

CARBON FOOTPRINT REPORT

APR 2023 - DEC 2024



THE PATH TO A CLEANER FUTURE

ABOUT THIS REPORT

This report outlines the carbon footprint generated by the operations of Inventys Research Company Pvt. Ltd. in FY 2023-24 & April 2024 – December 2024 through the assessment of greenhouse gas (GHG) emissions. It covers Scope 1, 2 and most material categories from Scope 3 emissions. All the data collected and analyzed within this report follow The Greenhouse Gas Protocol outlined by the World Resources Institute (WRI) and ISO 14064-1: 2018 – Greenhouse gases – Part 1, maintaining a high standard of accuracy and transparency in emissions measurement, management, and reporting processes.

CARBON FOOTPRINT REPORT FY 2023-24 & April 2024 – December 2024

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 <p>Inventys Research Company Pvt. Ltd. Butibori, K-38, Five Star Industrial Area, MIDC, Butibori -441122 Dist. Nagpur, Maharashtra State, India www.inventys.com</p>  <p>Report Approved by Mr. Dr. Deepak Birewar (Chairman and Managing Director) Mr. Umesh Kamat (Managing Director) Mr. Shrikant Kanadey (General Manager)</p>	 <p>Prepared by WIRE CONSULTANCY TEAM Mr. Syed Mohd Kazim Zaidi (Sr. Sustainability Consultant) Ms. Jyoti P (Sr. Sustainability Consultant) Ms. Nisha Gupta (Jr. Sustainability Consultant)</p> <p>Reviewed by Mr. Shishpal Singh Negi - Certified Carbon Footprint (ISO 14064)</p>  <p>This report was produced with the support of the WIRE CONSULTANCY www.wireconsultants.com</p>
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ABBREVIATIONS & ACRONYMS

BY	Base Year
CEA	Central Electricity Authority
CO₂	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
DEFRA	Department for Environment, Food and Rural Affairs
D.G.	Diesel Generator
EPA	Environment Protection Agency
GHG	Greenhouse Gases
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standard Organization
kWh	Kilowatt Hour
L	Liter
LPG	Liquefied Petroleum Gas
mt	Metric Tons
mtCO_{2e}	Metric Tons Carbon Dioxide Equivalent
tCO_{2e}	Ton of Carbon Dioxide Equivalent
WRI	World Resources Institute

CONTENT

ABOUT THIS REPORT	1
LIST OF TABLES	4
LIST OF FIGURES	5
DIRECTOR MESSAGE	6
1. EXECUTIVE SUMMARY	7
2. INTRODUCTION	16
3. INVENTORY DESIGN & DEVELOPMENT	21
4. OVERALL METHODOLOGY	27
5. CARBON FOOTPRINT	33
6. DATA SOURCES AND QUALITY	62
6. REFERENCES	69

LIST OF TABLES

Table 1: Scope-wise GHG emissions	7
Table 2: Category-wise GHG emissions (FY 2023-24)	8
Table 3: Category-wise GHG emissions (April 2024- December 2024)	10
Table 4: GHG Emission Intensity per employee (FY 2023-24)	12
Table 5: GHG Emission Intensity per employee (April 2024 – December 2024)	12
Table 6: Organizational Boundaries Details.....	23
Table 7: GHG Gases Covered.....	28
Table 8: Emission Factors and Conversion Values Used in GHG Calculations	30
Table 9: Emissions by Category (Scope-1, Scope-2 and Scope-3) in FY 2023-24.....	33
Table 10: Emissions by Category (Scope-1, Scope-2 and Scope-3) in Apr 24- Dec 24.....	34
Table 11: Emissions from Diesel Combustion in D.G. Set	37
Table 12: Emissions from LPG Consumption.....	38
Table 13: Emissions from ETP Operation.....	39
Table 14: Emissions from STP Operation	40
Table 15: Emissions from HFC-PFC Consumption.....	41
Table 16: Emissions from Use of Fire Extinguishers.....	42
Table 17: Summary of Scope-1 Emissions (FY 2023-2024)	42
Table 18: Summary of Scope-1 Emissions (April 2024- December 2024).....	43
Table 19: Summary of Scope-2 Emissions	46
Table 20: Emissions from Purchased Goods and Services.....	47
Table 21: Emissions from Capital Goods.....	48
Table 22: Emissions from Upstream Transportation	49
Table 23: Emissions from Downstream Transportation.....	50
Table 24: Emissions from Operational Waste	51
Table 25: Emissions from Business Travel.....	52
Table 26: Emissions from Employee Commute.....	53
Table 27: Emissions from Processing of Sold Products	54
Table 28: Summary of Scope-3 Emissions (FY 2023-2024)	55
Table 29: Summary of Scope-3 Emissions (April 2024- December 2024).....	56
Table 30: CO ₂ Sequestration by Tree Species (FY 2024-25)	58
Table 31: Miyawaki Plantation.....	59
Table 32: Biomass Consumption and Emission Reduction.....	61
Table 33: Biomass Consumption and Emission Reduction.....	61
Table 34: Quality of Sourced GHG Data.....	63
Table 35: Exclusion of GHG Emissions.....	66

LIST OF FIGURES

Figure 1: GHG emissions by Scope	7
Figure 2: GHG emission % by categories (FY 2023-24)	9
Figure 3: GHG emission % by categories (April 2024- December 2024)	11
Figure 4: Inventys Research Company Pvt. Ltd. layout.....	18
Figure 5: GHG Inventory Development Process.....	21
Figure 6: Photographs of the site (Site Visit- 28 th February & 1 st March, 2025).....	24
Figure 7: Scope-1 Emission by Sub-categories (FY 2023-24)	43
Figure 8: Scope-1 Emission by Sub-categories (April 2024- December 2024)	44
Figure 9:Scope-3 Emission by Sub-categories (FY 2023-24).....	56
Figure 10:Scope-3 Emission by Sub-categories (April 2024- December 2024)	57

DIRECTOR MESSAGE



"Driving Innovation, Shaping a Sustainable Future"

At Inventys Research, sustainability is more than a principle—it's the foundation of our vision for a better tomorrow. In an increasingly complex world, we believe true innovation lies at the intersection of science, environmental stewardship, and social responsibility.

Sustainability is embedded in everything we do—from pioneering green chemistry to minimizing waste and reducing our carbon footprint. These efforts reflect our belief that responsible innovation not only protects our planet, but also creates enduring value for our stakeholders and communities. Our team is dedicated to addressing global challenges—whether through advancing clean energy, improving resource efficiency, or developing sustainable materials. This Carbon Footprint Report is a reflection of our commitment to transparency and progress. It outlines our emissions across all scopes, from sourcing to production and distribution, and charts our ongoing efforts toward improvement.

We're proud of the strides we've made, but we know the journey is far from over. This report is not just a record—it's a catalyst. It represents our ongoing commitment to accountability, impact, and leadership in sustainability. As we grow, sustainability will remain a central pillar of our strategy. This is not only our responsibility—it is our opportunity to lead, to collaborate, and to drive systemic change in building a resilient, low-carbon future.

Together, let's lead with purpose—and build a sustainable tomorrow.

Dr. Deepak Birewar

Chairman and Managing Director

Inventys Research Company Pvt. Ltd.

1 EXECUTIVE SUMMARY

Inventys Research Company Pvt. Ltd. recognizes its role in working to conserve the environment while satisfying the needs of its clients and aims to take proactive steps to be part of the solution by assessing its carbon footprint and disclosing emissions from its operations. The carbon footprint report for FY 2023-24 & April 2024 – December 2024 evaluates various operational activities based on the GHG Protocol and ISO 14064-1 standard, highlighting the company's dedication to sustainability.

