Scope 3: Greenhouse Gas Emissions Accounting Report

F.Y.
2024-25

A comprehensive analysis of the greenhouse gas emission generated by the internal operations of the Parul University. Annual data is prepared for the 12 months of F.Y. 2024-25.

Parul® University
NAAC GRADE A++

Greenify
Integrators Pvt.Ltd

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Assessment team

Organisation: Greenify Integrators Private Limited

Greenify Integrators Private Limited is a forward-thinking environmental solutions provider committed to integrating sustainability into the core of modern business practices. With a team of dedicated experts, Greenify delivers innovative and customized services aimed at helping organizations transition towards a net-zero future. From carbon credit consulting and ESG frameworks to renewable energy solutions and water management, Greenify offers a holistic approach to environmental responsibility. The company's mission is to empower clients to adopt eco-friendly strategies that not only minimize environmental impact but also drive long-term success. Guided by a clear vision of harmonizing business growth with ecological well-being, Greenify is leading the charge in building a resilient and regenerative future.

Team Members	Designation	Qualifications
Ujjwal Shah	Proprietor	ISO 14064 GHG Lead Verifier/Lead Validator, LCA-EPD, Certified in Carbon Footprint, Resource Efficiency, and Environmental Sustainability; 21+ years of experience in EHS and ESG.
Kunal Mehta	Senior EHS Executive	**Education:** M.Sc., B.Sc. Environmental Science **Expertise:** GHG Accounting, Extended Producer Responsibility (EPR), Environmental Legal Compliance, Safety Audits, ESG Reporting and Strategy
Vrushali Thakkar	ESG Junior Executive	**Education:** M.Sc., B.Sc. Environmental Science **Expertise:** EcoVadis, GHG accounting, EPR, ESG Reporting and Strategy
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Reporting Organisation

Organisation: Parul University, Vadodara, Gujarat

Parul University Representatives	Concerned Departments
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Mr. Chirag Solanki	Travel Booking Dept
Mr. Alpesh Patel	Maintenance Dept
Mr. Sahu	Vigilance Dept
Mr. Ashusingh Rajput	Chief Rector

Principles followed in Reporting

Applying principles is essential to ensuring that data on greenhouse gas emissions is accurate and impartial. The principles are the basis for, and will guide the application of, the requirements in this document.

A. Relevance

Choose the GHG sources, sinks, reservoirs, data, and procedures that best suit the intended user's needs.

B. Completeness

Includes all relevant GHG emissions and removals

C. Consistency

Allow relevant comparisons to be established between GHG-related data

D. Accuracy

As far as is practical, lessen bias and uncertainty.

E. Transparency

Deliver intended users with enough accurate and relevant GHG-related information, to enable them to make decisions with a fair level of confidence

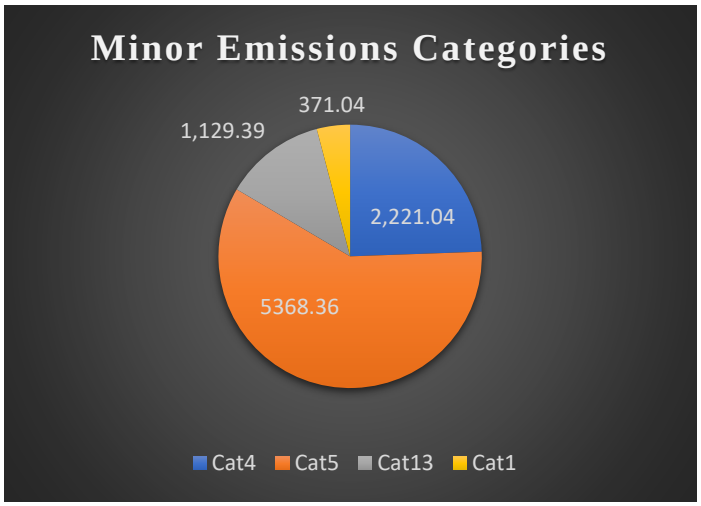
1. Executive Summary

Parul University, located in Vadodara, Gujarat, is a distinguished multidisciplinary institution committed to fostering excellence in higher education. This report provides a comprehensive analysis of the GHG emission generated by the internal operations of the Parul University campus. Annual data is prepared for the 12-month period of F.Y. 2024-25. It identifies the sources of greenhouse gases (GHG).

The study estimates total Scope 3 GHG emissions at **63,35,256.31 t CO_2eq**, arising from indirect activities across the value chain that are not included under Scope 1 or Scope 2. These emissions are primarily associated with upstream and downstream activities.

Analysis of individual categories, Category 7 (Employee Commuting) is the largest contributor to Scope 3 emissions, driven by a high number of employees and commuting distances across multiple transport modes. Category 2 (Capital Goods) and Category 6 (Business Travel) also contribute significantly due to emissions from construction materials, equipment procurement, and travel distances. Other categories, including Categories 3, 4, and 5, contribute comparatively moderate shares to overall Scope 3 emissions.

