Agreement (PPA) signed in the reporting year enables the purchase of renewable electricity, covering approximately 21.7% of annual consumption in the reporting year. Additionally, an on-site solar PV system has been commissioned, supplies an estimated 7.6% of campus electricity. Combined, these efforts have decarbonized over 29.3% of Great Lakes, Chennai's electricity use. In the coming years, the use of renewable energy is expected to decarbonize the electricity by 2/3 of annual consumption.
- **Waste Management:**
  - A biogas plant (commissioned in February 2025) processes up to 100 kg of food waste per day. The STP plant, uses a Sequential Batch Reactor (SBR) process to treat the sewage generated, which is reused for gardening after treatment and the sludge is handled by municipal authorities and used as manure.
  - Recyclables (paper, plastic, e-waste, metals) are collected and sent to external vendors for recycling.
- **Water Conservation:** A well-designed rainwater harvesting system is in place. Reportedly, further efforts toward low-flow fixtures, leak detection, and reuse systems are being implemented.
- **Built Environment:** The Great Lakes, Chennai campus is the first in South Asia to receive LEED Platinum certification, reflecting its leadership in green building standards.
- **Carbon Sequestration:** The 30-acre green campus boasts diverse flora and fauna, with large areas under grass, shrubs, and trees—including fruit-bearing trees, herbs, and indigenous species. Thecampus has more than 10700 tree and saplings of 67 varieties. Periodic tree plantation drives of up to ten trees per month further enrich the biodiversity and contribute to carbon capture.

As part of these efforts, the GHG inventory project demonstrates Great Lakes, Chennai's proactive role in climate accountability and data-driven sustainability planning.

1.2. Objective and importance of the GHG inventory

The objective is to establish a comprehensive and credible baseline of emissions across Scope 1 (direct emissions), Scope 2 (indirect electricity emissions), and material Scope 3 (indirect value chain emissions).

Great Lakes, Chennai aims to operate as a climate-responsible institution, integrating environmental stewardship into academic, administrative, and infrastructural systems. This GHG inventory represents a foundational step in understanding the institute's carbon footprint, identifying emission hotspots across scopes and categories, establishing a baseline for future emission reduction targets and aligning with national and global climate commitments. The inventory provides actionable insights to support decision-making in infrastructure planning, energy procurement, mobility solutions, and other procurement policies, thereby enabling climate-conscious operations.

1.3. About Reporting Standard

The inventory follows internationally recognized GHG Protocol standards and tools, developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The methodology aligns with the following publications –

- A Corporate Accounting and Reporting Standard, Revised Edition
- Corporate Value Chain (Scope 3) Accounting and Reporting Standard
- Technical Guidance for Calculating Scope 3 Emissions
- GHG Protocol Scope 2 Guidance

All activity data used in this inventory was either sourced directly from Great Lakes, Chennai's administrative departments or derived through stakeholder engagement, utility records, surveys, and procurement documentation. Where applicable, India-specific emission factors (e.g., CEA) and internationally recognized databases (e.g., DEFRA, USEPA EEIO) were used to ensure regional relevance and technical robustness.

2 - Organisational And Operational Boundaries

Establishing clear boundaries is a critical first step in preparing a comprehensive GHG emissions inventory. It ensures that the inventory is accurate, consistent, and aligned with global standards. This section outlines the organisational boundary, operational boundary, and the approach to emissions classification and attribution used in the GHG inventory for Great Lakes, Chennai campus.

2.1. Organisational Boundary and Control Approach

2.1.1. Organisational Boundary: Great Lakes, Chennai Campus

Great Lakes, Chennai operates across two campuses: Chennai and Gurgaon. This GHG inventory is focused exclusively on the 30-acre Chennai campus, which includes academic buildings, administrative facilities, student hostels, dining areas, sports and recreation infrastructure, and various operational utilities. This campus accommodates approximately 1,000 full-time residential students and a range of full-time and part-time faculty and staff.

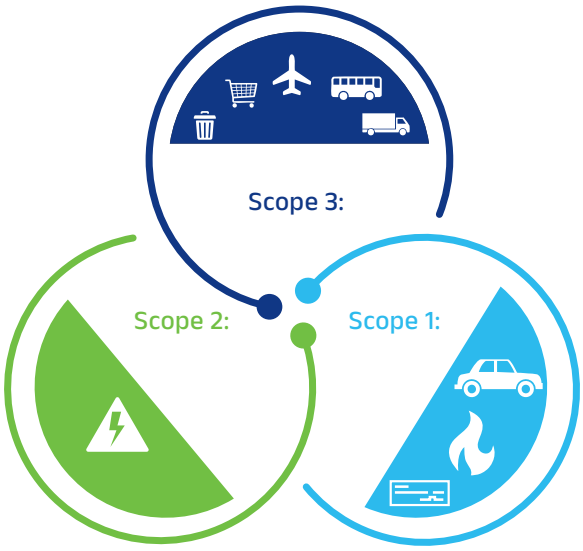
2.1.2. Consolidation Approach: Operational Control

As per the GHG Protocol, three approaches are available to set organisational boundaries: Equity Share Approach, Financial Control Approach and Operational Control Approach.

For this inventory, the Operational Control Approach is adopted. Under this method, the institute accounts for 100% of GHG emissions from operations over which it has full operational control. This approach is particularly suitable for academic institutions like Great Lakes, Chennai, where day-to-day campus operations are directly managed and controlled by the institute.

2.2. Operational Boundary

The GHG Protocol classifies emissions into three scopes:



Scope 1: Direct GHG emissions - Emissions from sources that are owned or controlled by the institution.

Scope 2: Indirect GHG emissions from purchased electricity - Emissions from the generation of electricity, heating, or cooling consumed by the institution but generated off-site.

Scope 3: Other indirect GHG emissions - Emissions that occur in the value chain of the institution, both upstream and downstream.

The operational boundary for GLIM includes all activities, facilities, and operations located within the Great Lakes, Chennai campus. It covers direct emissions from sources owned or controlled by the institution, such as diesel generators, institute-owned vehicles, refrigerant usage for air conditioning, and relevant process emissions from the biogas plant and STP. It also encompasses indirect emissions from purchased electricity, along with selected material Scope 3 categories pertinent to campus operations. These include purchased goods and services, capital goods, business travel, employee and student commuting, and waste generation. This boundary has been defined in alignment with the GHG Protocol to ensure accurate, transparent, and consistent emission inventorisation—enabling Great Lakes, Chennai to effectively monitor, manage, and reduce its carbon footprint.

2.3. Scope 3 Materiality Assessment

The WRI GHG protocol's Scope 3 Standard was referred to identify the relevant Scope 3 categories for Great Lakes, Chennai. The following methodology is adopted for the Scope 3 materiality assessment.

2.3.1. Scope 3 Materiality Assessment Methodology

Scope 3 categories have been evaluated through several criteria to support prioritization and narrow down the focus areas for strategic decarbonisation initiatives for Great Lakes, Chennai.

Scope 3 All Categories

Upstream
1 - Purchased Goods and Services
2 - Capital Goods
3 - Fuel And Energy-Related Activities
4 - Upstream Transportation & Distribution
5 - Waste Generated in Operations
6 - Business Travel
7 - Employee Commuting
8 - Upstream Leased Assets

Downstream
9 - Downstream Transportation and Distribution
10 - Processing of Sold Products
11 - Use of Sold Products
12 - End-of-Life Treatment of Sold Products
13 - Downstream Leased Assets
14 - Franchises
15 - Investments

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Screening and Assessment

1. Benchmarking & Sectoral Trends
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2. Significance of the organisational impacts (discussions with Great Lakes, Chennai stakeholders)
and
Validation from industry reports

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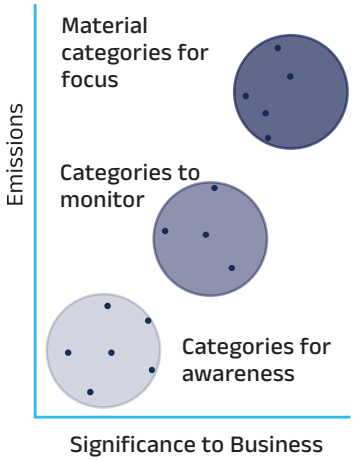


2.3.2. Benchmarking & Sectoral Trends

Benchmarking Scope 3 emissions within the higher education sector is essential for identifying relevant categories and understanding sectoral trends. Scope 3 emissions, encompassing indirect emissions from an institution's value chain, often constitute a significant portion of total GHG emissions in academic institutions. For instance, at Emory University, Scope 3 emissions increased by 80% from 2021 to 2023, highlighting their substantial impact on the university's overall carbon footprint (Ref[1]).