1.1 CARBON FOOTPRINT RESULTS SUMMARY

SCOPE-WISE GHG EMISSIONS:

The summary of greenhouse gas (GHG) emissions by different scopes within the reporting boundary for FY 2023-24 & April 2024 – December 2024 is presented below:

Table 1: Scope-wise GHG emissions

Category	Emissions in tCO ₂ e ⁻ FY 2023-24	Emissions in tCO ₂ e ⁻ April 2024 – December 2024
Scope 1	89.27	76.23
Scope 2	2127.88	2547.01
Scope 3	16058.16	66572.44
Total GHG Emissions (Scope-1+2+3)	18275.31	69195.68

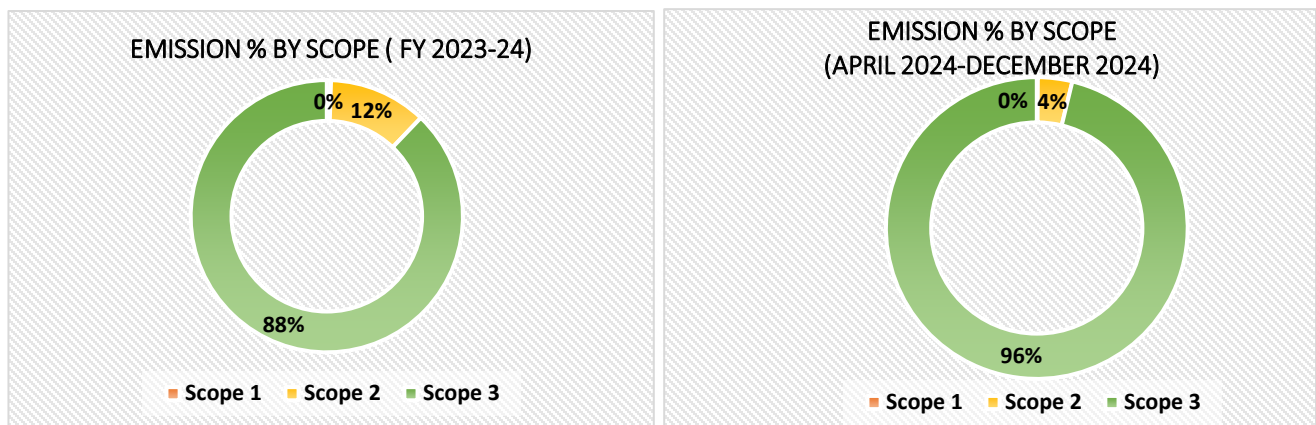


Figure 1: GHG emissions by Scope

1.2 CATEGORY-WISE GHG EMISSION

Table 2: Category-wise GHG emissions (FY 2023-24)

Scope	Category	Emissions (tCO ₂ e) (FY 2023-24)
1	Diesel Consumption in D.G.	12.52
	LPG Consumption	14.52
	ETP	7.12
	STP	0.17
	HFC-PFC Consumption in Air Conditioners	54.76
	Fire Extinguishers	0.17
2	Purchased Electricity	2127.88
3	Purchased Goods and Services	1018.69
	Capital Goods	454.94
	Upstream Transportation and Distribution	33.27
	Downstream Transportation and Distribution	13518.21
	Operational Waste	3.57
	Business Travel	74.98
	Employee Commute	0.16
	Processing of Sold Products	954.35
	Total	18275.31

Emission % by categories (FY 2023-24)

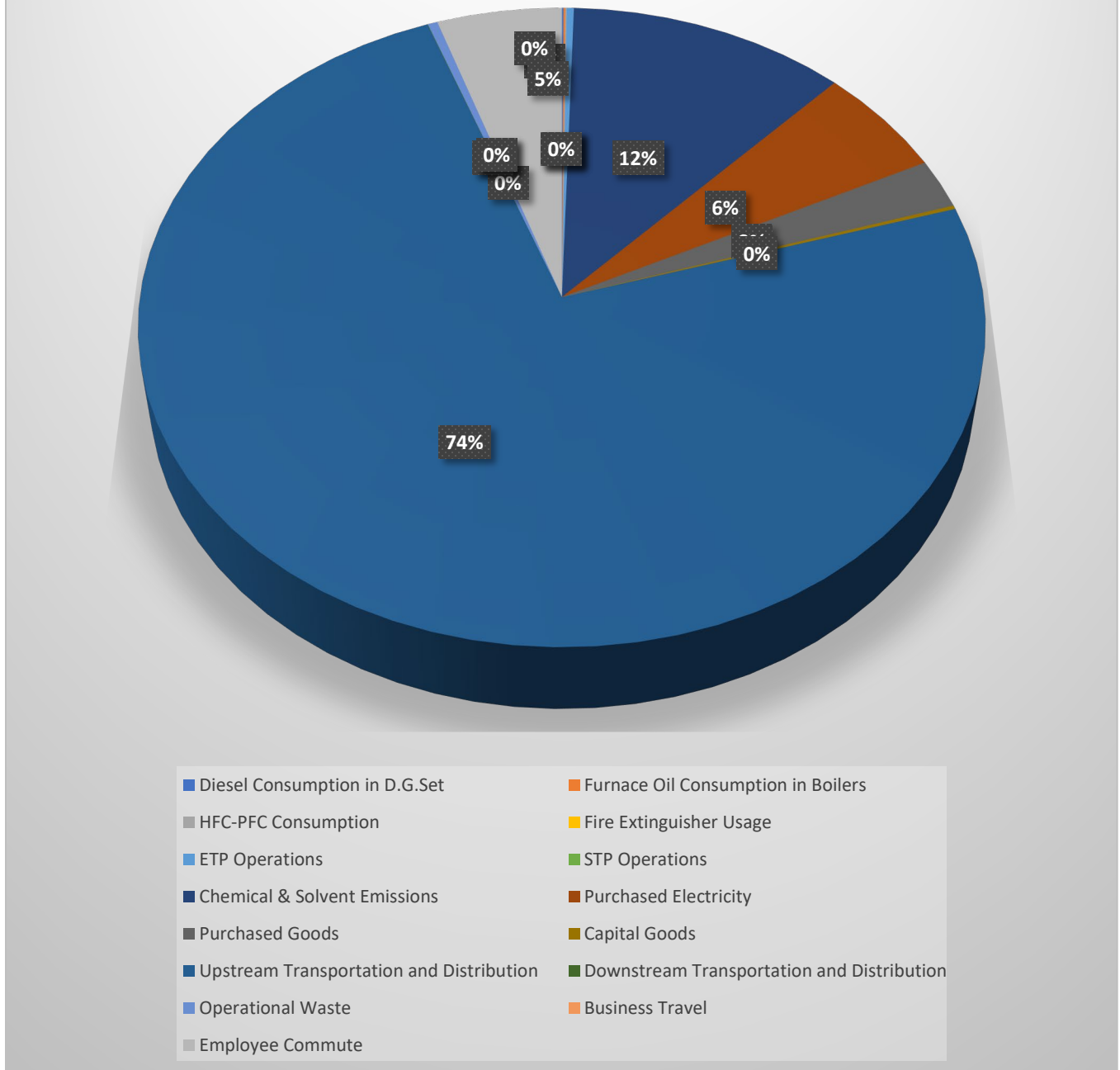
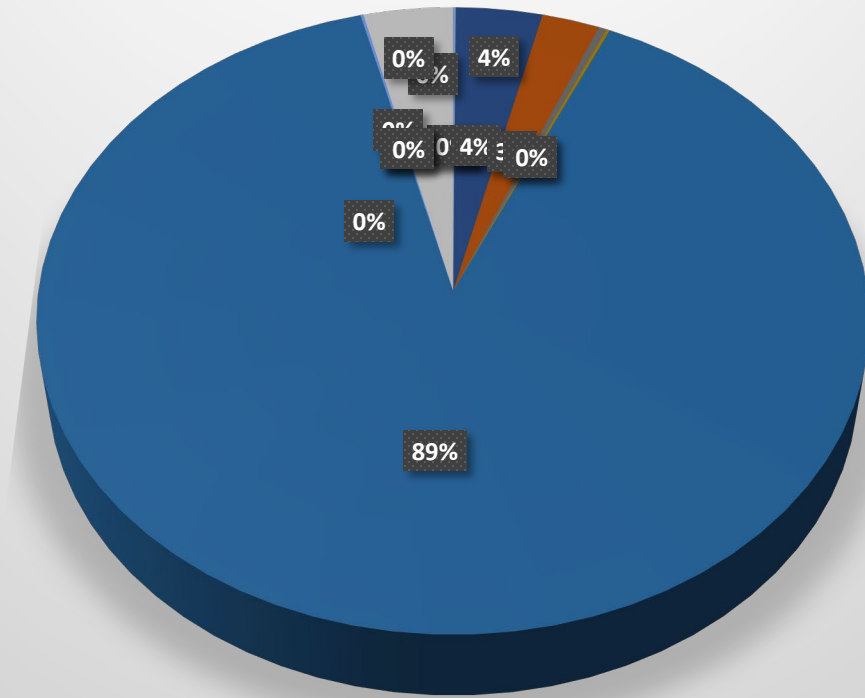