Figure 1: Overview of the categories Emissions



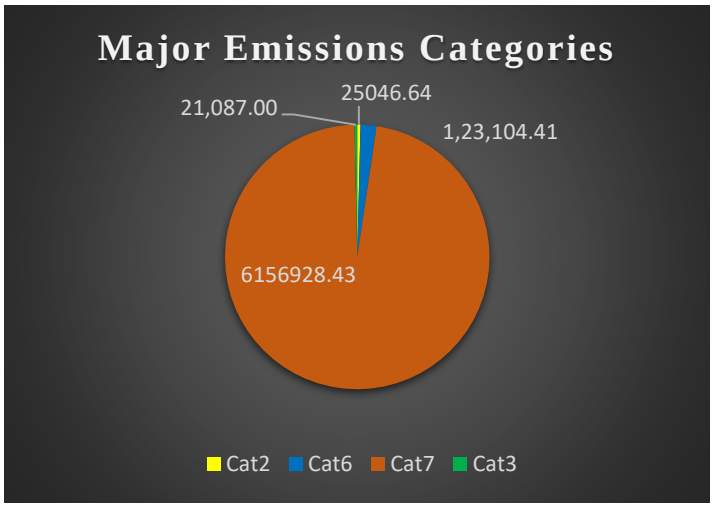


Table 1: Consolidated Summary of category-wise emission of Parul University in F.Y.2024-25

Category	Category Description	Emissions in tCO_2eq	Emissions in Percentage (%)
Category 1	Purchased Goods and Services	371.04	0.0059%
Category 2	Capital Goods	25,046.64	0.395%
Category 3	Fuel and energy-related activities	21,087	0.033%
Category 4	Upstream transportation and distribution	2221.03	0.0035%
Category 5	Waste generated in Operations	5368.36	0.0085%
Category 6	Business travel	1,23,104.41	1.94%
Category 7	Employee commuting	61,56,928.43	97.21%
Category	Upstream leased assets	Not Applicable	
Category 9	Downstream transportation and distribution	Not Applicable	
Category 10	Processing of sold products	Not Applicable	
Category 11	Use of sold products	Not Applicable	
Category 12	End-of-life treatment of sold products	Not Applicable	
Category 13	Downstream Leased Assets	1,129.39	0.018%
Category 14	Franchises	Not Applicable	
Category 15	Investments	Not Applicable	
Total Emissions		**63,35,256.31**	

2. Organizational Profile

2.1. Reporting Organisation

Parul University, located in Vadodara, Gujarat, is a distinguished multidisciplinary institution committed to fostering excellence in higher education. It holds the distinction of being India's youngest private university to receive NAAC A++ accreditation in its first cycle. The University seamlessly integrates the nation's rich cultural heritage with modern innovations and academic advancements, offering a dynamic environment for student enrichment while contributing to both national and global development.

Comprising a diverse array of faculties and institutes, Parul University offers an extensive range of diploma, undergraduate, postgraduate, and doctoral programs across multiple disciplines. Its industry-aligned and field-oriented programs are designed to equip students with the necessary skills and knowledge to excel in their careers. The University has a proven track record of facilitating career success through start-up incubation initiatives and exceptional placement opportunities.

The 150+ acre eco-friendly campus is home to over 50,000 students from across India and more than 3,500 international students from 75+ countries, establishing it as a truly global academic destination. In addition to its NAAC A++ accreditation, the University holds prestigious global memberships, including the Association of Commonwealth Universities.

2.2. Organisational Boundary

Parul University has established its prominence both nationally and internationally in the field of higher education. Nationally, it is recognized as one of Gujarat's leading private universities with a wide range of academic, research, and innovation initiatives. It comprises a state-of-the-art educational campus located in Vadodara, Gujarat, spread over 150+ acres, it hosts over 50,000 students, including 3,500+ international students from 75+ countries. It houses 20+ faculties and offers 200+ programs across diverse disciplines, including engineering, management, law, medicine, pharmacy, design, arts, and several others at undergraduate, postgraduate, and doctoral levels. Parul University maintains global partnerships with 75+ universities worldwide, enhancing academic exchange and international learning opportunities.

3. Reporting Boundary & Standards

3.1. Reporting Period and Frequency of Reporting

The GHG emissions covered by this inventory are based on calendar year April 1st, 2024 to March 31st, 2025 (F.Y. 2024-25). Parul University reports GHG emissions under the operational control approach criteria described in "GHG Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)", published by the World Resources Institute (WRI)/ World Business Council for Sustainable Development standard. The frequency of reporting is based annually.

3.2. Reporting Standards

The ISO 14064-1 standard (Second Edition – 2018-19), which provides organization-level-guidance for quantifying and reporting greenhouse gas emissions and removals, serves as the main basis for this report. The Intergovernmental Panel on Climate Change (IPCC) guideline publications and the India GHG program guidance documents are the sources of information used to estimate emissions for different categories. Aside from these citations, the document incorporates the GHG protocol for the identification, measurement, and classification of greenhouse gas emissions.