Based on reports from various institutions, the following categories are frequently material:

- **Employee and Student Commuting:** Daily travel to and from campus is a major contributor. Northern Illinois University includes emissions from student and employee commutes in their Scope 3 assessments (Ref[2]).
- **Business Travel:** Air travel for conferences, research, and study abroad programs significantly impact emissions. Emory University reported that emissions from air travel and study abroad are notable components of their Scope 3 emissions (ref[3]).
- **Purchased Goods and Services:** Procurement of goods and services contributes to indirect emissions. Institutions are increasingly focusing on supply chain emissions, recognizing their substantial role in the overall carbon footprint. Most of the educational institutions referenced above account for emissions associated with purchased goods and services as part of their GHG inventories.
- **Waste Management:** Emissions from solid waste disposal and sewage treatment are also

[1] https://sustainability.emory.edu/wp-content/uploads/2024/08/Emorys-2023-Greenhouse-Gas-Emissions-Inventory-Design.pdf
[2] https://www.hr.niu.edu/sustainability/_files/niu-greenhouse-gas-inventory-report.pdf
[3] https://sustainability.emory.edu/wp-content/uploads/2024/08/Emorys-2023-Greenhouse-Gas-Emissions-Inventory-Design.pdf
[4] https://www.coloradocollege.edu/offices/sustainability/topics/GHG-23-Technical-Report.pdf

considered. Southern Oregon University includes these in their Scope 3 reporting (ref[4]).

- **Capital Goods:** Emissions from the production of capital goods like infrastructure and equipment are relevant, though less frequently reported.

The higher education sector is increasingly emphasizing comprehensive GHG inventories that include Scope 3 emissions. Institutions are adopting standardized frameworks, such as the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard, to ensure consistency and comparability. There is also a trend toward improving data collection methodologies, engaging stakeholders across the value chain, and integrating sustainability into procurement policies.

2.3.3. Significance of Organisational Impacts (viewed through the Great Lakes, Chennai Lens)

Understanding the significance of organisational impacts is critical for determining the relevance and prioritization of emission sources within the GHG inventory. This assessment goes beyond quantitative emission volumes and considers the strategic, operational, reputational, and educational importance of specific activities to the institution. At Great Lakes, Chennai, this significance has been evaluated through internal consultations with stakeholders, including leadership, administrative teams, facility managers, and sustainability advocates.

A series of internal dialogues were conducted with key Great Lakes, Chennai stakeholders across departments—including administration, operations, academics, and finance—to understand which activities are most integral to Great Lakes, Chennai's identity, mission, and future direction. These discussions revealed that the significance of various emission sources is shaped by their alignment with institutional values, visibility among stakeholders, and potential for operational or reputational risk and opportunity.

Key insights are summarized below:

1. Energy Use and Electricity Consumption

a. **Why it Matters:** As an academic institution with a residential campus, electricity is central to delivering uninterrupted teaching, research, and student life.

b. **Stakeholder View:** There is strong recognition of energy's contribution to the carbon footprint and a clear mandate to transition towards clean energy. Accordingly, efforts have been made to increase the procurement of renewable energy (RE), both through power purchase agreements (PPAs) and onsite renewable installations. In the reporting year, 29.3% of total electricity consumption was met through renewable energy, with a commitment to further increase this share in the coming years.

c. **Institutional Impact:** High – both in terms of Scope 2 emissions and visibility; energy efficiency and renewable procurement are already high-priority focus areas.

2. Procurement of Goods and Services

a. **Why it Matters:** Great Lakes, Chennai's large-scale procurement especially in food services, security services, IT infrastructure, facility management, sewage treatment services -represents a significant share of Scope 3 emissions.

b. **Stakeholder View:** While these emissions are less visible, they are increasingly being acknowledged as vital due to their indirect impact and potential for sustainable procurement practices.

c. **Institutional Impact:** With clear opportunities for emissions reduction through vendor engagement, green procurement policies, and lifecycle considerations.

3. Commuting and Mobility

a. **Why it Matters:** With faculty, staff, and service providers commuting regularly, transport represents one of the major logistical and environmental challenge.

b. **Stakeholder View:** Emissions from employee commuting through transport facilities are significant and solutions like route optimization, or electric fleet transition, were discussed as future interventions.

c. **Institutional Impact:** Medium to High – relevant in Scope 3 and crucial for decarbonizing operations tied to campus accessibility and working culture.

4. Capital Infrastructure and Development

a. **Why it Matters:** The Chennai campus continues to invest in infrastructure to support academic expansion and residential facilities.

b. **Stakeholder View:** While infrequent, these investments carry a high embedded carbon impact and reflect l ong-term sustainability commitments. During the reporting period, Great Lakes, Chennai has been investing in the development of a new hostel, which is expected to be completed in the next financial year.

c. **Institutional Impact:** Medium – capital goods are relevant to Scope 3 and critical to consider with respect to the campus expansion and green building initiatives.

5. Business Travel

a. **Why it Matters:** Faculty and staff engage in travel for conferences, admissions, collaborations, and academic outreach.

b. **Stakeholder View:** Although travel is essential, there is a growing recognition of the potential to adopt digital alternatives or implement carbon-conscious travel planning. It was also acknowledged that improving data collection efforts is crucial for enhancing the accuracy and completeness of emission calculations, and necessary steps will be taken to support this.

c. **Institutional Impact:** Medium – potential for reduction, though balanced with the academic mission and brand-building efforts.

6. Waste Generation and Management

a. **Why it Matters:** Waste, especially food waste, is a visible and operational issue linked to sustainability, hygiene, and compliance.

b. **Stakeholder View:** The newly installed biogas and STP systems are viewed as achievements, but continuous monitoring and waste reduction are seen as necessary next steps.

c. **Institutional Impact:** Moderate – more symbolic and operational than emission-intensive, but strongly aligned with sustainability values.

7. Refrigerant Use (Fugitive Emissions)

a. **Why it Matters:** Refrigerants, although used in small quantities, are potent GHGs.

b. **Stakeholder View:** There is awareness, but high willingness to adopt more sustainable cooling technologies over time.

c. **Institutional Impact:** Low to Moderate – technically significant due to high Global Warming Potential (GWP), but lower on strategic visibility.

Based on the significance of impacts within the Scope 3 category, the materiality assessment is linked to multiple criteria, including: Size (scale of emissions), Influence (ability to drive change), Risk (potential financial, regulatory, or reputational implications), Stakeholder Interest (concerns of investors, communities, and other stakeholders), Outsourcing (degree of control over external impacts), Sector Guidance (industry-specific best practices), and Spending or Revenue Analysis (level of expenditure or financial relevance).

	Scope 3 Category	Evaluation Criteria						
		Size	Influence	Risk	Stakeholder	Outsourcing	Sector Guidance	Spending or Revenue Analysis
Upstream	1 - Purchased Goods and Services	High	Medium	Low	Medium	High	Medium	High
	2 - Capital Goods	High	Medium	Low	Medium	High	Medium	High
	3 - Fuel- and Energy-Related Activities	Low	Low	Low	Low	Low	Medium	Medium
	4 - Upstream Transportation and Distribution	Low	Low	Medium	Low	High	Medium	Medium
	5 - Waste Generated In Operations	Medium	Medium	Medium	Medium	High	Medium	Medium
	6 - Business Travel	Medium	Medium	Low	Medium	Medium	Medium	Medium
	7 - Employee Commuting	Medium	Low	Low	Medium	High	Medium	Medium
	8 - Upstream Leased Assets	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
Downstream	9 - Downstream Transportation and Distribution	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	10 - Processing of Sold Products	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	11 - Use of Sold Products	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	12 - End-of-Life Treatment of Sold Products	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	13 - Downstream Leased Assets	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	14 - Franchises	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant
	15 - Investments	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant	Not Relevant

2.4. Green House Gases included in the Inventory

The GHG inventory for GLIM includes GHGs relevant to its operations, in line with international reporting standards. The GHG Protocol recommends accounting for the following seven greenhouse gases covered under the Kyoto Protocol: Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur Hexafluoride (SF_6), and Nitrogen Trifluoride (NF_3). For the purpose of this inventory, the GHGs that are relevant to GLIM's operations have been considered.

All emissions are reported as CO_2-equivalents (CO_2e) to provide a standardized measure that reflects the relative global warming impact of each GHG. This is done by multiplying the mass of each gas emitted by its Global Warming Potential (GWP).

2.4.1. Global Warming Potentials (GWP)

GHGs differ in both their residence time in the atmosphere and their radiative efficiency—that is, their ability to trap heat in the Earth's atmosphere. Some gases, such as Methane (CH_4) and Nitrous Oxide (N_2O), are more effective at trapping heat than Carbon Dioxide (CO_2), while others like Hydrofluorocarbons (HFCs) can have thousands of times more warming impact per molecule. Because of these differences, the Global Warming Potential (GWP) metric was developed to provide a standardized way to compare the climate impact of different gases over a given time horizon. GWPs convert emissions of various GHGs into a common unit—Carbon Dioxide Equivalent (CO_2e)—to enable consistent reporting and aggregation.

This inventory uses 100-year GWP values from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6), reflecting the most recent scientific consensus at the time of reporting. This approach is consistent with the recommendations of the GHG Protocol and is widely adopted in corporate and institutional carbon accounting.

3. Methodology, Data Sources & Assumptions

This section outlines the methodological framework, data sources, emission factors, and key assumptions used for the GHG emissions inventorisation at GLIM. The analysis encompasses Scope 1, Scope 2, and relevant Scope 3 emissions.

3.1. Methodology

The methodology adopted for this inventorisation adheres to the guidelines of the GHG Protocol Corporate Accounting and Reporting Standard and references supplementary guidance from the Intergovernmental Panel on Climate Change (IPCC), India-specific data from Central Electricity Authority (CEA), etc.