Figure 2: GHG emission % by categories (FY 2023-24)

Table 3: Category-wise GHG emissions (April 2024- December 2024)

Scope	Category	Emissions (tCO ₂ e) (April 2024- December 2024)
1	Diesel Consumption in D.G.	16.56
	LPG Consumption	11.51
	ETP	4.13
	STP	0.12
	HFC-PFC Consumption in Air Conditioners	43.76
	Fire Extinguishers	0.14
2	Purchased Electricity	2547.01
3	Purchased Goods and Services	1712.13
	Capital Goods	230.71
	Upstream Transportation and Distribution	95.81
	Downstream Transportation and Distribution	61813.88
	Operational Waste	1.33
	Business Travel	88.18
	Employee Commute	0.11
	Processing of Sold Products	2630.30
	Total	69195.68

Emission % by categories (April 2024- December 2024)



- Diesel Consumption in D.G. & Forklift
- LPG Consumption
- ETP
- STP
- HFC-PFC Consumption
- Fire Extinguisher
- Purchased Electricity
- Purchased Goods and Services
- Capital Goods
- Upstream Transportation and Distribution
- Downstream Transportation and Distribution
- Operational Waste
- Business Travel
- Employee Commute
- Processing of Sold Products

Figure 3: GHG emission % by categories (April 2024- December 2024)

1.3 GHG EMISSION INTENSITY

GHG EMISSION INTENSITY PER EMPLOYEE:

The details for GHG emissions intensity for FY 2023-24 & April 2024 – December 2024 are assessed as follows:

Table 4: GHG Emission Intensity per employee (FY 2023-24)

Site	Number of Employees	Total Absolute GHG Emissions	Total GHG Emission Intensity per employee (mtCO ₂)
Inventys Research Company Pvt. Ltd., Nagpur, Maharashtra	310	18275.31	58.95

Table 5: GHG Emission Intensity per employee (April 2024 – December 2024)

Site	Number of Employees	Total Absolute GHG Emissions	Total GHG Emission Intensity per employee (mtCO ₂)
Inventys Research Company Pvt. Ltd., Nagpur, Maharashtra	310	69195.68	223.21

1.4 CARBON SEQUESTRATION THROUGH TREE PLANTATION

Inventys Research Company Private Limited has also taken proactive steps towards mitigating its carbon footprint by planting trees. Tree Plantation plays a crucial role in carbon sequestration, as trees absorb atmospheric CO₂ through photosynthesis and store it in their biomass and the soil. The trees planted have sequestered a total annual rate of 4.11 metric tons of CO₂ per annum. This carbon sequestration helps offset a portion of the plant's greenhouse gas emissions and contributes to the company's overall sustainability efforts.

Reduction Initiative	tCO ₂ sequestered per annum (April 2024 - December 2024)
CO ₂ Sequestration by Tree Plantation	4.11

1.5 EXISTING SUSTAINABILITY INITIATIVES

Our Sustainability Initiatives in Action

At Inventys Research, sustainability isn't just a vision—it's a daily practice. Through ongoing green initiatives and active environmental programs & through practical, measurable actions, we minimize our environmental impact while fostering a culture of responsibility. Here are some of the key steps we've taken:

Energy Efficiency

- Installed 5-star rated ACs for optimal cooling with minimal energy consumption.
- Implemented sensor-based electricity systems to reduce unnecessary power usage.

Emission Control & Air Quality

- Installed scrubber systems to effectively control and reduce harmful emissions.
- Installed retrofits to minimize excess diesel consumption in equipment.

Green Spaces & Awareness

- Carried out plantation drives to enhance green cover and offset carbon footprint.
- Biomass (Pellets + Briquettes) utilization for sustainable waste-to-energy conversion.
- Regular sustainability awareness training for employees to promote eco-conscious practices.



"Small steps today lead to a greener tomorrow—we're committed to making every action count."

Also, the company maintains and actively enforces robust environmental policies, occupational health and safety guidelines, and green procurement practices throughout its supply chain. These management systems are independently validated through ISO 14001:2015 (Environmental Management System) and ISO 45001:2018 (Occupational Health and Safety Management System) certifications, ensuring adherence to international best practices in sustainability governance.

1.6 SUSTAINABILITY INITIATIVES - FUTURE ROADMAP

Our Path to a Greener Future

Expanding Green Initiatives

- Large-Scale Plantation Drives: Target of 500+ native trees/year to enhance biodiversity and carbon sequestration.
- Employee Green Champions: Volunteer teams to lead local ecological restoration projects.

Energy Transformation

- Solar Panel Integration: Transitioning 30% of facility energy to solar power by 2028, with a 100% renewable goal by 2035.
- Upgrading to 5-Star Rated ACs: Phasing out older systems to cut cooling-related energy use by 25%.

Sustainable Mobility

- EV Fleet Transition: Replacing 50% of company vehicles with electric alternatives by 2030, supported by on-site charging stations.
- Green Commuting Incentives: Subsidies for employees using EVs, bicycles, or public transport.

Beyond Compliance

- AI-Driven Resource Optimization: Deploying smart systems to monitor and reduce water/energy waste in real time.

2 INTRODUCTION

At the current global rate of consumption, humans are depleting natural resources at a faster pace than they are replenished, leading to a projected need to satisfy our needs by 2030. To address this challenge, it is imperative to reduce carbon emissions.

Inventys Research Company Pvt. Ltd. is hereby presenting its carbon footprint assessment for FY 2023-24 & April 2024 – December 2024, aimed at quantifying and evaluating the company's greenhouse gas (GHG) emissions. This assessment serves as a means to establish benchmarks for GHG emissions performance indicators and to track progress over time.

2.1 About Inventys Research Company Pvt. Ltd.

Inventys Research Company Pvt. Ltd. is an Indian research-driven chemical manufacturing firm with over four decades of expertise in research, process development, scale-up, and production of fine chemicals and active ingredients for pharmaceutical, agrochemical, and specialty chemical applications. The company is certified by WHO-GMP, ISO 9001, ISO 14001, and OHSAS 18001, underscoring its commitment to quality and safety standards.

Headquartered in Mumbai with manufacturing facilities in Nagpur, Inventys serves as a reliable and trustworthy manufacturing partner to innovators in the life sciences domain. The company's services include exclusive manufacturing and Contract Development and Manufacturing Organization (CDMO) services for crop protection (producing actives, advanced intermediates, and registered starting materials), healthcare (advanced intermediates and key starting materials), electronics (specialty chemicals), and other applications.

Inventys has a strong focus on sustainability and innovation. Since 2012, the company has converted more than 51% of its energy usage to be derived from non-depletable resources. Additionally, over 30% of its revenue comes from green chemistry-based products with zero effluent generation. This commitment to circularity was recognized by the Federation of Indian Chambers of Commerce and Industry (FICCI) with the Best Green Process award in 2022

Main Services and Products of Inventys Research Company Pvt. Ltd.

Main Services

- Contract Development and Manufacturing Organization (CDMO) services, including custom synthesis and exclusive manufacturing of fine chemicals.
- Process research and development, with expertise in green chemistry and continuous process optimization.
- Exclusive manufacturing for life sciences and specialty chemicals, providing flexible production capabilities for pharmaceuticals, agrochemicals, and specialty sectors.

Main Products

- Pharmaceutical ingredients and intermediates, including key starting materials and high-purity specialty chemicals.
- Agrochemical actives and intermediates, focusing on crop protection solutions with sustainable formulations.
- Specialty chemicals for electronics and industrial applications, supporting semiconductor and high-performance sectors.
- Green chemistry-based products, with over 30% of the portfolio dedicated to eco-friendly and zero-effluent solutions.

Inventys continues to be a trusted partner for global innovators, leveraging advanced chemistry, sustainable practices, and large-scale manufacturing expertise.