3.3. Reporting Boundary

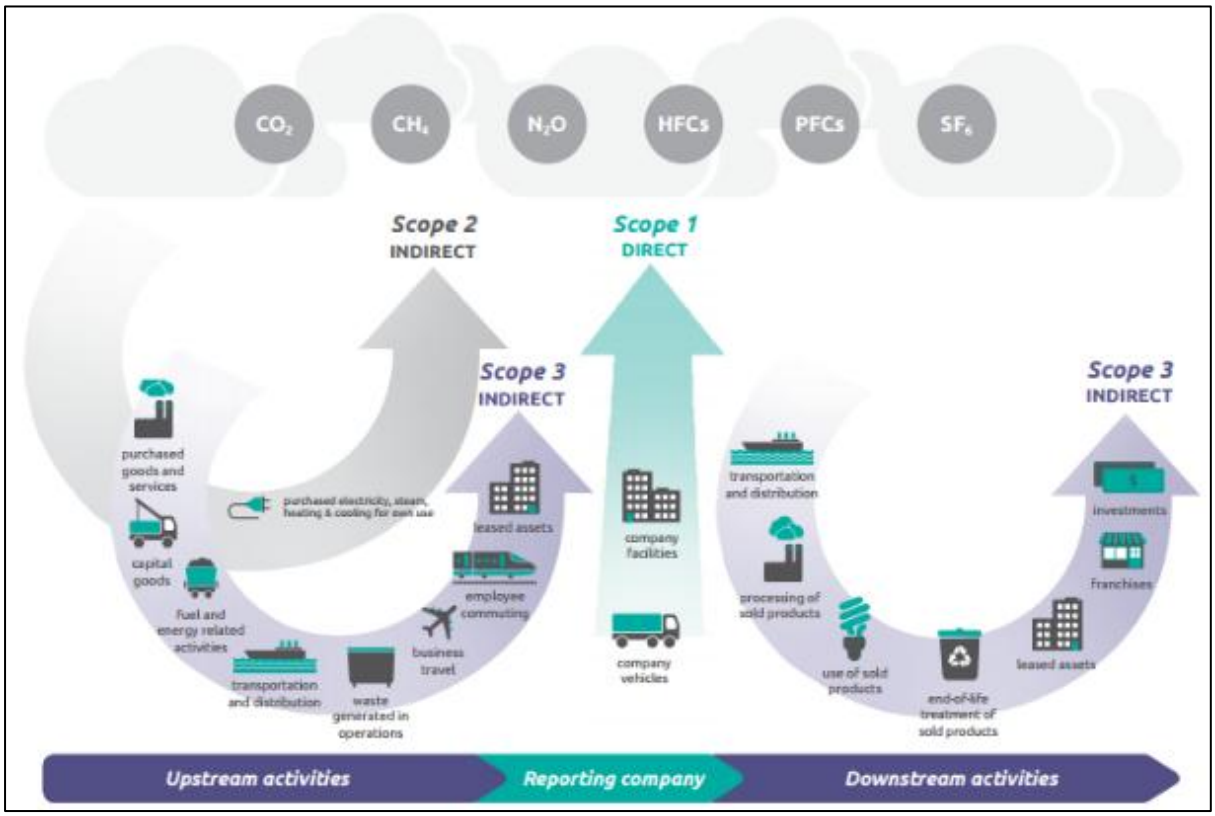
The present exercise of GHG Emission is reported for Parul University (India). Parul University's greenhouse gas (GHG) emissions reporting, in line with the GHG Protocol, encompasses scope 3 indirect emissions. Scope 3 emissions considered in this assessment cover both upstream and downstream activities associated with the University's operations. The inclusion of upstream and downstream emissions ensures a comprehensive representation of Parul University's value-chain-related GHG impacts and supports transparent and consistent reporting in line with internationally accepted GHG accounting principles.

4. Scope 3 Categories Overview

Scope 3 greenhouse gas (GHG) emissions are defined as all other indirect emissions (not included in Scope 2) that are generated throughout a company's value chain. These indirect activities, highlighted in Figure 2 below, are the largest source of GHG emissions for companies operating in many sectors.

In accordance with the GHG Protocol Corporate Value Chain (Scope 3) Standard, Scope 3 emissions are categorized into **15 distinct categories**, covering **upstream and downstream activities** across the campus's value chain. Upstream emissions include the impacts that arise from everything required to produce your service or product, while downstream emissions include the impacts that arise from everything related to consuming your service or product. These categories capture all indirect emissions not included in Scope 1 and Scope 2.

Figure 2: Overview of GHG Protocol Scopes and Emissions



Source: Greenhouse Gas (GHG) Protocol (2025) (https://ghgprotocol.org/)

4.1. Upstream Scope 3 Categories (Categories 1–8)

Upstream emissions include indirect emissions related to goods and services purchased**,** transportation**,** waste**,** and employee-related activities occurring before the company's own operations.

1. **Category 1 – Purchased Goods and Services**

   Emissions from the extraction, production, and transportation of goods and services purchased or acquired by the company in the reporting year, excluding capital goods.

2. **Category 2 – Capital Goods**

   Emissions from the cradle-to-gate production of capital goods purchased or acquired by the company, such as buildings, machinery, equipment, and vehicles.

3. **Category 3 – Fuel- and Energy-Related Activities (Not Included in Scope 1 or Scope 2)**

   Emissions related to the upstream extraction, production, and transportation of fuels and energy consumed by the company, not already accounted for in Scope 1 or Scope 2.

4. **Category 4 – Upstream Transportation and Distribution**

   Emissions from the transportation and distribution of products purchased by the company, between suppliers and the company's facilities, in vehicles not owned or controlled by the company.

5. **Category 5 – Waste Generated in Operations**

   Emissions from the treatment and disposal of waste generated from the company's operations, including landfill, incineration, recycling, composting, and wastewater treatment.

6. **Category 6 – Business Travel**

   Emissions from the transportation of employees for business-related activities in vehicles not owned or controlled by the company, including air, rail, road, and accommodation-related emissions.

7. **Category 7 – Employee Commuting**

   Emissions from the transportation of employees between their homes and worksites, including remote and hybrid working impacts where applicable.

8. **Category 8– Upstream Leased Assets**

   Emissions from the operation of assets leased by the company (as lessee) that are not included in Scope 1 or Scope 2.

4.2. Downstream Scope 3 Categories (Categories 9–15)

Downstream emissions include indirect emissions associated with the distribution, use, and end-of-life treatment of sold products and services.