The three scopes covered are:

- Scope 1: Direct emissions from on-campus fuel combustion (e.g., diesel for generators).
- Scope 2: Indirect emissions from purchased electricity.
- Scope 3: Other indirect emissions relevant to campus activities (e.g., commuting, purchased goods, waaste).

Where suitable activity data and emission factors were available, business activities outlined under the GHG Protocol Standard were assessed and reported. GLIM provided the activity data based on the operational information recorded and/or with certain assumptions. The assumptions were explicitly stated in Assumptions section.

The following process was followed to ensure a robust approach:

1. The project team provided Great Lakes, Chennai with a detailed data request list outlining the necessary information on potential GHG-emitting activities across campus operations.
2. GLIM's administration and facility management teams collected and shared data on fuel use, electricity consumption, procurement, transportation, business travel and waste related activities.
3. The project team reviewed all supplied activity data for completeness and clarity.
4. Clarifications were sought where necessary. Guidance was also provided to GLIM team to improve the quality and accuracy of data collection.
5. Suitable methodologies and emission factors were applied to calculate GHG emissions across identified scopes and categories.
6. Calculations were conducted in accordance with the GHG Protocol Standard.

   While the data provided by GLIM is considered complete and sufficient for calculation of emissions, the data has not been audited or independently verified.

3.2. Data Collection Methods and Sources

To estimate the GHG emissions across Scope 1, Scope 2, and relevant Scope 3 categories, both primary and secondary data sources were utilized. Primary data was collected directly from institutional records and stakeholder inputs, while secondary data provided standardized emission factors and methodological guidance. The following outlines the key data sources used in the assessment:

1. Primary Data Collection

- Campus Utility Records: Diesel purchase logs, electricity bills, and Sewage treatment plant data.
- Administration: Mode of transport, frequency, distance travelled by faculty, staff, and students.
- Procurement Records: Annual spending and categories of purchased goods and services.
- Waste Data: From campus facilities and housekeeping teams.

2. Secondary Data Sources

- Emission Factors: IPCC 2006 Guidelines, GHG Protocol tools and databases, India-specific factors from CEA (Electricity Emission Factors, 2023), CPCB and MoEFCC guidelines for waste management
- Global Warming Potentials (GWP): IPCC Sixth Assessment Report (AR6)

3.3. Assumptions and Limitations

The following assumptions and limitations were considered during the GHG emissions inventorisation for the Great Lakes, Chennai campus. These helps clarify the scope, methodology, and potential uncertainties in the data and calculations:

- **Diesel Consumption:** It is assumed that all recorded diesel consumption was solely for DG operations. No other use cases (e.g., transport or machinery) were included.
- **Petrol Consumption:** The consumption is estimated using the expenses details (in INR) provided and the average petrol price of 100INR in Chennai.
- **Combustion Emissions Methodology:** Stationary combustion emissions were calculated using a fuel-based approach, i.e., volume of diesel consumed (in litres) multiplied by appropriate emission factors (EF).
- **Electricity Consumption:** Grid electricity consumption was based on actual utility bills for the reporting year. Any discrepancies due to unmetered areas or billing delays are not accounted for.
- **Grid Emission Factor:** The latest available grid emission factor from the Central Electricity Authority was applied.
- **Commuting Frequency Assumption:** Weekly commuting was assumed to occur 5 days per week for approximately 40 weeks per year, accounting for academic schedules and holidays.
- **Procurement Emissions Methodology:** A spend-based approach was used for estimating emissions from purchased goods and services. Annual expenditure in various categories was multiplied by emission factors from the USEPA EEIO database.
- **Currency Adjustments:** Procurement data in Indian Rupees was adjusted and converted to USD, using 2022 average exchange rates as the latest supply chain emission factors are available for 2022.
- **Business Air Travel:** It is assumed that a flight covering a distance of 1,000 km incurs an average cost of INR 6,000, which is used as the basis for estimating emissions from business travel.
- **Employee Commuting by Buses:** It is assumed that institute out-sourced buses run for an average of 22 working days per month, based on a standard academic schedule excluding weekends and holidays. Additionally, for the purpose of fuel consumption estimation, the average mileage of the buses is assumed to be 8 km per litre (kmpl). These assumptions are used to calculate fuel-based emissions from staff commuting via institutional transport.

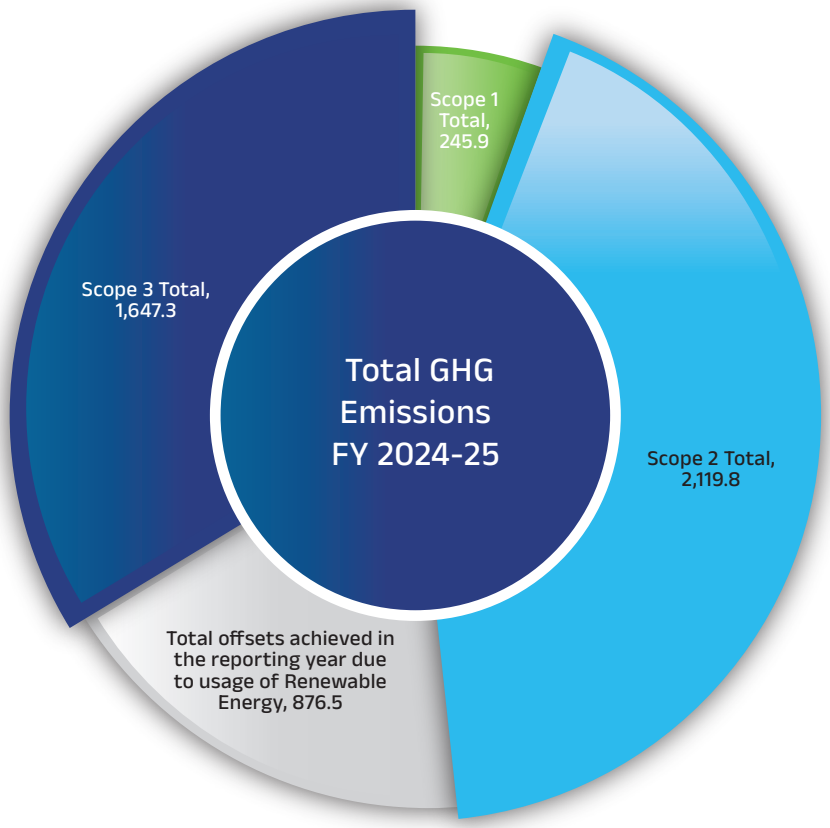
4. Emission Inventory FY 2024-25

The total GHG emissions for the GLIM for the reporting year April 2024 to March 2025 are estimated at 4,013 tCO_2e. These emissions have been categorized under Scope 1, Scope 2, and Scope 3 as per the GHG Protocol standards.
A breakdown of emissions by scope is presented in Table 4.1, along with their respective contributions by each scope to the total GHG footprint. A graphical representation is provided in Figure 4.1 to illustrate the relative share of each scope.

Table 4.1: Total GHG Emissions in FY 2024-25 by scope for GLIM

GHG Emissions Scope	Emissions (tCO_2e)	Percentage
Scope 1 Emissions	245.9	6.13%
Scope 2 Emissions	2,119.8	52.82%
Scope 3 Emissions	1,647.3	41.05%
Total Emissions	4013.0	100%
RE-Based Offsets (Reported Only)	876.5	-

Figure 4.1: Total GHG Emissions in FY 2024-25 by Scope for GLIM



4.1. Scope 1 Emissions

Scope 1 GHG emissions are direct emissions from sources that are owned or controlled by the institution. For Great Lakes, Chennai, these emissions arise from the combustion of fuels in generators and vehicles, biological and waste treatment processes, and fugitive refrigerant releases from air-conditioning systems.

The total Scope 1 emissions for the reporting year are estimated at 245.9 tCO_2e. The breakdown of emission sources is presented in Figure 4.2 and summarized in Table 4.2.

Figure 4.2: Scope 1 Emissions Breakdown by Activity (in tCO_2e)

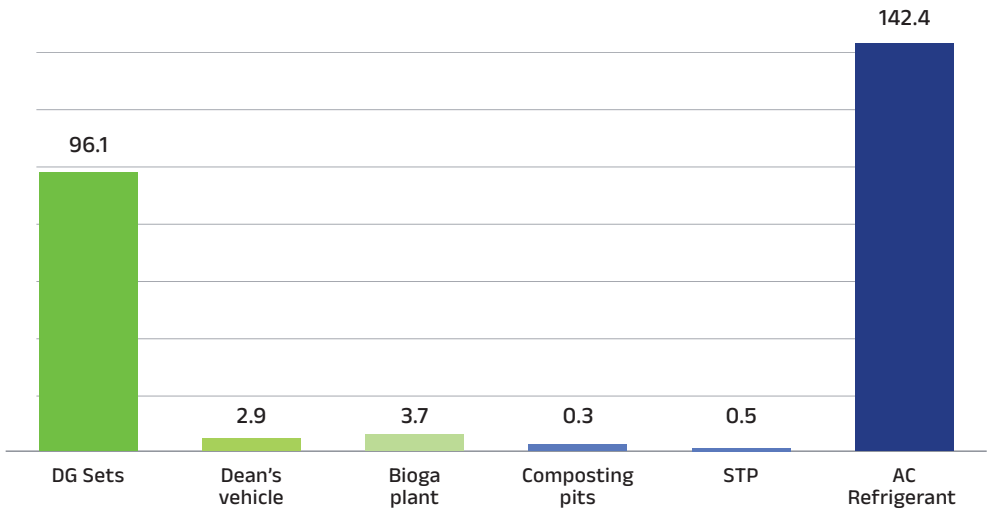


Table 4.2: Scope 1 Emissions Summary

Scope 1 Activity	Activity data	Emissions (tCO_2e)	Percentage
Stationary Emissions			
Diesel Generators	33,255.3 litres of diesel consumed	96.1	39.1%
Mobile Emissions			
Dean's vehicle	1,200 litres of petrol consumed	2.9	1.2%
Process Emissions			
Biogas Plant (Food Waste)	175 kg of biogas generated	3.7	1.5%
Conventional Composting	24,480 kg of food waste composted	0.3	0.1%
Sewage Treatment Plant (STP)	35,164 kilolitres of sewage treated	0.5	0.2%
Fugitive Emissions			
Air Conditioning Systems (Split, Ductable, VRF)	Refrigerant leakage from various AC units	142.4	57.9%
Total Scope 1 Emissions	-	245.9	100%

The data for diesel consumption used in the campus diesel generators was provided by GLIM and reportedly sourced from logbooks maintained at the generator sites. Petrol consumption associated with the Dean's vehicle was estimated based on average monthly fuel expense data shared by GLIM.