2.2 Boundaries & Methodology

Inventory boundaries are divided into organizational and operational. The organizational boundary pertains to the businesses and operations that form part of Inventys Research Company Pvt. Ltd. In the FY 2023-24 & Apr 2024 -Dec 2024 reporting period, Inventys Research Company Pvt. Ltd. Nagpur, Maharashtra.

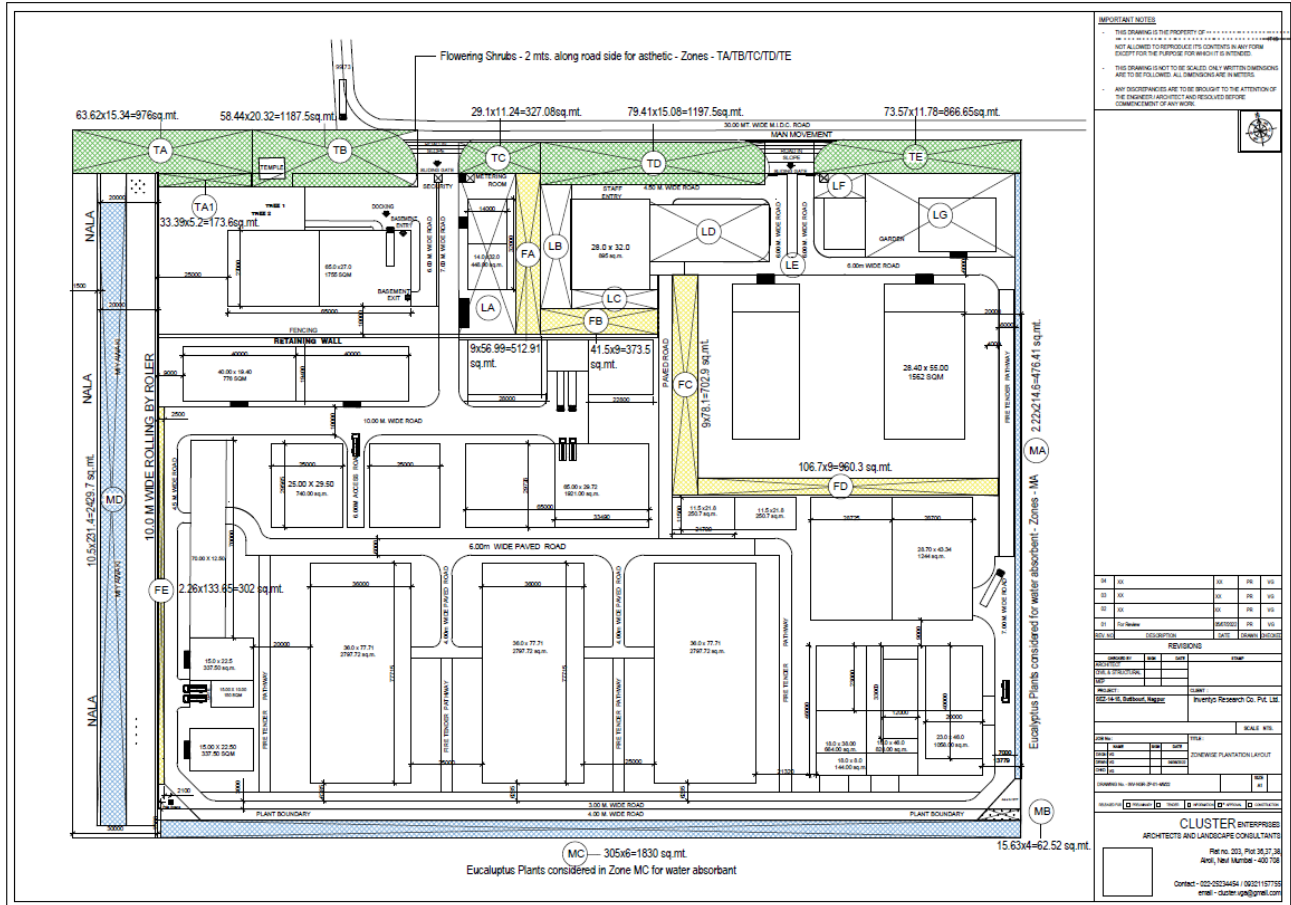
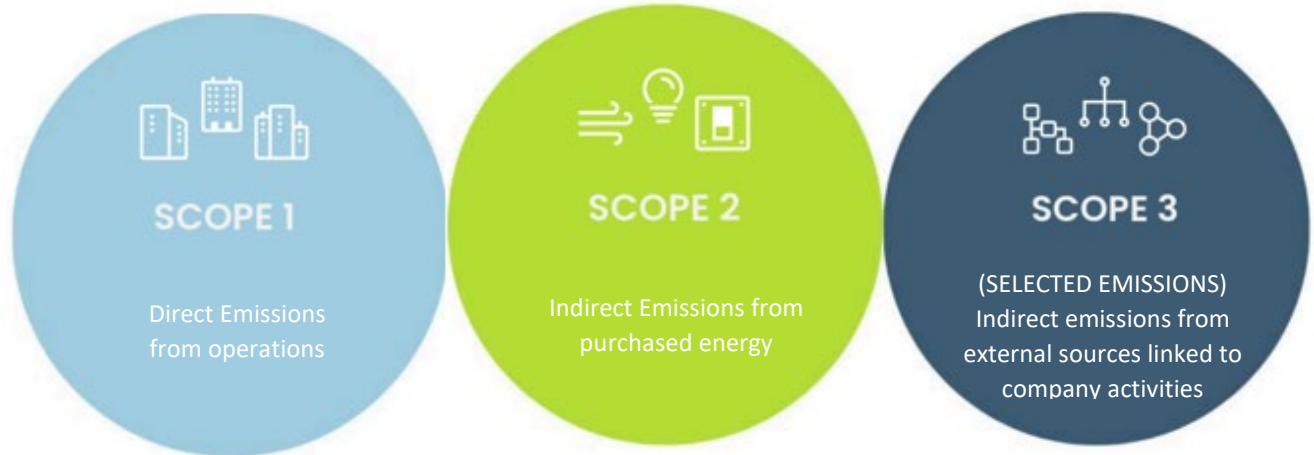


Figure 4: Inventys Research Company Pvt. Ltd. layout

The operational boundaries are the activities that lead to emissions whether they are direct or indirect. They include direct GHG emissions (Scope 1), indirect GHG emissions from the consumption of purchased electricity (Scope 2), and selected categories from indirect GHG emissions from external sources (Scope 3).



The analysis and calculations of this assessment followed protocols & standards specially developed for accounting and reporting carbon footprint including The Greenhouse Gas Protocol Guidelines, the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for Greenhouse Gas Inventories (with 2019 Refinements) and the ISO 14064-1:2018 Standards.

2.3 Base Year for GHG Inventory and Reporting Period

A base year is a reference year in the past with which current emissions can be compared. In order to maintain the consistency and comparability with future carbon footprints, base year emissions need to be recalculated when structural changes occur in the company that change the inventory boundary (such as acquisitions or divestments). If no changes to the boundaries of the inventory happen, the base year is not adjusted.

The first year of reporting for the company is Fiscal Year 2023-24; thus, the current report is also considered the base year for the company.

2.4 REPORT DEVELOPMENT - TECHNICAL EXPERTISE

This report was produced with the support of WIRE CONSULTANCY, a leading sustainability consulting firm specializing in carbon footprint assessment, environmental management, and sustainability reporting. With a team of certified professionals, Wire Consultancy helps organizations measure, manage, and mitigate their environmental impact while improving operational efficiency.

WIRE CONSULTANCY brings expertise in:

- Greenhouse gas emissions inventory development as per ISO 14064 standard & GHG Protocol
- Sustainability/ESG reporting and disclosure
- Environmental compliance and management systems
- Climate change mitigation and adaptation
- Energy efficiency and renewable energy transition study

REPORT PREPARATION TEAM:

Mr. Syed Mohd Kazim Zaidi (Sr. Sustainability Consultant)

- Lead analyst for emissions calculation and methodology development

Ms. Jyoti P (Sr. Sustainability Consultant)

- Data analysis, emissions categorization specialist and report preparation

Ms. Nisha Gupta (Jr. Sustainability Consultant)

- Data collection and report drafting support

REPORT REVIEWER:

In addition, this carbon footprint report has been thoroughly reviewed for accuracy, completeness, and compliance with international greenhouse gas accounting standards.