9. **Category 9 – Downstream Transportation and Distribution**
   Emissions from transportation and distribution of sold products between the company's operations and the end consumer, in vehicles and facilities not owned or controlled by the company.
10. **Category 10 – Processing of Sold Products**
    Emissions from the processing of intermediate products sold by the company by third parties.
11. **Category 11 – Use of Sold Products**
    Emissions from the use of goods and services sold by the company over their expected lifetime.
12. **Category 12 – End-of-Life Treatment of Sold Products**
    Emissions from waste disposal and treatment of products sold by the company at the end of their useful life.
13. **Category 13 – Downstream Leased Assets**
    Emissions from the operation of assets owned by the company and leased to other entities, where such emissions are not included in Scope 1 or Scope 2.
14. **Category 14 – Franchises**
    Emissions from the operation of franchises not included in Scope 1 or Scope 2, where the company is the franchisor.
15. **Category 15 – Investments**
    Emissions associated with the company's investments, including equity investments, debt investments, project finance, and managed assets.

4.3. Scope 3 Category Identification and Applicability Assessment

An on-site assessment was undertaken to evaluate and quantify Scope 3 (indirect) GHG emissions associated with the facility's operations. Activities observed during the site visit were assessed against the relevant Scope 3 categories in accordance with the GHG Protocol. Based on the assessment, Scope 3 Categories 8, 9, 10, 11, 12, 14, and 15 were identified as not applicable to the facility.

5. Methodology and GHG Emission Calculation

5.1. Data Collection

The methodologies of quantification of Scope 3 emissions are based on available records from third-party service providers, procurement data, and internal estimates where primary data is unavailable. The best available data and calculation methods are applied to ensure accurate estimation of indirect emissions.

Table 2: Overview of Scope 3 Emission Sources

Scope	Category	Emission Sources	Data Source
3	1	Purchased Goods and Services	Procurement records, purchase invoices, supplier-provided emission data
	2	Capital Goods	Procurement records, supplier emission reports
	3	Fuel- and Energy-related Activities (upstream)	Fuel suppliers' emission factors, purchase invoices
	4	Upstream Transportation and Distribution	Transport invoices, logistics reports, estimated distances
	5	Waste Generated in Operations	Third-party waste management service reports, invoices, and treatment facility data, emission factors from Defra/Climatiq
	6	Business Travel	Travel booking records, invoices, travel distance estimates, mode-specific emission factors
	7	Employee Commuting	Survey data of staff and students, estimated travel distances, mode-specific emission factors
	13	Downstream Leased Assets	Leased asset-specific energy bills, fuel consumption records, and tenant-provided activity data

5.2. Calculation of GHG Emission

Category 1: Purchased Goods & Services

This category accounts for upstream (cradle-to-gate) greenhouse gas emissions arising from the production of goods and services purchased by Parul University during the reporting year (2024-25) and used for its operational activities. These emissions occur outside the organizational boundary but are attributable to the University's value chain.

The assessment includes emissions associated with the procurement of goods and materials such as laboratory chemicals, consumables, stationery, furniture, medical supplies, and other operational materials, as well as services procured from external vendors.

The data on purchased goods and services was provided solely by Parul University, based on their procurement records, purchase invoices, and ERP system data. All calculations in this category are derived from the information supplied by the University. Where supplier-specific data was not available, secondary emission factors from recognized databases were applied in accordance with the GHG Protocol Scope 3 guidance.

GHG emissions under this category were estimated using the weight-based and spent-based method, where purchase quantities or monetary values were multiplied by appropriate secondary emission factors sourced from recognized databases such as Defra, Environmentally Extended Input-Output (EEIO) factors, and other internationally accepted life-cycle inventory sources, in accordance with the GHG Protocol Scope 3 guidance.

Table 3: Calculation of category 1

Category 1 – Purchased Goods and Services		
Sr No.	**Purchased goods items**	**tCo_2eq**
1	Plastic folder	2.82
2	Papers	307.23
3	Stationary items	4.36
4	Cartridges	1.08
5	Cell	0.32
6	Housekeeping sanitation items	24.17
7	Electrical items - IT	9.93
8	Glassware	21.13
	Total emission of category 1	**371.04**

Category 2: Capital Goods

This category covers upstream (cradle-to-gate) greenhouse gas emissions associated with the manufacture of capital goods purchased by Parul University during the reporting year (2024 – 25). Capital goods include long-term assets such as buildings, infrastructure, laboratory and

medical equipment, furniture, IT equipment, and other long-term assets used for institutional operations. These emissions occur outside the organizational boundary but form part of the University's value chain.

GHG emissions under this category were estimated using procurement and financial data provided by Parul University, including records related to capital asset purchases. Where detailed physical data was not available, a spend-based estimation approach was applied using appropriate secondary emission factors, including Environmentally Extended Input-Output (EEIO) factors, in line with the GHG Protocol Scope 3 guidance.