Process emissions from the biogas plant were estimated using the total volume of gas generated and its composition, as provided by GLIM. Emissions from conventional composting activities were calculated based on the quantity of food waste processed on campus.

For the sewage treatment plant (STP), emissions were estimated based on the total volume of sewage treated and the level of Biological Oxygen Demand (BOD) reduction achieved. The STP reportedly operates using aerobic treatment through eco-SBR (Sequential Batch Reactor) technology.

4.2. Scope 2 Emissions

Scope 2 GHG emissions are indirect emissions resulting from the consumption of purchased electricity, which is generated off-site but consumed within the institution. These emissions form a significant portion of the carbon footprint for educational campuses due to the substantial energy demand from academic blocks, administrative offices, residential hostels, and other facilities.

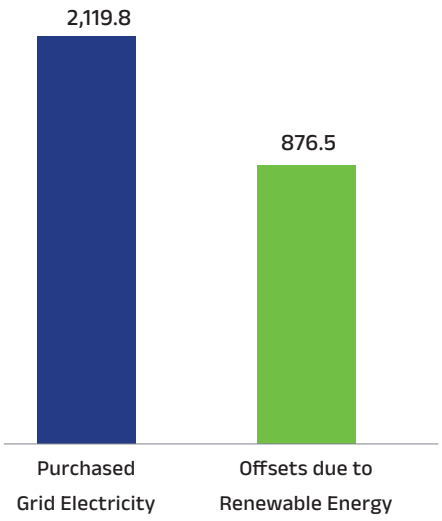
During the reporting period April 2024 to March 2025, GLIM consumed a total of 4,121,590 kWh of electricity. Of this:

- 2,915,885 kWh (70.7%) was sourced from the conventional grid, contributing to Scope 2 emissions.
- 1,205,705 kWh (29.3%) was sourced from renewable energy (RE) — comprising onsite solar generation (7.6%) and purchased renewable electricity via Power Purchase Agreements (PPAs) (21.7%).

Note: Only grid-sourced electricity is accounted for under Scope 2 emissions. Electricity generated from or purchased as renewable energy is excluded from Scope 2 calculations. However, in this report, the emissions avoided due to renewable energy use are reported separately as "offsets" to highlight GLIM's transition toward cleaner energy. These offsets are explicit and not be used to calculate net emissions.

The total Scope 2 emissions attributable to grid electricity consumption are estimated at 2,119.8 tCO_2e. The offsets achieved due to renewable energy usage are estimated at 876.5 tCO_2e. A visual representation is provided in Figure 4.3, and a summary of Scope 2 emissions and RE offsets is presented in Table 4.3.

Figure 4.3: Scope 2 Emissions & RE Offsets (in tCO_2e)



The electricity consumption data used in the analysis was provided by GLIM and reportedly sourced from monthly utility bills for the reporting period.

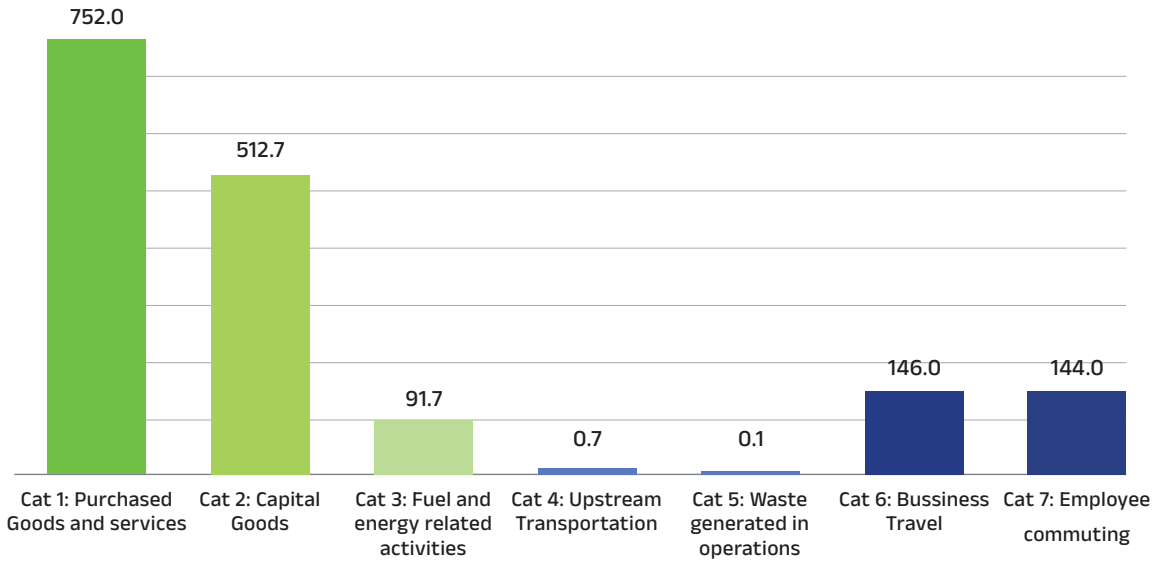
Scope 2 Activity	Activity data (tCO_2e)	Emissions	Percentage
Purchased Electricity from grid	2,915,885 kWh of grid electricity consumed	2,119.8	100%
Total Scope 2 Emissions	-	2,119.8	100%
RE-Based Offsets (Reported Only)	1,205,705 kWh from both onsite solar + renewable PPAs	876.5 (offset)	-

4.3. Scope 3 Emissions

Scope 3 GHG emissions are indirect emissions that occur outside the boundaries of the institution, arising from upstream and downstream activities associated with GLIM's operations. These emissions occur at various points in the value chain, including procurement, outsourced services, commuting, and waste management.

For the reporting year April 2024 to March 2025, the total Scope 3 emissions for GLIM are estimated at 1,647.3 tCO_2e. A breakdown of these emissions by category is illustrated in Figure 4.4 and presented in Table 4.4, with detailed explanations provided in the following subsections.

Figure 4.4: Scope 3 Emissions Breakdown by Category



Category 1: Purchased Goods & Services	Activity data	Emissions (tCO_2e)	Percentage
Category 1: Purchased Goods & Services	30,40,42,372 INR spent on various purchased goods and services during the reporting year	752.0	45.7%
Category 2: Capital Goods	18,76,66,825 INR spent on various capital goods during the reporting year	512.7	31.1%
Category 3: Fuel and energy related activities	The same fuel and electricity consumption data used for Scope 1 and 2 GHG emissions estimation is used for this category	91.7	5.6%
Category 4: Upstream transportation	1,00,000 INR spent on transportation of kitchen consumables during the reporting period	0.7	0.04%

Category 5: Waste generated in operations	Waste generation and disposal data were considered for the estimations	0.1	0.01%
Category 6: Business Travel	32,13,000 INR spent on business travel during the reporting period	146.0	8.9%
Category 7: Employee commuting	Employee commuting includes 666 km/day by bus, 150 km/day by two-wheeler, and an estimated 33,000 km of cab travel per month	144.0	8.7%
Total Scope 3 Emissions	-	1,647.3	100%

4.3.1 : Scope 3 Category 1: Purchased Goods & Services

Category 1 of Scope 3 covers emissions resulting from the procurement of goods and services, such as stationery, IT equipment, facility management, food services, consulting, etc. These emissions occur during the production, processing, and delivery stages of the goods and services that GLIM purchases, even though they occur outside the campus premises.

Emissions under this category were estimated using the spend-based method, where annual procurement expenditures were multiplied by corresponding emission factors from the USEPA EEIO database.

For the reporting period, Scope 3 Category 1 emissions are estimated at 752.0 tCO_2e, accounting for approximately 45.7% of GLIM's total Scope 3 emissions. The activity-wise summary is presented in Table 4.4a.