Mr. Shishpal Singh Negi *Certified Carbon Footprint Professional (ISO 14064)*

Mr. Shishpal Singh Negi brings over 12 years of experience in environmental assessment and carbon accounting. His expertise in ISO 14064 standards ensures this report meets the highest levels of technical accuracy and methodological consistency.



3 INVENTORY DESIGN & DEVELOPMENT

Sustainability reporting acts as a powerful tool for controllers, public interest groups, and other stakeholders to determine the environmental performance of an organization. Quantification of GHG emissions requires the GHG activity data to be collected and recorded at a sufficiently disaggregated level, and capable of being consolidated in various forms. The Company has developed and implemented GHG monitoring and quantification system in line with the requirements of GHG Protocol and ISO 14064-1:2018.

GHG MANAGEMENT PROCESS

The major steps taken in designing and development of GHG Inventory are as follows:

1. Defining operational boundary
2. Identification of GHG sources
3. Selection and collection of GHG activity data
4. Selection of GHG emission factors
5. Calculation of GHG emissions

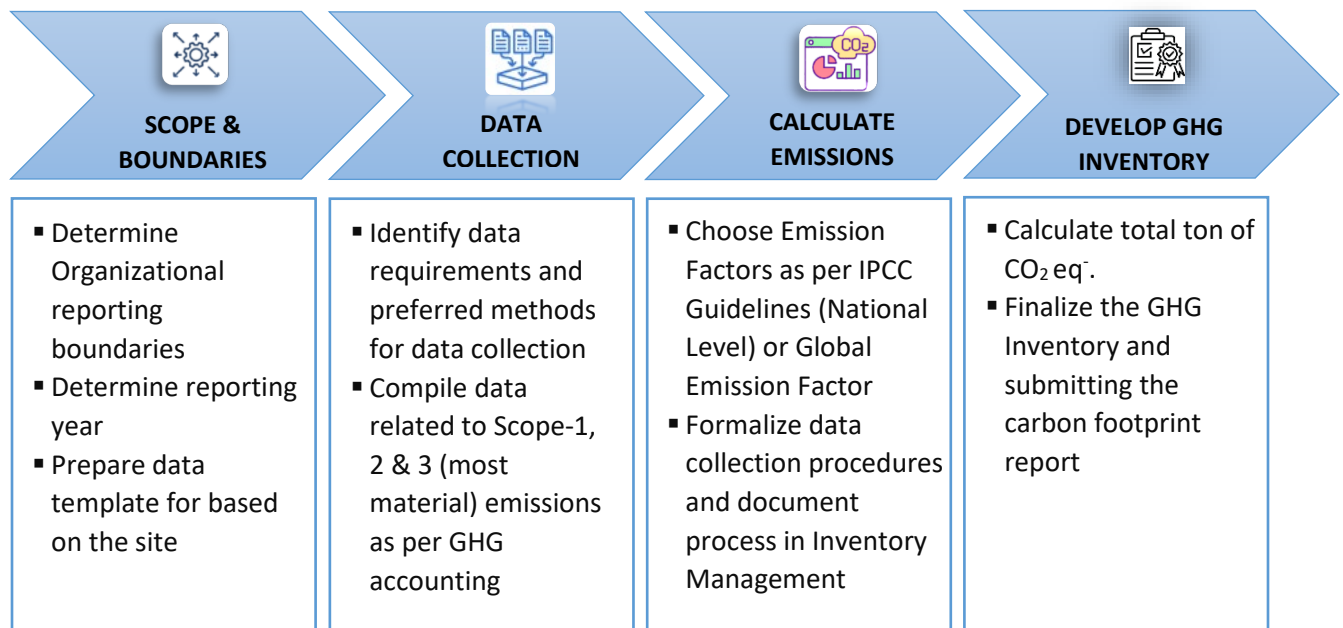


Figure 5: GHG Inventory Development Process

The emissions factors selected, and methodologies used for GHG accounting are referenced from the sources as given in the standard (ISO 14064 - 1: 2018) e.g., GHG protocol, DEFRA, IPCC etc.

Completeness

The company has accounted for emission sources which contribute significantly to its GHG emissions for scope 1 and scope 2 while has selected sources from scope 3 based on the relevance of the emission type.

Scope 1 sources have been allocated and assessed and a proper monitoring system has been identified for each emission source. All the purchased electricity consumption sources are accounted for direct GHG emissions under scope 2. For Scope 3, most material are accounted for GHG emissions.

Materiality

Information is material if, by its inclusion or exclusion, it can be seen to influence any decisions or actions taken by users of it. Therefore, within the predefined scope the source of emissions that by its inclusion or exclusion makes a significant difference in reported GHG emissions or GHG removals will be considered material for GHG Inventory. The company has established and implemented procedures to identify and record GHG emission sources resulting within the boundary.

GHG Activity Data Monitoring, Transparency and Accuracy

The company has established and implemented the procedures for identification of GHG sources and sinks and the procedures to monitor and record the GHG activity data during the given period. The calculations of GHG emissions for the period are based on actual data monitored and recorded.

3.1 Organizational Boundaries

The organizational boundary for the current GHG report encompasses the operations of Inventys Research Company Pvt. Ltd, Nagpur, Maharashtra. Inventys Research Company Pvt. Ltd. is considered a single entity for this report, with no subsidiaries or separate entities included in the GHG emission boundary. The following site has been included within the set boundary:

Table 6: Organizational Boundaries Details




 Office Site	 Number of Employees	 Type of Premise
Inventys Research Company Pvt. Ltd, Nagpur, Maharashtra	310	Research and Manufacturing Facility





Figure 6: Photographs of the site (Site Visit- 28th February & 1st March, 2025)

3.2 Operational Boundaries

In establishing the operational boundary for GHG accounting of Inventys Research Company Pvt. Ltd., it has identified emissions associated with its operations and categorized them as direct, indirect, and other indirect emissions, which fall under Scope 1, Scope 2, and Scope 3 categories respectively. The operational boundary includes the complete value chain and all products that are part of Inventys Research Company Pvt. Ltd. business offerings.

Direct GHG emission sources included in the GHG inventory are the sources owned and controlled by the company. The major and only identified source of indirect emissions caused by the organization is the consumption of grid electricity. Emissions due to this category are the consequence of energy consumption activities taking place in the factory, however, the source (i.e., combined grid) is neither owned nor controlled by the organization. Similarly, other indirect emission sources (i.e., purchased goods and services, operational waste, employee commuting, upstream transportation, downstream transportation, business travel, etc.) included in this inventory are not under the control of the company.

3.3 Scope Emissions

Scope-1: Direct GHG Emissions

The organization has identified major source of its direct GHG emissions from operational safety processes like-

- Diesel consumption in Utilities (DG Set)
- LPG Consumption
- ETP
- STP
- HFC-PFC Consumption (Refrigeration system)
- Fire Extinguisher

Scope 2: Indirect GHG Emissions

The only GHG emission source for Scope 2 emissions at the company is

- Grid Electricity Consumption (purchased Electricity)

The electricity is imported from Indian Grid. State DISCOM issues monthly electricity bills against electricity consumption. The total consumption units given in the power bills are used for the calculation of indirect GHG emissions from purchased electricity.

There are GHG removal activities by the company in the reporting year by purchase and utilization of energy generated from renewable sources (solar and wind).

Scope 3: Other Indirect GHG Emissions
















Scope 3 allows for the treatment of all other indirect GHG emissions which are a consequence of the activities of the company but occur from sources not owned by the company and not included under scope 1 and scope 2 emissions. The scope 3 emissions are distinguished in 15 categories depending upon the upstream and downstream emission sources across the corporate value chain of the organization.

The company has accounted for the selected emissions from Scope-3 such as

- Purchased Goods and Services

- Capital Goods
- Upstream transportation and distribution
- Downstream transportation and distribution
- Operational waste
- Business travel
- Employee commute
- Processing of sold products




Other categories have not been included in the scope of calculation for the reporting year either due to unavailability of data or due to inapplicability of the category for the company scope and relevant business activities.