Table 4: Calculation of category 2

Category 2 – Capital Goods		
Sr No.	**Types of materials**	**tCo_2eq**
1	Construction Aggregates	828.96
2	TMT (MS Rod)	14264.29
3	AAC Blocks	423.44
4	Readymade Mixture Concrete	1913.04
5	Kota Stone & Granite	28.3
6	Clay Bricks/Expose Bricks	2506.96
7	Cement Bags	3951.07
8	Aluminium Frame & Bars	53.92
9	Plywood Sheets	97.13
10	Sunmica Sheets	6.93
11	Wood strips/frames	19.32
12	Electric fittings/materials	83.59
13	Hardware materials	107.84
14	Plumbing Materials	72.74
15	HDPE/STP Materials	32.19
16	Curtains/cloth materials/fittings	73.62
17	Air Conditioners and its associated	46.39
18	Settering materials (By Contractor)	6.05

19	Solar Materials	45.75
20	Glass & its associated materials	22.16
21	Fire Wood	331.49
22	Paver Blocks/Slabs/Pipes	7.17
23	Lift and its materials	47.42
24	Furniture	3.23
25	Lab Instrument	73.09
26	Laboratory equipment	0.55
	Total emission of category 2	**25,046.64**

Category 3: Fuel- and Energy-Related Activities (Not Included in Scope 1 or Scope 2)

This category includes upstream (cradle-to-gate) greenhouse gas emissions associated with the extraction, production, and transportation of fuels and energy purchased and consumed by Parul University during the reporting year 2024–25, which are not already accounted for under Scope 1 or Scope 2. These emissions occur outside the organizational boundary but are attributable to the University's value chain.

The assessment covers well-to-tank emissions related to fuels consumed in on-site stationary and mobile sources, as well as upstream emissions from purchased electricity, including generation and transmission and distribution (T&D) losses, to the extent not included in Scope 2.

GHG emissions under this category were estimated using fuel and electricity consumption data provided by Parul University. Appropriate upstream (well-to-tank) emission factors and transmission and distribution loss factors were applied, sourced from recognized databases such as DEFRA and UK electricity upstream emission factors for electricity generation and T&D losses, in accordance with the GHG Protocol Scope 3 Standard.

GHG emissions under Scope 3 Category 3 were calculated by quantifying the upstream (well-to-tank) emissions associated with fuels and purchased electricity consumed by Parul University during the reporting year, excluding emissions already reported under Scope 1 and Scope 2.

Fuel-related emissions (Well-to-Tank)

For fuels consumed in on-site stationary and mobile sources (e.g., diesel used in DG sets and wood logs used in water heater), emissions were estimated using the fuel-based method**.** Reported fuel consumption data (in litres or kilograms) were multiplied by relevant well-to-tank emission factors sourced from recognized databases such as DEFRA, in line with the GHG Protocol Scope 3 guidance.

Table 5: Calculation of category 3

Category 3 – Fuel and energy related activities		
Sr No.	**Fuel & Energy used**	**tCo_2eq**
1	Diesel	0.94
2	Wood logs	30.24
3	LPG Gas Cylinder	93.41
4	Electricity	20,962.41
	Total emission of category 3	**21,087**

Category 4: Upstream Transportation & Distribution

This category accounts for greenhouse gas emissions associated with the transportation and distribution of goods purchased by Parul University during the reporting year 2024–25, from suppliers to the University's facilities. These emissions occur outside the organizational boundary but are attributable to the University's value chain.

The assessment includes emissions from all relevant upstream logistics activities, covering goods transported by road, rail, air, or sea using vehicles or transport modes not owned or controlled by the University. This category captures the fuel combustion and associated GHG emissions resulting from the movement of purchased goods prior to their arrival at the University.

GHG emissions under this category were estimated using fuel consumption data provided by Parul University for upstream transportation activities, including diesel and petrol fuels used for the movement of goods. An activity-based, fuel-consumption methodology was applied, whereby the quantity of fuel consumed was multiplied by appropriate emission factors to calculate associated GHG emissions. Average biofuel blend emission factors were applied for

diesel and petrol. Emission factors from recognized databases such as DEFRA, EPA, and other internationally accepted sources, were applied in accordance with the GHG Protocol Scope 3 guidance.

Table 6: Calculation of category 4

Category 4 – Upstream Transportation and Distribution		
Sr No.	**Fuel Type**	**tCo_2eq**
1	Diesel	2160.84
2	Petrol	60.19
	Total emission of category 4	**2221.03**

Category 5: Waste Generated in Operations

This category accounts for greenhouse gas emissions associated with the treatment and disposal of waste generated by Parul University during the reporting year 2024–25. These emissions occur outside the University's organizational boundary but are attributable to the University's value chain.

The assessment includes emissions from all waste streams generated in University operations, including hazardous and non-hazardous solid waste, biomedical waste, e-waste, and general municipal waste. Emissions from waste treatment and disposal processes such as landfilling, incineration, recycling, composting, and wastewater treatment were considered, depending on the disposal method.

GHG emissions under this category were estimated using waste generation data provided by Parul University, including records of quantities of waste sent to different treatment or disposal facilities. An activity-based methodology was applied, using waste-type and treatment-specific emission factors sourced from recognized databases such as DEFRA, EPA, Climatiq, and other internationally accepted life-cycle inventory sources, in accordance with the GHG Protocol Scope 3 guidance.

Table 7: Calculation of category 5

Category 5 – Waste Generated in Operation		
Sr No.	**Waste**	**tCo_2eq**
1	Plastic	0.26
2	Paper	0.26
3	Scraps	0.01
4	Food waste	0.32
5	E waste	0
6	Biomedical waste (Yellow category)	5367.51
	Total emission of category 5	**5,368.36**

Category 6: Business Travel

This category accounts for greenhouse gas emissions associated with the treatment and disposal of waste generated by Parul University during the reporting year 2024–25. These emissions occur outside the University's organizational boundary but are attributable to the University's value chain.