Table 4.4a: Scope 3 Category 1: Purchased Goods & Services Emissions Summary

Scope 3 Activity	Scope 3 Activity Spend (INR)	Emissions (tCO_2e)	Percentage
Category 1 Purchased Goods & Services			
Facility management services	5,41,41,520	381.6	51%
Food services	7,06,59,187	113.7	15%
Marketing services (advertising etc.)	7,30,93,776	69.5	9%
Security services	3,45,91,786	53.6	7%
IT items & infrastructure	2,90,63,265	50.7	7%
Maintenance consumables	83,80,000	25.3	3%
Furniture	78,14,000	23.4	3%
Software services (webhosting, etc.)	83,27,718	9.4	1%
Landscaping services	54,00,000	6.8	1%
AC maintenance	54,21,000	5.0	1%
Healthcare services (medical etc.)	23,10,000	4.1	1%
Consulting services	22,91,024	2.2	0%
Stationery items (pens, paper, etc.)	5,61,041	1.8	0%
STP maintenance	2,21,000	1.6	0%
R&D services	7,29,609	1.4	0%
Gifts	5,73,446	1.3	0%
DG maintenance	1,17,000	0.2	0%
Electrical switch gears maintenance	1,45,000	0.1	0%
Lift maintenance	1,13,000	0.1	0%
Transformer maintenance	89,000	0.1	0%
Hospitality services (stay etc.) - Outstation	0	0	0.0%
Legal services	0	0	0.0%
Total Category 1 Emissions	-	752.0	100%

The procurement spend data used for this analysis was provided by GLIM and sourced from the Finance Department for the reporting period.

4.3.2: Scope 3 Category 2: Capital Goods

Category 2 of Scope 3 includes GHG emissions associated with the procurement of capital goods, such as construction of buildings, infrastructure development, machinery, and vehicles. These emissions are attributed to the manufacturing, processing, and transportation of capital goods, even though the emissions occur off-site.

For this assessment, emissions under this category were calculated using the spend-based method, where annual capital expenditure was multiplied by relevant emission factors from the USEPA EEIO database.

For the reporting year April 2024 to March 2025, Scope 3 Category 2 emissions are estimated at 512.7 tCO_2e, accounting for approximately 31.1% of GLIM's total Scope 3 emissions. The activity-wise breakdown is provided in Table 4.4b.

Table 4.4b: Scope 3 Category 2: Capital Goods Emissions Summary

Scope 3 Activity	Spend (INR)	Emissions (tCO_2e)	Percentage
Category 2 Capital Goods			
New Hostel Construction	102,000,000	278.6	54.3%
Other Infrastructure Construction	84,516,825	230.9	45.0%
Kitchen Equipment / Hostel Machines	800,000	2.2	0.4%
Buggies	350,000	1.0	0.2%
Total Category 2 Emissions	**-**	**512.7**	**100%**

The capital expenditure data used for this analysis was provided by GLIM's Finance Department for the reporting period.

4.3.3 Scope 3 Category 3: Fuel- and Energy-Related Activities

Category 3 of Scope 3 emissions covers upstream emissions associated with the production and delivery of purchased fuels and purchased electricity, which are not included in Scope 1 or Scope 2. This includes:

- Well-to-Tank (WTT) emissions from the extraction, refining, and transportation of fuels used in diesel generators and vehicles.
- Transmission and Distribution (T&D) losses during the delivery of grid electricity to the campus.

Emissions in this category were estimated using DEFRA-published emission factors for both WTT and T&D losses.

For the reporting year April 2024 to March 2025, Scope 3 Category 3 emissions are estimated at 91.69 tCO_2e, accounting for approximately 5.6% of GLIM's total Scope 3 emissions. The detailed breakdown by activity is presented in Table 4.4c.

Table 4.4c: Scope 3 Category 3: Fuel- and Energy-Related Activities Emissions Summary

Scope 3 Activity	Activity Data	Emissions (tCO_2e)	Percentage
Category 3 Fuel and Energy related activities			
Purchased electricity from grid	2,915,885 kWh consumed	68.72	74.9%
Purchased fuel for Diesel Generators	35,609.3 L of diesel consumed	22.22	24.2%
Purchased fuel for Dean's vehicle	1,200 L of petrol consumed	0.75	0.8%
Total Category 3 Emissions	-	**91.69**	**100%**

The data used for estimating Scope 1 and Scope 2 emissions (i.e., fuel and electricity consumption) was also used as the basis for estimating upstream emissions under this category.

4.3.4. Scope 3 Category 4: Upstream Transportation

Category 4 of Scope 3 covers upstream transportation emissions, which are associated with the transportation of goods and services purchased by GLIM prior to reaching the campus. These emissions typically occur during the logistics and distribution phase and are not included in other Scope 1 or 2 categories.

For this assessment, emissions were estimated using a spend-based method, wherein expenditures related to transportation activities were multiplied by relevant emission factors from the USEPA EEIO database.

For the reporting year April 2024 to March 2025, Scope 3 Category 4 emissions are estimated at 0.7 tCO_2e, accounting for approximately 0.04% of GLIM's total Scope 3 emissions. The detailed breakdown is presented in Table 4.4d.

Table 4.4d: Scope 3 Category 4: Upstream Transportation Emissions Summary

Scope 3 Activity	Activity Data	Emissions (tCO_2e)	Percentage
Category 4 Upstream Transportation			
Transportation of consumables	1,00,000 INR spent on transportation of kitchen consumables during the reporting period	0.7	100%
Total Category 4 Emissions	-	0.7	100%

The expenditure data for transportation-related activities used in this analysis was sourced from GLIM's Finance Department for the reporting period.

4.3.5. Scope 3 Category 5: Waste Generated in Operations

Category 5 of Scope 3 accounts for GHG emissions resulting from the treatment and disposal of waste generated during the regular operations of GLIM. These emissions typically occur off-site, during waste processing activities such as recycling, composting, land application, or landfill disposal.

For this assessment, emissions were estimated using emission factors published by DEFRA, which account for both the type and treatment method of waste.

For the reporting year April 2024 to March 2025, Scope 3 Category 5 emissions are estimated at 0.13 tCO_2e, accounting for approximately 0.01% of GLIM's total Scope 3 emissions. The detailed breakdown by waste stream is presented in Table 4.4e.

Table 4.4e: Scope 3 Category 5: Waste Generated in Operations Emissions Summary

Scope 3 Activity (Type of Waste)	Activity Data (Waste Generated)	Emissions (tCO_2e)	Percentage
Category 3 Fuel and Energy Related Activities			
Iron Scrap (Recycled)	2439 kg	0.052	39%
STP Sludge (Used for Land Application)	280 KL	0.044	33%
Plastic Scrap (Recycled)	500 kg	0.011	8%
Water Cooler Scrap (Recycled)	20 Nos.	0.009	6%
TV Scrap Sent (Recycled)	12 Nos.	0.006	5%
Paper Scrap Sent (Recycled)	154 kg	0.003	2%
Cable Scrap Sent (Recycled)	87 kg	0.002	1%
Motor Scrap (Recycled)	84 kg	0.002	1%
Battery Scrap (Recycled)	2 Nos.	0.001	1%
Aluminium Scrap (Recycled)	49.5 kg	0.001	1%
SS Scrap (Recycled)	40 kg	0.001	1%
Thagaram Scrap (Recycled)	39 kg	0.001	1%
Indoor Cassette Type AC Scrap (Recycled)	3 Nos.	0.001	0%
Small Exhaust Fan Scrap (Recycled)	3 Nos.	0.000	0%
Total Category 5 Emissions	-	0.13	100%

The waste generation and disposal data used in this analysis was provided by GLIM's Facility Management Department for the designated reporting period.

4.3.6. Scope 3 Category 6: Business Travel

Scope 3 Activity	Spend (INR)	Emissions (tCO_2e)	Percentage
Category 6 Business Travel			
Business Travel – Air	32,13,000 INR spent on business travel during the reporting period	145.96	100%
Total Category 6 Emissions	-	145.96	100%

Category 6 of Scope 3 GHG emissions includes business travel-related emissions, specifically from air travel undertaken by GLIM staff or representatives for institutional purposes. These emissions occur off-site, primarily from aircraft fuel combustion, and are attributed to the institution due to their operational necessity.

As detailed travel itinerary data was not available, emissions for this category were estimated using the spend-based method, where reported travel expenditures were converted into emissions using DEFRA-published emission factors for domestic air travel.

Assumption: It is assumed that a 1,000 km domestic flight incurs an average cost of INR 6,000. This benchmark is used to estimate distance traveled from the total spend, enabling application of distance-based emission factors

For the reporting period April 2024 to March 2025, Scope 3 Category 6 emissions are estimated at 145.96 tCO_2e, accounting for approximately 9.1% of GLIM's total Scope 3 emissions. The summary is presented in Table 4.4f.

Scope 3 Category 7: Employee Commuting Emissions Summary

Category 7 of Scope 3 GHG emissions includes emissions from employee commuting, which occur off-site but are attributable to institutional operations. These emissions arise from the use of various transport modes by staff traveling between their residences and the campus.

At GLIM, employee commuting is partially outsourced and is facilitated through a fleet of four dedicated buses operating from key city locations: Parrys, KK Nagar, Porur, and Pallikaranai. In addition, some employees commute using two-wheelers (primarily local staff) and cabs, particularly during off-hours or weekends.

For this assessment, emissions were estimated based on travel distance, mode of transport, fuel type, and trip frequency. Assumptions include:

- Institute out sourced buses are assumed to operate 22 working days per month.
- Bus mileage is assumed to be 8 km per litre (kmpl).