SCOPE 1	SCOPE 2	SCOPE 3
 DG Set	 Purchased Electricity	 Purchased Goods and Services
 LPG Consumption		 Capital Goods
 ETP		 Upstream Transportation
 STP		 Downstream Transportation
 HFC-PFC Consumption		 Operational Waste
 Fire Extinguisher		 Business Travel
		 Employee Commute
		 Processing of sold products

4 OVERALL METHODOLOGY

4.1 Followed Protocols & Standards

Currently there are several internationally recognized methodologies and standards for the calculation of carbon footprint according to their approach, scope and orientation. Inventys Research Company Pvt. Ltd. Carbon Footprint analysis and calculations were based on:

 <p>GREENHOUSE GAS PROTOCOL</p>	<p>THE GREENHOUSE GAS PROTOCOL GUIDELINES</p> <ul style="list-style-type: none">❖ A Corporate Accounting and Reporting Standard❖ Corporate Value Chain (Scope 3) Accounting and Reporting Standard
	<p>ISO 14064-1: 2018</p> <ul style="list-style-type: none">❖ Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
	<p>2006 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)</p> <ul style="list-style-type: none">❖ Guidelines for Greenhouse Gas Inventories (with 2019 Refinements)

4.2 Data Collection

The identification of emission sources and the type of data available, assessment has been done. Accordingly, customized data collection spreadsheets were designed for each emission source considered in the GHG inventory. Data collection sheets were communicated and reviewed simultaneously with the focal points at the departments to ensure transparency and completeness in data collection procedure. Data collected was categorized under Scope-1 direct emissions, Scope-2 indirect emissions and Scope-3 other indirect emissions.

4.3 Calculation Approach



Global warming potentials (GWPs) are factors describing the radiative forcing impact of one unit of a specific greenhouse gas (e.g. methane) relative to one unit of carbon dioxide. They are used in GHG accounting to convert individual greenhouse gas emissions to a standardized unit for comparison; carbon dioxide equivalent (CO_{2e}).

100-year GWPs to all emissions data in this inventory in order to calculate total emissions, in metric tons carbon dioxide equivalent (tCO_{2e}). Global warming potential values were sourced from the Intergovernmental Panel on Climate Change’s (IPCC) Sixth Assessment Report (AR6, Version No. 2, 2024), the most recent IPCC report available at the time of assessment. The Kyoto Protocol GHGs (or categories of GHGs) and their respective GWPs are listed in the table below:

Table 7: GHG Gases Covered

Greenhouse Gas	Chemical Formula	100-Year GWP
Carbon Dioxide	CO ₂	1
Methane - fossil	CH ₄	29.8
Nitrous Oxide	N ₂ O	273
Hydrofluorocarbons (HFCs)	Various	Various
Perfluorocarbons (PFCs)	Various	Various
Nitrogen Trifluoride	NF ₃	17,400
Sulphur Hexafluoride	SF ₆	24,300

To calculate the GHG emissions, the main formula used is:

$$\text{GHG Emissions (tCO}_2\text{e)} = \text{Activity Data (unit of activity)} \times \text{Emission Factor} \times \text{GWP}$$

Where,



ACTIVITY DATA

Activity data are those associated with the consumption of energy, electricity or consumables of the organization and were obtained via customized data collection sheets.



EMISSION FACTOR

Emission factors (EF) are representing the quantity of pollutants released to the atmosphere caused by a certain activity. The emission factor is usually expressed as the carbon dioxide equivalent (CO₂e) emissions generated by a unit such as weight, volume and distance, e.g., CO₂e/litre fuel consumed or CO₂e-/kWh of purchased electricity etc. Emission factors are retrieved from Department for Environment, Food & Rural Affairs (DEFRA), 2006 Intergovernmental Panel on Climate Change (IPCC) with 2019 Refinements, Country Specific Emission Factors, India, Country specific grid electricity emission factor and Environmental Protection Agency.



GLOBAL WARMING POTENTIAL (GWP)

GWP, is the heat absorbed by any greenhouse gas in the atmosphere, as a multiple of the heat that would be absorbed by the same mass of carbon dioxide. GWP is 1 for CO₂. The global warming potentials of the sixth IPCC report have been used.

Table 8: Emission Factors and Conversion Values Used in GHG Calculations

Particulars	Value	Unit	Source
Density of Diesel	0.84	kg/litre	Table 1. CO2 emission factors by Fuel - GHG Protocol (https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx)
Net Calorific Value of Diesel	43	TJ/Gg	Table 1. CO2 emission factors by Fuel - GHG Protocol (https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx)
Emission Factor for Diesel	74100	kg CO2/TJ	IPCC - National Greenhouse Gas Inventories – Chapter 3 Mobile Combustion
Net Calorific Value of LPG	47.3	TJ/Gg	Table 1. CO2 emission factors by Fuel - GHG Protocol (https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx)
Emission Factor for LPG	63100	kg CO2/TJ	IPCC - National Greenhouse Gas Inventories – Chapter 3 Mobile Combustion
Density of Liquid CO2	1100	kg m-3	IPCC - National Greenhouse Gas Inventories
Emission Factor of Liquid CO2	0.82	kg CO2/kg	IPCC - National Greenhouse Gas Inventories
Grid Emission Factor	0.716	tCO2/MWh	CEA Database Version 19.0
Emission Factor for the Truck	0.17	kgCO2/t.mile	GHG Emission Factors Hub - US EPA
Emission Factor for Diesel Car	0.29	kgCO2/km	India GHG Program - India Specific Road Transport Emission Factors 2015 (Version 1)
Emission Factor for Train	0.007976	kgCO2/passenger-km	India GHG Program - India Specific Rail Transport Emission Factors for Passenger Travel and Material Transport 2015 (Version 1)

Particulars	Value	Unit	Source
Emission Factor for Flight (Short Haul < 300 miles)	0.207	kgCO ₂ /passenger-mile	Environmental Protection Agency (EPA)- Emission Factors for Greenhouse Gas Inventories; September, 2023
Emission Factor for Flight (>= 300 miles, < 2300 miles)	0.129	kgCO ₂ /passenger-mile	Environmental Protection Agency (EPA)- Emission Factors for Greenhouse Gas Inventories; September, 2023
Emission Factor for Flight (>= 2300 miles)	0.163	kgCO ₂ /passenger-mile	Environmental Protection Agency (EPA)- Emission Factors for Greenhouse Gas Inventories; September, 2023
Emission Factor for Petrol Bike	0.0356	kgCO ₂ /km	India GHG Program - India Specific Road Transport Emission Factors 2015 (Version 1)
Emission Factor for Diesel Auto (Fuel of auto is assumed as diesel)	0.1322	kgCO ₂ /km	India GHG Program - India Specific Road Transport Emission Factors 2015 (Version 1)
Emission Factor for Petrol Car	0.27	kgCO ₂ /km	India GHG Program - India Specific Road Transport Emission Factors 2015 (Version 1)
Emission Factor for Bus	0.015161	kgCO ₂ /passenger-km	India GHG Program - India Specific Road Transport Emission Factors 2015 (Version 1)
Emission factor for Purchasing Goods & Services	Different values	kgCO ₂ e/ \$	https://www.epa.gov/climateleadership/scope-3-inventory-guidance#factors
Emission factor for Purchasing Goods & Services	Different values	kgCO ₂ e/ \$	https://www.epa.gov/climateleadership/scope-3-inventory-guidance#factors
Emission of Sold items	Different values	kgCO ₂ e/ \$	https://www.epa.gov/climateleadership/scope-3-inventory-guidance#factors

Particulars	Value	Unit	Source
Emission of Sold items	Different values	kgCO2e/ \$	https://www.epa.gov/climateleadership/scope-3-inventory-guidance#factors
Root-shoot ratio	0.27	-	Table 3A.1.8 of IPCC GPG-LULUCF 2003
Default Specific gravity of miscellaneous species	0.6	-	The Gold Standard A/R requirements (version 0.9)
Carbon content in woody living biomass	0.47	-	IPCC Default value
Carbon: CO2 conversion	3.66666667	-	By Default
$V = 0.00855 + 0.4432 * DBH^2 + 0.28813 * DBH^2 * Height * 100$	-	cubic centimeter	Volume equations for forests of India, Nepal and Bhutan; Forest Survey of India, min of Envoy and forest, GoI, 1996.