The assessment includes GHG emissions arising from business travel undertaken as part of university operations. This covers travel by university employees and representatives using company-arranged or reimbursed transportation modes. Emissions from road-based business travel were considered, including vehicles operating on diesel and compressed natural gas (CNG), depending on the fuel type and vehicle category used for official travel purposes.

GHG emissions under this category were estimated using business travel activity data provided by Parul University, including records of fuel consumption or distance travelled for different vehicle types used for official travel. An activity-based methodology was applied, using distance - and vehicle-specific emission factors sourced from recognized India GHG program and internationally accepted databases such as DEFRA, IPCC, EPA, and other standard life-cycle inventory sources, in accordance with the GHG Protocol Scope 3 guidance.

Table 8: Calculation of category 6

Category 6 – Business Travel		
Sr No.	**Vehicle type**	**tCo_2eq**
1	Diesel (MUV Car)	508.16
2	CNG (Medium sized Car)	5654.52
3	Petrol (Small sized Car)	7670.46
4	Air travel (short haul)	1698.65
5	Air travel (long haul) + Taxi travel	1,07,558.94
6	Rail travel	13.64
	Total emission of category 6	**1,23,104.40**

Category 7: Employee Commuting

This category accounts for greenhouse gas emissions associated with the treatment and disposal of waste generated by Parul University during the reporting year 2024–25. These emissions occur outside the University's organizational boundary but are attributable to the University's value chain.

The assessment includes GHG emissions arising from employee commuting to and from the University campus as part of routine operations. This covers daily travel by employees using various modes of transportation. Emissions from road-based commuting were considered, including cars, two-wheelers, and buses, depending on the mode of transport used by employees for commuting purposes.

GHG emissions under this category were estimated using employee commuting activity data provided by Parul University, including information on commuting distance, frequency, and mode of transport. An activity-based methodology was applied, using distance- and vehicle-mode-specific emission factors sourced from DEFRA, in accordance with the GHG Protocol Scope 3 guidance.

Table 9: Calculation of category 7

Category 7 – Employee Commuting		
Sr No.	**Items**	**tCo_2eq**
1	Cars	8,44,356.29
2	Two-wheeler	24,30,070.46
3	Bus	28,82,501.68
	Total emission of category 7	**61,56,928.43**

Category 13: Downstream Leased Assets

This category accounts for greenhouse gas (GHG) emissions arising from the operation of assets owned by Parul University and leased to third-party entities during the reporting year 2024–25. These emissions occur outside the University's organizational boundary but are attributable to its value chain, in accordance with the GHG Protocol Scope 3 guidance.

The assessment includes GHG emissions associated with leased facilities operated by tenants on the University campus, such as food outlets, retail units, and service providers. As Parul University acts as a lessor and does not operate these assets directly, emissions from fuel and energy use, mobile combustion, and refrigerant-related sources within leased premises were considered under this category.

This category covers emissions associated with fuel and energy use, mobile combustion, and refrigerant-related sources within leased assets operated by third-party tenants on Parul University premises. Emissions from road-based transportation related to leased activities were considered, including cars (petrol), rickshaws (petrol and diesel), and two-wheelers, along with emissions from fire extinguishers, and LPG gas cylinders used within leased premises.

GHG emissions under this category were estimated using Scope 1 and Scope 2 activity data provided by lessees, as compiled by Parul University. A leased-asset-specific methodology, in line with the GHG Protocol Scope 3 guidance (Category 13: Downstream Leased Assets), was applied. Emissions were calculated using reported fuel consumption, LPG consumption data, and vehicle transport for goods multiplied by relevant emission factors. Emission factors were sourced from recognized databases such as CEA, GHG IPCC, GHG protocol, Defra and other

internationally accepted life-cycle inventory sources to estimate the associated GHG emissions.

Table 10: Calculation of category 13

Category 13 – Downstream Leased Assets		
Sr No.	**Items**	**tCo_2eq**
1	Car, Tempo & EECO (Petrol)	1,012.63
2	Tempo & EECO (CNG)	3.98
3	Rikshaw (Diesel)	0.26
4	Rikshaw (Petrol)	3.57
5	Two wheelers (Petrol)	7.23
6	Fire Extinguisher Cylinders (CO_2) Refilled	0.01
7	Purchased cooking gas (LPG)	101.71
	Total emission of category 13	**1,129.38**

6. Result and Discussion

The total Scope 3 greenhouse gas (GHG) emissions for Parul University for the reporting year 2024–25 are estimated at **63,35,256.31 tCO_2eq**, encompassing emissions across the University's value chain. These emissions include upstream activities such as procurement of goods and services, capital goods, fuel and energy use, and transportation, as well as downstream emissions associated with leased assets. In Table 9, category-wise emissions are presented.

Table 11: Category-wise emission

Scope 3 Category	Category Description	Emission (tCo_2eq)
Category 1	Purchased Goods & Services	371.04
Category 2	Capital Goods	25,046.64
Category 3	Fuel & Energy-Related Activities	21,087.00
Category 4	Upstream Transportation & Distribution	2,221.04
Category 5	Waste Generated in Operations	5,368.36
Category 6	Business Travel	1,23,104.41
Category 7	Employee Commuting	61,56,928.43
Category 13	Downstream Leased Assets	1,129.39
Total Emission		**63,35,256.31**

Analysis of Scope 3 emissions shows that **Category 7 – Employee Commuting** is the largest contributing category, with total emissions of **61,56,928.43 tCO_2e**. This is mainly due to the large number of employees and regular commuting over considerable distances using different transport modes. Among the commuting options, bus travel accounts for the highest emissions (28,82,501.68 tCO_2e), followed by two-wheelers (24,30,070.46 tCO_2e) and cars (8,44,356.29 tCO_2e). The results highlight employee mobility as a key driver of Scope 3 emissions and indicate a significant opportunity for emission reduction through improved commuting practices and sustainable transport initiatives.