For the reporting year April 2024 to March 2025, Scope 3 Category 7 emissions are estimated at 144.0 tCO_2e, accounting for approximately 9.0% of GLIM's total Scope 3 emissions. A breakdown of commuting activities is provided in Table 4.4g.

Table 4.4g: Scope 3 Category 7: Employee Commuting Emissions Summary

Scope 3 Activity	Activity data	Emissions (tCO_2e)	Percentage
Category 7 Employee Commuting			
Employee cabs (off-hours / weekends)	160 km per trip; 208 trips	81.5	56.60%
Bus – KK Nagar to Manamai	180 km round-trip per working day	16	11.10%
Bus – Parrys to Manamai	178 km round-trip per working day	15.8	11.00%
Bus – Porur to Manamai	168 km round-trip per working day	15	10.40%
Bus – Pallikaranai to Manamai	140 km round-trip per working day	12.5	8.70%
Local employees – 2-wheelers	15 km per day, 10 employees	3.2	2.20%
Total Category 7 Emissions	-	**144.0**	**100%**

The data used for this analysis was provided by GLIM's Administration and Logistics Department for the reporting period.

4.4. Emission Intensity

GHG performance is typically assessed using two key metrics:

- An absolute metric, representing the total GHG emissions of the organization; and
- A relative (or intensity) metric, which normalizes total emissions against a relevant business parameter to enable performance benchmarking.

The absolute metric reflects the total emissions attributable to an organization during a given reporting period. While this number is essential for internal tracking and setting reduction targets, it is generally not suitable for comparisons across organizations even within the same sector due to inherent differences in size, operational scope, and business activities. However, it serves as a critical baseline for year-on-year performance tracking and for the formulation of decarbonization strategies.

For GLIM, this GHG assessment represents the first comprehensive emissions inventory, establishing the baseline total emissions for the reporting year FY 2024–25. The total absolute emissions have been calculated as 4,013 tCO_2e. While this figure provides a starting point for the institute's climate action journey, its relevance is maximized when contextualized using emission intensity metrics.

Emission intensity metrics allow organizations to evaluate their environmental impact relative to operational scale or productivity. For educational institutions, typical normalization parameters may include:

a. Revenue-based intensity (GHG emissions per unit of economic output),

b. Area-based intensity (emissions per acre or per square meter of built-up space),

c. Student activity intensity (emissions per Equivalent Full-Time Student Load), and

d. Per capita intensity (emissions per person on campus, including students, faculty, and staff).

For this analysis, per capita emission intensity has been selected as the most meaningful normalization metric. This is based on the premise that the campus's operational emissions are strongly influenced by the activities and presence of the Students and the Staff in the institute. To provide a more granular view, the total campus community has been segmented into three distinct profiles and the per capita emission intensity for each segment is presented in the following table.

Campus Community Group	Campus Community Group Headcount in FY 2024-25	Per Capita Emission Intensity (tCO_2e)
Students only	1,000	4.013
Students + Employees (on payroll)	1,147	3.499
Students + Employees + Contract Staff	1,457	2.754

While per capita GHG intensity offers useful insights for internal performance evaluation and peer benchmarking, it should be interpreted with caution. Variations in how institutions define its campus community categories, set GHG accounting boundaries, ensure data quality, and select emission factors can significantly impact the comparability of per capita emission metrics. For this reason, unless peer institutions follow a consistent methodology, apply similar assumptions, and operate at comparable scales and functional scopes, direct comparisons may be considered indicative rather than conclusive. Nevertheless, per capita intensity remains a valuable proxy for evaluating institutional GHG performance, identifying hotspots, and informing future reduction strategies.

Conclusion

The GHG emissions profile of GLIM aligns with typical patterns observed across higher education institutions (HEIs), particularly those with integrated residential and academic infrastructure. For the reporting year FY 2024–25, total emissions estimated is 4,013 tCO_2e, with the largest share attributed to Scope 2 emissions i.e. 2,119.8 tCO_2e, which represents significant electricity demand driven by classroom, administrative, and residential operations.

Scope 3 emissions (i.e. 1,647.3 tCO_2e) also constitute a major component of the overall footprint, primarily influenced by purchased goods and services (45.7%) and capital goods (31.1%). In contrast, Scope 1 emissions (245.9 tCO_2e) remain relatively modest, due to limited use of on-site fossil fuel-based systems such as diesel generators and institutional vehicles.

The institute has already demonstrated progress in advancing its decarbonisation agenda, particularly in relation to Scope 2 emissions. With a PPA initiated during the third quarter of the reporting year and a fully operational on-campus solar installation, approximately ~30% of total electricity consumption is already being offset by renewable sources. These initiatives are projected to cover nearly two-thirds of the campus's electricity demand in the near term, further reducing the institute's carbon intensity.

The notable share of emissions from purchased goods and services reflects the outsourced nature of several operational activities, including canteen and catering services, facility management, and the procurement of consumables, equipment, and IT accessories. Recognizing the importance of addressing emissions across the value chain, it is recommended that GLIM enhance its engagement with suppliers by encouraging the provision of actual emissions data and the adoption of low-carbon alternatives.

The contribution of capital goods to Scope 3 emissions is primarily driven by a one-time infrastructure project—the construction of a new residential block for students, scheduled for completion in the following year. The associated emissions are classified as embodied emissions and are accounted for in the reporting period in which the construction activity occurs. Emissions from capital goods are expected to decline in future reporting years upon completion of the construction activity.

The institute is encouraged to transition from spend-based estimation methods to more accurate activity-based or hybrid approaches that incorporate vendor-supplied emissions data. It is also recommended to embed sustainability into procurement practices by amending relevant policies to include GHG performance criteria in supplier selection and contracting processes.

By institutionalizing these practices, GLIM can enhance the robustness of its GHG inventory, improve its emissions traceability across scopes, and build a foundation for credible climate target-setting and progress tracking aligned with global best practices.

Appendix A - Calculation Tables

Scope 1: Stationary Emissions

S.No.	Source ID	Fuel Type	Total Consumption (l)	Emission factors (kg/l)			Emission factor source	Emissions (kg)			Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
				CO_2 factor	CH_4 factor	N_2O factor		CO_2 emission	CH4 emissions	N_2O emissions		
1	Diesel Generators (DG) Sets	Diesel	35609.3	2.689	0.000109	0.0000218	IPCC	95746.9452	3.8764	0.7753	96066.7	96.1

Scope 1: Mobile Emissions

S.No.	Source ID	Fuel Type	Total Consumption (l)	Emission factors (kg/l)			Emission factor source	Emissions (kg)			Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
				CO_2 factor	CH_4 factor	N_2O factor		CO_2 emission	CH4 emissions	N_2O emissions		
1	Dean's vehicle	Petrol	1200	2.395	0.000864	0.0001106	IPCC	2873.5106	1.0366	0.1327	2938.7	2.9

Scope 1: Process Emissions (Biogas Plant)

S.No.	Source ID	Type of GHG emitting from the process	Total Gas Generation (kg)	Emission factors (kg/kg)			Emission factor source	Emissions (kg)			Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
				CO_2 factor	CH4 factor	N_2O factor		CO_2 emission	CH_4 emissions	N_2O emissions		
1	Biogas plant (1/12 months)	Methane - 75% CO2 - 20% Nitrogen - 5 %	175	0.20	0.75	0.00	Site specific design data	35.00	131.25	0.00	3696.9	3.7

Scope 1: Process Emissions (Conventional Composting)

S.No.	Source ID	Type of waste	Quantity Generated	Units	Waste disposal method	Waste disposal emission factors as per UK DEFRA			Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
						Waste type as per DEFRA	Assumed activity as per DEFRA	Emission factor (Kg CO2e/Ton)		
2	Conventional Composting (11/12 months)	Food Waste	29200	Kgs	Conventional Composting	Organic: food and drink waste	Composting	8.912	260.2	0.260

Scope 1: Process Emissions (STP)

S.No.	Source ID	Average BOD inlet concentration (mg/l)	Total Sewage Treated (kl)	Emission factors			Emission factor source	Emissions (kg)			Total Emissions (kgCO2e)	Total Emissions (tCO_2e)
				CO_2 factor	CH_4 factor (kg/kgof BOD)	N_2O factor (Kg N_2O-N/Kg N)	Assumed activity as per DEFRA	CO_2 emission	CH4 emissions	N_2O emissions		
3	STP	400	39497	0	0.018	0.016	IPCC	0.00	6.34	1.35	544.4	0.5444

Scope 1: Fugitive Emissions - Refrigeration

S.No.	Source ID	Type of Refrigerant used	Total Refrigerant capacity (kg)	GWP	Total CO_2 emission ($kgCO_2e$)	Total Emissions (tCO_2e)
1	Split Acs, Ductable AC units & VRF Units	R22	104.25	1760	5504.40	5.50
2	Split Acs, Ductable AC units & VRF Units	R32	102.75	677	2086.85	2.09
3	Split Acs, Ductable AC units & VRF Units	R407	25.5	1923.4	1471.40	1.47
4	Split Acs, Ductable AC units & VRF Units	R410	2250	1923.5	129836.25	129.84
5	Fridges discarded	-	0		0.00	0
6	Cold Room discarded	-	0		0.00	0
7	Deep freezers discarded	-	0		0.00	0
8	Discarded ACs	R32	5.1375	677	3478.09	3.48
	Total				**142377**	**142**