5 CARBON FOOTPRINT

5.1 Overview

Table 9: Emissions by Category (Scope-1, Scope-2 and Scope-3) in FY 2023-24

Scope	Category Name	Emissions tCO ₂ e- in FY 2023-24
1.1	Diesel Consumption in D.G.	12.52
1.2	LPG Consumption	14.52
1.3	ETP	7.12
1.4	STP	0.17
1.5	HFC-PFC Consumption	54.76
1.6	Fire Extinguisher	0.17
1.7	Purchased Electricity	2127.88
2	Purchased Goods and Services	1018.69
3.1	Capital Goods	454.94
3.2	Upstream Transportation and Distribution	33.27
3.3	Downstream Transportation and Distribution	13518.21
3.4	Operational Waste	3.57
3.5	Business Travel	74.98
3.6	Employee Commute	0.16
3.7	Processing of Sold Products	954.35

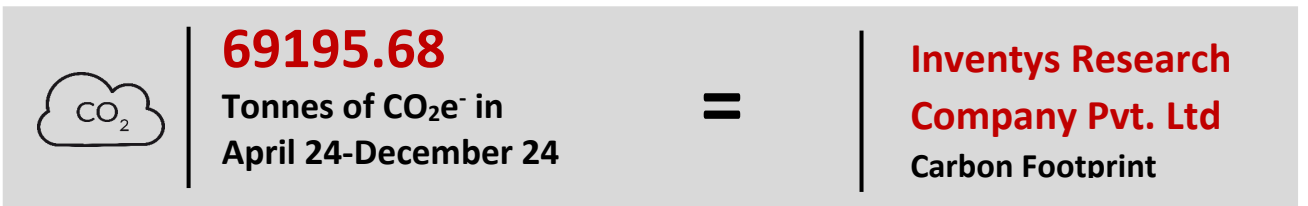
Table 10: Emissions by Category (Scope-1, Scope-2 and Scope-3) in Apr 24- Dec 24

Scope	Category Name	Emissions tCO ₂ e- in Apr 24- Dec 24
1.1	Diesel Consumption in D.G.	16.56
1.2	LPG Consumption	11.51
1.3	ETP	4.13
1.4	STP	0.12
1.5	HFC-PFC Consumption	43.76
1.6	Fire Extinguisher	0.14
1.7	Purchased Electricity	2547.01
2	Purchased Goods and Services	1712.13
3.1	Capital Goods	230.71
3.2	Upstream Transportation and Distribution	95.81
3.3	Downstream Transportation and Distribution	61813.88
3.4	Operational Waste	1.33
3.5	Business Travel	88.18
3.6	Employee Commute	0.11
3.7	Processing of Sold Products	2630.3

Emissions By Scope tCO₂e- in FY 2023-24



Emissions By Scope tCO₂e- in Apr 24-Dec 24



5.2 Emissions Breakdown

The breakdown sections below show FY 2023-24 & Apr 24-Dec 24 emissions for each category.

5.2.1 SCOPE-1 EMISSIONS

5.2.1.1 Diesel Consumption in D.G. Set and Forklift Operation

EMISSION FROM DIESEL CONSUMPTION IN D.G. SET AND FORKLIFT OPERATION



12.52

tCO₂e⁻
in FY 2023-24

Diesel fuel is a significant source of direct emissions at Inventys Research Company Pvt. Ltd., used for backup power generation. The company employs a consumption-based methodology to accurately quantify these Scope 1 emissions, following the GHG Protocol guidelines.

The emissions are calculated using the formula:

Emissions (tCO₂e⁻) = Activity Data × Density × NCV × Emission Factor × GWP

Where:

- Activity Data is the quantity of diesel consumed in liter
- Emission Factor for diesel is 74,100 kg CO₂/TJ
- Net Calorific Value of diesel is 43 TJ/Gg with a density of 0.84 kg/liter
- GWP (Global Warming Potential) is 1 for CO₂



16.56

tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

Inventys Research Company Pvt. Ltd., has determined that from 1st April 2023 to 31st March 2024, a total of **5009.25 liters** of Diesel were consumed in DG Sets, resulting in emissions equivalent to **12.52 metric tons of CO₂e⁻**.

April 2024-December 2024


Inventys Research Company Pvt. Ltd., has determined that from April 2024 to December 2024, a total of **6188 liters of Diesel were consumed** in backup power generation, resulting in emissions equivalent to **16.56 metric tons of CO₂e⁻**.

Table 11: Emissions from Diesel Combustion in D.G. Set

Reported Year	Total Diesel consumed (liters)	Emission from Diesel Combustion (tCO ₂ e)
FY 2023-24	5009.25	12.52
April 2024-December 2024	6188.00	16.56

5.2.1.2 LPG Consumption

EMISSION FROM LPG CONSUMPTION



14.52

tCO₂e⁻
in FY 2023-24

Liquefied Petroleum Gas (LPG) is used primarily in the kitchen area at Inventys Research Company Pvt. Ltd. The consumption of LPG contributes to the company's direct emissions inventory.

The emissions are calculated using the formula:

Emissions (tCO₂e) = Activity Data × NCV × Emission Factor × GWP

Where:


- Activity Data is the quantity of LPG consumed in kg
- Emission Factor for LPG is 63,100 kg CO₂/TJ
- Net Calorific Value of LPG is 47.3 TJ/Gg
- GWP (Global Warming Potential) is 1 for CO₂

FY 2023-24

The site has determined that from 1st April 2023 to 31st March 2024, a total of **4864 kg** of LPG were consumed for operations, resulting in emissions equivalent to **14.52 metric tons of CO₂e**.

April 2024-December 2024

The site has determined that from April 2024 to December 2024, a total of **3857 kg** of LPG were consumed for operations, resulting in emissions equivalent to **11.51 metric tons of CO₂e**.



11.51

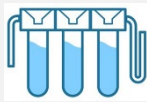
tCO₂e⁻
in Apr 24- Dec 24

Table 12: Emissions from LPG Consumption

Reported Year	Total LPG consumed (kg)	Emission from LPG Consumption (tCO ₂ e)
FY 2023-24	4864	14.52
April 2024-December 2024	3857	11.51

5.2.1.3 ETP Operation

EMISSION FROM EFFLUENT TREATMENT PLANT (ETP) OPERATION



7.12
tCO₂e⁻
in FY 2023-24

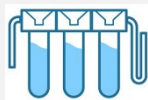
The Effluent Treatment Plant (ETP) at Inventys Research Company Pvt. Ltd. treats industrial wastewater before discharge. During treatment, the Conventional Activated Sludge Process produces nitrous oxide (N₂O) emissions from nitrogen removal.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Total Nitrogen removed} \times \text{N}_2\text{O Emission factor} \times \text{GWP}$$

Where:

- Total Nitrogen removed is the amount of nitrogen removed during treatment (kg N)
- N₂O Emission factor is the conversion rate for N₂O emissions (kg N₂O-N/kg N)
- GWP for N₂O is 273 (IPCC AR6)



4.13
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

Inventys Research Company Pvt. Ltd., has determined that from 1st April 2023 to 31st March 2024, ETP operations resulted in emissions equivalent to **7.12 metric tons of CO₂e.**

April 2024-December 2024

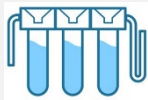
Inventys Research Company Pvt. Ltd., has determined that from April 2024 to December 2024, ETP operations resulted in emissions equivalent to **4.13 metric tons of CO₂e.**

Table 13: Emissions from ETP Operation

Reported Year	Total Quantity of Waste Water Treated (Q _{ww})	Emission from ETP Operation (tCO ₂ e)
FY 2023-24	8133.50	8.66
April 2024-December 2024	5984.00	4.13