Category 2 – Capital Goods and **Category 6 – Business travel** are also substantial contributors, primarily due to emissions associated with the production of construction materials, IT and laboratory equipment, and the distance travelled. Other categories, including

Fuel & Energy related activities (Category 3), upstream transportation and distribution (Category 4), and Waste Generated in Operations (Category 5), contribute moderate shares to the total emissions.

These results provide insights into key emission sources across the University's value chain. While upstream activities such as procurement and energy consumption account for a significant portion, travel-related emissions dominate the overall footprint, indicating clear areas for potential mitigation. Downstream leased assets (Category 13) account for a relatively small portion of emissions but are included to ensure a comprehensive assessment.

All emissions were calculated using activity data, including fuel and electricity consumption, waste quantities, transport distances, and leased asset operations, multiplied by recognized emission factors from sources such as DEFRA, India GHG Programme, GHG Protocol, Climatiq, IPCC, and EPA. The methodology follows the GHG Protocol Scope 3 calculation guidelines, ensuring consistency and transparency in reporting. These results serve as a baseline for identifying priority areas for emissions reduction, energy efficiency improvements, and sustainable procurement initiatives across the University.

7. Recommendation and Mitigation Actions

Category 1 – Purchased Goods and Services

Prioritize procurement from Green Pro-certified and other low-carbon suppliers, with a strong preference for localized vendors to minimize transport distances and associated emissions. Bulk purchasing will further reduce logistics-related emissions. Supplier GHG emissions will be tracked annually, with year-on-year reduction targets of 5–10% to drive continuous improvement.

Category 2 – Capital Goods

Choose recycled steel, fly ash concrete, and local materials to minimize embodied carbon. Prioritize prefabricated construction and suppliers with verified low-carbon processes.

Category 3- Fuel & Energy-Related Activities

Switch to LED lighting, energy-efficient equipment, and renewables. Maintain systems regularly and target 5% annual energy reduction through monitoring.

Category 4 – Upstream Transportation

Use CNG/electric vehicles, consolidate shipments, and partner with fuel-efficient logistics providers. Track transport emissions monthly for optimization.

Category 5 – Waste Generated in Operations

Eliminate single-use plastics. Reduce waste generation at source. Target zero waste to landfill through recycling and composting.

Category 6 – Business Travel

Replace flights with video calls, use trains/public transport, and carpool for local trips. Promote fuel-efficient and cleaner vehicles such as CNG, electric, or hybrid vehicles.

Category 7 – Employee Commuting

Employees should be encouraged to use cleaner mobility options such as electric vehicles, CNG vehicles, biofuel-powered vehicles, or fuel-efficient two-wheelers. At the organizational level, conventional diesel buses can be phased out and replaced with electric or biofuel/CNG buses. Additionally, promoting carpooling and shared transport among employees will further reduce fuel consumption and associated greenhouse gas emissions.

Category 13 – Downstream Leased Assets

To reduce emissions from downstream leased assets, energy-efficient lighting, equipment, and appliances should be used, and the capacity of existing solar energy systems can be increased to maximize renewable energy use.

7.1. Way Forward to Net zero emission

Parul University can advance towards net zero emissions by strategically addressing Scope 3 emissions arising from indirect sources across its value chain, including business travel, employee commuting, procurement of goods and services, upstream energy supply chains, and waste management by third parties. Implementing a comprehensive supplier engagement program that prioritizes low-carbon vendors, requires sustainable supply chain certifications (such as Green Pro, ISO 14001, or equivalent), and embeds sustainability criteria within procurement contracts will significantly reduce emissions associated with purchased goods and services.

To mitigate transportation-related impacts, the University can expand the use of virtual collaboration tools, subsidize public and electric transport for staff and students, and partner with low-emission logistics providers for events and supplies. Additionally, systematic primary data collection on employee commuting patterns—through surveys, access records, and mobility assessments—will improve data accuracy, enable targeted interventions, and support measurable emission reduction strategies aligned with net zero goals.

7.2. Measurement and Targets

- Establish a Scope 3 GHG inventory in alignment with GHG Protocol standards to accurately track emissions across the value chain.
- Set science-based targets (SBTi) to define measurable and time-bound emission reduction pathways.
- Conduct annual audits, including green building assessments and green audits, and ESG disclosures to strengthen accountability and support continuous improvement.
- Align sustainability initiatives with ISO 14064 and ISO 50001 standards to ensure transparent, consistent, and measurable progress.
- Integrate technological interventions with nature-based solutions, including Miyawaki afforestation and wastewater reuse, to enhance overall sustainability outcomes.

- Promote strategic investments, institutional innovation, and proactive stakeholder engagement to support long-term climate goals.
- Position Parul University as a model for sustainable higher education, progressing toward its vision of a carbon-neutral campus.

7.3. Innovation and Partnerships

Building on existing initiatives, Parul University can further enhance sustainability through strategic collaborations. The University already operates internal electric vehicles for campus transport, partners with the Kachhre Se Azadi Foundation for effective waste management, and has established GHG monitoring with completed Scope 1 and 2 assessments. Leveraging these successes, similar partnerships can be pursued across other value chain activities to promote circular economy practices, reduce emissions, and drive innovation, reinforcing the University's role as a leader in sustainable higher education.