Scope 2: Electricity related emissions

S.No.	Activity	Type of electricity	Measurement Unit	Total Electricity Consumption	CO_2 emission factor (T/Mwh) from CEA	Emission factor source	Total Emissions (tCO_2e)
1	All operations	Grid	KWh	2915885	0.727	CEA	2119.8

Emissions offset due to usage of RE

S.No.	Activity	Type of electricity	Measurement Unit	Total Electricity Consumption	CO_2 emission factor (T/Mwh) from CEA	Emission factor source	Total Emissions (tCO_2e)
1	All operations	Renewable through PPA	KWh	893018	0.727	CEA	649.2
2	All operations	Onsite solar panel	KWh	312687	0.727	CEA	227.3
	Total			1205705			876.5

Scope 3 Cat-1: Purchased Goods & Services

		Purchased Item Description	Amount spent	Unit of currency	USD (ref 2022)	Supply chain emission factors as per USEPA									Total Emissions ($kgCO_2e$	Total Emissions (tCO_2e)
						Purchase type	Group	Sector	Sub sector	Industry Group	NAICS Code	NAICS Industry	Units	Emission Factor		
1	Purchased good	Stattionery items - Pen, Markers, Paper, etc.,	561041	INR	6842	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Miscellaneous Manufacturing (NAICS 339)	Other Miscellaneous Manufacturing: NAICS 3399	339940	Office Supplies (except Paper) Manufacturing	kg CO_2e/2022 USD, purchaser price	0.265	1813.1	1.8
2	Purchased good	IT items	29063265	INR	354430	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Computer and Electronic Product Manufacturing (NAICS 334)	Computer and Peripheral Equipment Manufacturing: NAICS 3341	334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	kg CO_2e/2022 USD, purchaser price	0.143	50683.5	50.7
3	Purchased good	Furnitures	7814000	INR	95293	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Furniture and Related Product Manufacturing (NAICS 337)	Household and Institutional Furniture and Kitchen Cabinet Manufacturing: NAICS 3371	337127	Institutional Furniture Manufacturing	kg CO_2e/2022 USD, purchaser price	0.246	23442.0	23.4
4	Purchased good	Maintenance consumables	8380000	INR	102195	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Fabricated Metal Product Manufacturing (NAICS 332)	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing: NAICS 3327	332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing	kg CO_2e/2022 USD, purchaser price	0.248	25344.4	25.3
5	Purchased good	Gifts	573446	INR	6993	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Miscellaneous Manufacturing (NAICS 339)	Other Miscellaneous Manufacturing: NAICS 3399	339999	All Other Miscellaneous Manufacturing	kg CO_2e/2022 USD, purchaser price	0.182	1272.8	1.3
6	Purchased Service	Sodexo - Facility management services	54141520	INR	660262	Service-Providing Industries	Trade, Transportation, and Utilities	Utilities (NAICS 22)	Utilities (NAICS 221)	Water, Sewage and Other Systems: NAICS 2213	221320	Sewage Treatment Facilities	kg CO_2e/2022 USD, purchaser price	0.578	381631.7	381.6
7	Purchased Service	Compass - Food services	70659187	INR	861697	Service-Providing Industries	Leisure and Hospitality	Accommodation and Food Services (NAICS 72)	Food Services and Drinking Places (NAICS 722)	Special Food Services: NAICS 7223	722310	Food Service Contractors	kg CO_2e/2022 USD, purchaser price	0.132	113744.1	113.7
8	Purchased Service	Security services	34591786	INR	421851	Service-Providing Industries	Professional and Business Services	Administrative and Support and Waste Management and Remediation Services (NAICS 56)	Administrative and Support Services (NAICS 561)	Other Support Services: NAICS 5619	561990	All Other Support Services	kg CO_2e/2022 USD, purchaser price	0.127	53575.1	53.6
9	Purchased Service	AC maintenance	5421000	INR	66110	Service-Providing Industries	Other Services (except Public Administration)	Other Services (except Public Administration) (NAICS 81)	Repair and Maintenance (NAICS 811)	Electronic and Precision Equipment Repair and Maintenance: NAICS 8112	811211	Consumer Electronics Repair and Maintenance	kg CO_2e/2022 USD, purchaser price	0.076	5024.3	5.0
10	Purchased Service	STP maintenance	221000	INR	2695	Service-Providing Industries	Trade, Transportation, and Utilities	Utilities (NAICS 22)	Utilities (NAICS 221)	Water, Sewage and Other Systems: NAICS 2213	221320	Sewage Treatment Facilities	kg CO_2e/2022 USD, purchaser price	0.578	1557.8	1.6
11	Purchased Service	Tranformer maintenance	89000	INR	1085	Service-Providing Industries	Other Services (except Public Administration)	Other Services (except Public Administration) (NAICS 81)	Repair and Maintenance (NAICS 811)	Electronic and Precision Equipment Repair and Maintenance: NAICS 8112	811219	Other Electronic and Precision Equipment Repair and Maintenance	kg CO_2e/2022 USD, purchaser price	0.076	82.5	0.1
12	Purchased Service	DG maintenance	117000	INR	1427	Service-Providing Industries	Other Services (except Public Administration)	Other Services (except Public Administration) (NAICS 81)	Repair and Maintenance (NAICS 811)	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance: NAICS 8113	811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	kg CO_2e/2022 USD, purchaser price	0.136	194.0	0.2
13	Purchased Service	Electrical switch gears maintenance	145000	INR	1768	Service-Providing Industries	Other Services (except Public Administration)	Other Services (except Public Administration) (NAICS 81)	Repair and Maintenance (NAICS 811)	Electronic and Precision Equipment Repair and Maintenance: NAICS 8112	811219	Other Electronic and Precision Equipment Repair and Maintenance	kg CO_2e/2022 USD, purchaser price	0.076	134.4	0.1
14	Purchased Service	LIft maintenance	113000	INR	1378	Service-Providing Industries	Other Services (except Public Administration)	Other Services (except Public Administration) (NAICS 81)	Repair and Maintenance (NAICS 811)	Electronic and Precision Equipment Repair and Maintenance: NAICS 8112	811219	Other Electronic and Precision Equipment Repair and Maintenance	kg CO_2e/2022 USD, purchaser price	0.076	104.7	0.1
15	Purchased Service	Marketing services (advertising etc.)	73093776	INR	891388	Service-Providing Industries	Professional and Business Services	Professional, Scientific, and Technical Services (NAICS 54)	Professional, Scientific, and Technical Services (NAICS 541)	Management, Scientific, and Technical Consulting Services: NAICS 5416	541613	Marketing Consulting Services	kg CO2e/2022 USD, purchaser price	0.078	69528.2	69.5
16	Purchased Service	Software services (webhosting, etc.)	8327718	INR	101558	Service-Providing Industries	Information	Information (NAICS 51)	Data Processing, Hosting, and Related Services (NAICS 518)	Data Processing, Hosting, and Related Services: NAICS 5182	518210	Data Processing, Hosting, and Related Services	kg CO_2e/2022 USD, purchaser price	0.093	9444.9	9.4
17	Purchased Service	Hospitality services (stay etc.) - Outstation	0	INR	0	Service-Providing Industries	Leisure and Hospitality	Accommodation and Food Services (NAICS 72)	Accommodation (NAICS 721)	Rooming and Boarding Houses: NAICS 7213	721310	Rooming and Boarding Houses, Dormitories, and Workers' Camps	kg CO_2e/2022 USD, purchaser price	0.145	0.0	0.0
18	Purchased Service	Healthcare services (medical etc.)	2310000	INR	28171	Service-Providing Industries	Education and Health Services	Health Care and Social Assistance (NAICS 62)	Hospitals (NAICS 622)	General Medical and Surgical Hospitals: NAICS 6221	622110	General Medical and Surgical Hospitals	kg CO_2e/2022 USD, purchaser price	0.145	4084.8	4.1
19	Purchased Service	Consulting services	2291024	INR	27939	Service-Providing Industries	Professional and Business Services	Professional, Scientific, and Technical Services (NAICS 54)	Professional, Scientific, and Technical Services (NAICS 541)	Management, Scientific, and Technical Consulting Services: NAICS 5416	541618	Other Management Consulting Services	kg CO_2e/2022 USD, purchaser price	0.078	2179.3	2.2
20	Purchased Service	R&D services	729609	INR	8898	Service-Providing Industries	Professional and Business Services	Professional, Scientific, and Technical Services (NAICS 54)	Professional, Scientific, and Technical Services (NAICS 541)	Scientific Research and Development Services: NAICS 5417	541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	kg CO_2e/2022 USD, purchaser price	0.156	1388.0	1.4
21	Purchased Service	Legal services	0	INR	0	Service-Providing Industries	Professional and Business Services	Professional, Scientific, and Technical Services (NAICS 54)	Professional, Scientific, and Technical Services (NAICS 541)	Legal Services: NAICS 5411	541199	All Other Legal Services	kg CO_2e/2022 USD, purchaser price	0.041	0.0	0.0
22	Purchased Service	Landscaping services	5400000	INR	65854	Service-Providing Industries	Professional and Business Services	Professional, Scientific, and Technical Services (NAICS 54)	Professional, Scientific, and Technical Services (NAICS 541)	Architectural, Engineering, and Related Services: NAICS 5413	541320	Landscape Architectural Services	kg CO_2e/2022 USD, purchaser price	0.103	6782.9	6.8
		Total													**752012**	**752.0**