8. Annexure

8.1. Assumption Sheet

Assumptions considered into GHG inventorization and calculations

Category	Category Description	Materials/Items	Emission Factor Source/Assumption
1	Capital Goods	Xerox Paper A4, A3, A5, Printed Journals, Printed Stationary	Paper (except Newsprint) Mills; Kg Co_2eq /2022 USD, purchased price, EEIO factors converted to INR
		Stationary items (chalk/sutli/duster/pen/pencil/stamp pad/stamp pad ink/highlighter/CD/white board marker/cello tape/glue stick/u-pin/cutter/binder clips/scissor etc.)	Stationery product manufacturing, used EEIO factors
		Cell (Duracell AA+/AAA+/9V Duracell/Eveready C-type/Gluco meter cell)	EEIO Factor used of Primary Battery
		Plastic folders	EEIO factor used of laminated plastics plate, sheet (except packaging), and shape manufacturing
		Cartridges (Canon/Kyocera/Riso/Konica Minolta)	EEIO factor used of printing machinery and equipment manufacturing
		Housekeeping Sanitation Items (Floor Cleaner/Dettol hand-wash/Broom/Garbage Bag/room freshener/cotton duster/dustbin/Colin etc.)	EEIO factor used of polish and other sanitation good manufacturing
		Laboratory machine	EEIO factor used of analytical laboratory instrument manufacturing
		For laboratory glassware	EEIO factor used of other pressed and blown glass and glassware manufacturing
2	Capital goods	Construction Aggregates	Emission factor used of construction aggregates primary material production
		TMT (MS Rod)	Emission factor used of metals primary material production
		AAC Blocks	Emission factor used of concrete primary material production

		Readymade Mixture Concrete	Emission factor used of Concrete Primary material production
		Kota Stone & Granite	Emission factor used of aggregates Primary material production
		Clay Bricks/Expose Bricks	Emission factor used of bricks primary material production
		Cement Bags	Emission factor used of concrete primary material production
		Aluminium Frame & Bars	Emission factor used of metals primary material production
		Plywood Sheets	Emission factor used of wood primary material production
		Sunmica Sheets	Emission factor used of wood primary material production
		Wood strips/frames	Emission factor used of wood primary material production
		Electric fittings/materials	Emission factor used of electric items - small primary material production
		Hardware materials	Emission factor used of metals primary material production
		Plumbing Materials	Emission factor used of plastics: PVC (incl. forming) primary material production
		HDPE/STP Materials	Emission factor used of plastics: HDPE (incl. forming) primary material production
		Curtains/cloth materials/fittings	Emission factor used of clothing primary material production
		Air Conditioners and its associated	Emission factor used of electric items - large primary material production
		Settering materials (By Contractor)	Emission factor used of average construction primary material production
		Solar Materials	Emission factor used of electric items - small primary material production
		Glass & its associated materials	Emission factor used of glass primary material production
		Fire Wood	Emission factor used of wood primary material production
		Paver Blocks/Slabs/Pipes	Emission factor used of average construction primary material production

		Lift and its materials	Emission factor used of metals primary material production
		Furnitures	Emission factor used of wood primary material production
5	Waste generated in operations	Plastic	Emission factor used of Plastics: average plastics closed-loop
		Paper	Emission factor used of Paper and board: mixed closed-loop
		Scrap	Emission factor used of Metal: scrap metals closed-loop
		Food Waste	Emission factor used of organic: food and drink waste composting
		Biomedical Waste	Emission factor used of Incineration
6	Business Travel	Tempo traveller/Tavera/Toofan	Uplift emission factor taken of MUV car
		Sedan	Emission factor for medium hybrid car taken
7	Employee Commuting	Trips Per Week	Trips Per Week considered 6 days, Weeks worked per year considered 36 for cars, one-way distance 227km, for two-wheelers one-way distance consider 25km, for bus one-way distance 40km and weeks worked per year 38 were taken

8.2. List of Abbreviations

GHG: Greenhouse gas

ESG: Environment, social, and governance

tCo_2eq: Tonnes carbon dioxide equivalent

tCO_2eq/t: Tonnes carbon dioxide equivalent per tonne

kg CO_2eq: kilogram carbon dioxide equivalent

kg CO_2eq/kg: kilogram carbon dioxide equivalent per kilogram

IPCC: Intergovernmental Panel on Climate Change

EEIO: Environmentally Extended Input-Output

T&D: transmission and distribution

DEFRA: Department for Environment, Food and Rural Affairs

DG sets: Diesel Generator sets

WTT: Well-to-tank

EPA: Environment protection act

CNG: Compressed natural gas

LPG: Liquified petroleum gas

GWP: Global Warming Potential

CEA: Central Electricity Authority

9. References

1. Greenhouse gas protocol https://share.google/0Nm0OTKtsL6sutiCJ
2. Emission Factor for greenhouse gas inventories https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf
3. IPCC 2006 Guidelines for National Greenhouse Gas Inventories
4. A Corporate Accounting and Reporting Standard by 'The Greenhouse Gas Protocol'
5. Corporate value chain (scope 3) standard https://ghgprotocol.org/corporate-value-chain-scope-3-standard
6. Government UK: Greenhouse gas reporting conversion factor 2025 https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2025
7. India GHG programme https://indiaghgp.org/
8. CEA (Central Electricity Authority) https://ceaclearance.gov.in/