Scope 3 Cat-2: Capital Goods

S.No	Category	Purchased Item Description	Amount spent	Unit of currency	Amount spent in USD (ref 2022)	Supply chain emission factors as per USEPA									Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
						Purchase type	Group	Sector	Sub sector	Industry Group	NAICS Code	NAICS Industry	Units	Emission Factor		
1	Capital good	New Hostel	102000000	INR	1243902	Goods-Producing Industries	Construction	Construction (NAICS 23)	Construction of Buildings (NAICS 236)	Nonresidential Building Construction: NAICS 2362	236220	Commercial and Institutional Building Construction	kg CO2e/2022 USD, purchaser price	0.224	278634.1	278.6
2	Capital good	Machineries - Chapathi making machine, STP Blowers	800000	INR	9756	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Fabricated Metal Product Manufacturing (NAICS 332)	Cutlery and Handtool Manufacturing: NAICS 3322	332215	Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (except Precious) Manufacturing	kg CO2e/2022 USD, purchaser price	0.223	2175.6	2.2
3	Capital good	Buggies	350000	INR	4268	Goods-Producing Industries	Manufacturing	Manufacturing (NAICS 31-33)	Transportation Equipment Manufacturing (NAICS 336)	Motor Vehicle Manufacturing: NAICS 3361	336111	Automobile Manufacturing	kg CO2e/2022 USD, purchaser price	0.24	1024.4	1.0
4	Capital good	Civil works, STP Faculty cabins etc.,	84516825	INR	1030693	Goods-Producing Industries	Construction	Construction (NAICS 23)	Construction of Buildings (NAICS 236)	Nonresidential Building Construction: NAICS 2362	236220	Commercial and Institutional Building Construction	kg CO2e/2022 USD, purchaser price	0.224	230875.2	230.9
	Total														**512709**	**512.7**

Scope 3 Cat-3: Fuel & Energy related activities (not included in Scope 1 and 2)

S.No.	Source ID	Type of Fuel/ Energy	Units of Measurement	Total Consumption	Emissions related to	WTT Emission Factors - DEFRA	WTT Emission Factors units	Total CO_2 emission ($kgCO_2e$)	Total Emissions (tCO_2e)
1	Diesel Generators (DG) Sets	Diesel	liters	35609.3	WTT fuels	0.62409	kg CO2e/l	22223.4	22.22
2	Dean's vehicle	Petrol	liters	1200	WTT fuels	0.62409	kg CO2e/l	748.9	0.75
3	All operations	Grid	KWh	2915885	T&D losses	0.02357	kgCO2e/kWh	68721.0	68.72
	Total							**91693.28**	**91.69**

Scope 3 Cat-4: Upstream Transportation

S.No.	Transportation details	Mode of transport	Amount Spent	Unit of currency	Amount spent in USD (ref 2022)	Supply chain emission factors as per USEPA									Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
						Purchase type	Group	Sector	Sub sector	Industry Group	NAICS Code	NAICS Industry	Units	Emission Factors		
1	Consumables	Road	1,00,000	INR	1220	Service-Providing Industries	Trade, Transportation, and Utilities	Transportation and Warehousing (NAICS 48-49)	Truck Transportation (NAICS 484)	General Freight Trucking: NAICS 4841	484110	General Freight Trucking, Local	kg CO2e/2022 USD, purchaser price	0.595	725.6	0.7256

Scope 3 Cat-5: Waste generated in operations

S.No.	Waste description	Type of waste	Quantity Generated	Units	Waste disposal method	Waste disposal emission factors as per UK DEFRA			Total Emissions ($kgCO_2e$)	Total Emissions (tCO_2e)
						Waste type as per DEFRA	Assumed activity as per DEFRA	Emission factor (Kg CO_2e/Ton)		
1	Scrap	Iron	2439	Kg	Recycling	Metal: scrap metal	Open loop recycling	21.281	51.9	0.052
2	Scrap	Paper	154	Kg	Recycling	Paper and board: mixed	Combustion	21.281	3.3	0.003
3	Scrap	Water cooler	20	No	Recycling	Plastics: PVC (incl. forming)	Open loop recycling	21.281	8.5	0.009
4	Scrap	Motor scrap	84	Kg	Recycling	Metal: scrap metal	Open loop recycling	21.281	1.8	0.002
5	Scrap	Aluminum	49.5	Kg	Recycling	Metal: aluminium cans and foil (excl. forming)	Open loop recycling	21.281	1.1	0.001
6	Scrap	Thagaram	39	Kg	Recycling	Metal: scrap metal	Open loop recycling	21.281	0.8	0.001
7	Scrap	Plastic	500	Kg	Recycling	Plastics: average plastics	Open loop recycling	21.281	10.6	0.011
8	Scrap	Cable	87	Kg	Recycling	WEEE - small	Open loop recycling	21.281	1.9	0.002
9	Scrap	Small Exhaust Fan	3	No	Recycling	WEEE - mixed	Open loop recycling	21.281	0.1	0.000
10	Scrap	SS	40	Kg	Recycling	Metal: steel cans	Open loop recycling	21.281	0.9	0.001
11	Scrap	Indoor Cassette Type AC	3	No	Recycling	WEEE - large	Open loop recycling	21.281	0.6	0.001
12	Scrap	Battery	2	No	Recycling	Batteries	Open loop recycling	21.281	1.1	0.001
13	Scrap	TV	12	No	Recycling	WEEE - large	Open loop recycling	21.281	6.4	0.006
14	STP Sludge	STP sludge mixed with water	280	KL	Land applications	Commercial and industrial waste	Landfill	520.335	43.7	0.044
	Total								**132.6**	**0.133**

Scope 3 Cat-6: Business Travel - Outstation

S.No.	Travel Description	Mode of travel	Expenses (INR)	Distance in passenger. km	Emission factors (kg CO_2e/passenger km)	Emission factor source	Total Emissions (kgCO_2e)	Total Emissions (tCO_2e)
1	Business travel - Air	Flight	32,13,000	535500	0.273	Business travel - domestic emission factors as per UK DEFRA	145964.9	145.96
	Total						**145964.9**	**145.96**

Scope 3 Cat-7: Employee Commuting

S.No.	Travel Description	Origin	Destination	Fuel type	Distance of Travel (km)	No. of trips in month	Total Distance traveled in a year (km)	Average Mileage (km/l)	Estimated fuel consumption	Emission factors (kg/l)			Emission factor source	Emissions (kg)			Total Emissions (kgCO_2e)	Total Emissions (tCO_2e)
										CO_2 factor	CH_4 factor	N_2O factor		CO_2 emission	CH_4 emissions	N_2O emissions		
1	Bus-1	Parrys	Manamai	Diesel	178	22	46992	8	5874	2.689	0.000109	0.0000218	IPCC	15794.1200	0.6394	0.1279	15846.9	15.8
2	Bus-2	KK Nagar	Manamai	Diesel	180	22	47520	8	5940	2.689	0.000109	0.0000218	IPCC	15971.5820	0.6466	0.1293	16024.9	16.0
3	Bus-3	Porur	Manamai	Diesel	168	22	44352	8	5544	2.689	0.000109	0.0000218	IPCC	14906.8099	0.6035	0.1207	14956.6	15.0
4	Bus-4	Pallikaranai	Manamai	Diesel	140	22	36960	8	4620	2.689	0.000109	0.0000218	IPCC	12422.3415	0.5029	0.1006	12463.8	12.5
5	Local employees (2-wheelers)	Anupuram	Manamai	Petrol	150	22	39600	30	1320	2.395	0.000864	0.0001106	IPCC	3160.8617	1.1403	0.1460	3232.5	3.2
6	Cabs	Chennai	Manamai	Petrol	160	208	399360	12	33280	2.395	0.000864	0.0001106	IPCC	79692.0284	28.7489	3.6799	81498.7	81.5
	Total																**144023.5**	**144.0**

Appendix B - Emission Factors

Accurate and reliable GHG accounting and reporting depend heavily on the quality of emission factors used. These standardized values convert activity data (e.g., fuel use, electricity consumption) into emissions, ensuring consistent and comparable calculations across sectors and regions. The selection of emission factor sources is influenced by an organization's operations, geographic location, and reporting requirements.

1. Global Standards

a. GHG Protocol Cross-Sector Tools - Provides standardized emission factors aligned with international GHG accounting frameworks. Used for calculating Scope 1 (mobile and stationary) emissions for GLIM. (Link)

b. Intergovernmental Panel on Climate Change (IPCC) - Offers detailed guidelines and default emission factors for fuels, processes, and fugitive emissions. - IPCC AR6 Global Warming Potentials (GWPs) used for fugitive emissions. (Link)

2. Region-Specific Sources

a. Department for Environment, Food & Rural Affairs (DEFRA) (UK) - UK-specific factors for fuels, transport, and energy use. (Link)

b. Environmental Protection Agency (EPA) (US) - Emission factors for various US-based activities including energy, transportation, and waste. (Link)

c. Central Electricity Authority (CEA) (India) - Provides Indian grid emission factors, essential for Scope 2 calculations. (Link)

GREAT LAKES INSTITUTE of MANAGEMENT CHENNAI

Report prepared at the request of
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