5.2.1.4 STP Operation

EMISSION FROM SEWAGE TREATMENT PLANT (STP) OPERATION



0.17
tCO₂e⁻
in FY 2023-24

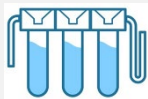
The Sewage Treatment Plant (STP) at Inventys Research Company Pvt. Ltd. treats domestic wastewater from facility operations. The Activated Sludge Process produces nitrous oxide (N₂O) emissions from nitrogen removal.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Total Nitrogen removed} \times \text{N}_2\text{O Emission factor} \times \text{GWP}$$

Where:

- Total Nitrogen removed is the amount of nitrogen removed during treatment (kg N)
- N₂O Emission factor is the conversion rate for N₂O emissions (kg N₂O-N/kg N)
- GWP for N₂O is 273 (IPCC AR6)



0.12
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

Inventys Research Company Pvt. Ltd. has determined that from 1st April 2023 to 31st March 2024, STP operations resulted in emissions equivalent to **0.17 metric tons of CO₂e.**

April 2024- December 2024

Inventys Research Company Pvt. Ltd. has determined that from April 2024 to December 2024, STP operations resulted in emissions equivalent to **0.12 metric tons of CO₂e.**

Table 14: Emissions from STP Operation

Reported Year	Total Quantity of Waste Water Treated (Q _{ww})	Emission from STP Operation (tCO ₂ e)
FY 2023-24	5279.00	0.17
April 2024-December 2024	4153.70	0.12

5.2.1.5 HFC-PFC Consumption

EMISSION FROM HFC-PFC CONSUMPTION



54.76
tCO₂e⁻
in FY 2023-24

Refrigerant Consumption for Cooling Systems. Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs) are used in refrigeration and air conditioning systems at Inventys Research Company Pvt. Ltd. These gases have high global warming potentials and are carefully monitored as part of the company's GHG inventory.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{GWP}$$

Where:

- Activity Data is the quantity of refrigerant consumed in kg
- GWP (Global Warming Potential) varies by refrigerant type

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, the total HFC-PFC consumption, resulting in emissions equivalent to **54.76 metric tons of CO₂e**.



43.76
tCO₂e⁻
in Apr 24- Dec 24

April 2024-December 2024

For the reporting period from April 2024 to December 2024, the total HFC-PFC consumption, resulting in emissions equivalent to **43.76 metric tons of CO₂e**.

Table 15: Emissions from HFC-PFC Consumption

Reported Year	Emission from HFC-PFC Consumption (tCO ₂ e)
FY 2023-24	54.76
April 2024-December 2024	43.76

5.2.1.6 Fire Extinguishers

EMISSION FROM USE OF FIRE EXTINGUISHER



0.17

tCO₂e⁻

in FY 2023-24

Fire Safety Equipment Usage. Fire extinguishers containing various agents, including CO₂, are installed throughout Inventys Research Company Pvt. Ltd facility for safety purposes. Emissions occur when these extinguishers are tested or used during emergencies.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Emission Factor}$$

Where:

- Activity Data is the quantity of CO₂ released from fire extinguishers in kg
- GWP (Global Warming Potential) is 1 for CO₂

FY 2023-24



0.14

tCO₂e⁻

in Apr 24- Dec 24

At Inventys Research Company Pvt. Ltd., the CO₂-type fire extinguisher, with a Global Warming Potential (GWP) of one, is accounted for annually based on the volume and number of CO₂ fire extinguisher tanks. The site has determined CO₂ Fire Extinguisher usage from 1st April 2023 to 31st March 2024, a total of 166.5 kgs were consumed for fire extinguishers, resulting in emissions equivalent to **0.17 metric tons of CO₂e**.

April 2024-December 2024

At Inventys Research Company Pvt. Ltd., 30 no. of fire extinguishers were used on-site from April 2024 to December 2024. The site has determined CO₂ Fire Extinguisher usage from April 2024 to December 2024, a total of 135 kgs were consumed for fire extinguishers, resulting in emissions equivalent to **0.14 metric tons of CO₂e**.

Table 16: Emissions from Use of Fire Extinguishers

Reported Year	Quantity of CO2 Consumption in Fire Extinguishers (kg)	Emission from Use of Fire Extinguishers (tCO ₂ e-)
FY 2023-24	166.5 kgs	0.17
April 2024-December 2024	135 kgs	0.14

5.2.1.7 Summary of Scope-1 Emission

Table 17: Summary of Scope-1 Emissions (FY 2023-2024)

Category	Area of Usage	Emissions tCO ₂ e- in Scope 1 in FY 2023-24
Diesel Consumption in Utilities	In D.G. Set	12.52
LPG Consumption	In Kitchen Area	14.52
Emission from ETP (tCO ₂ e-)	Effluent Treatment Plant	7.12
Emission from STP (tCO ₂ e-)	Sewage Treatment Plant	0.17
HFC-PFC Consumption	In refrigeration System	54.76
Fire Extinguishers (FE)	In Fire Safety Equipment (CO ₂ Cylinder)	0.17
Total		89.27

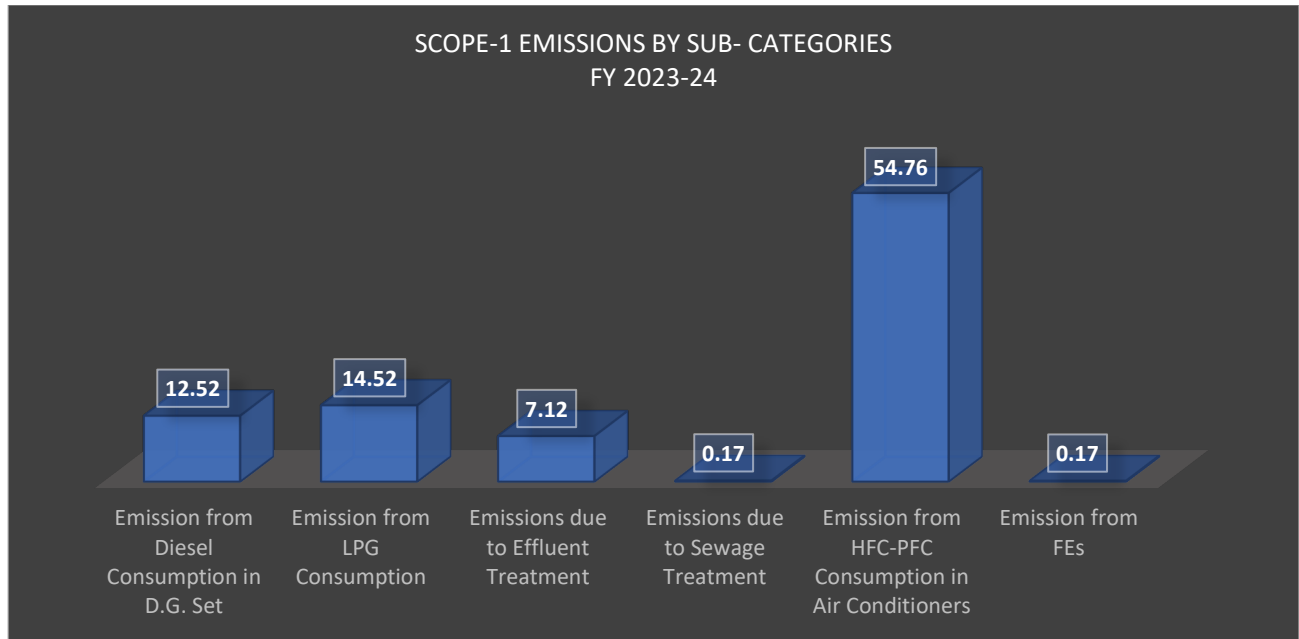


Figure 7: Scope-1 Emission by Sub-categories (FY 2023-24)

Table 18: Summary of Scope-1 Emissions (April 2024- December 2024)

Category	Area of Usage	Emissions tCO ₂ e- in Scope 1 in April 2024-December 2024
Diesel Consumption in Utilities	In D.G. Set a	16.56
LPG Consumption	Canteen	11.51
Emission from ETP (tCO ₂ e-)	Effluent Treatment Plant	4.13
Emission from STP (tCO ₂ e-)	Sewage Treatment Plant	0.12
HFC-PFC Consumption	In refrigeration System	43.76
Fire Extinguishers (FE)	In Fire Safety Equipment (CO ₂ Cylinder)	0.14
Total		76.25

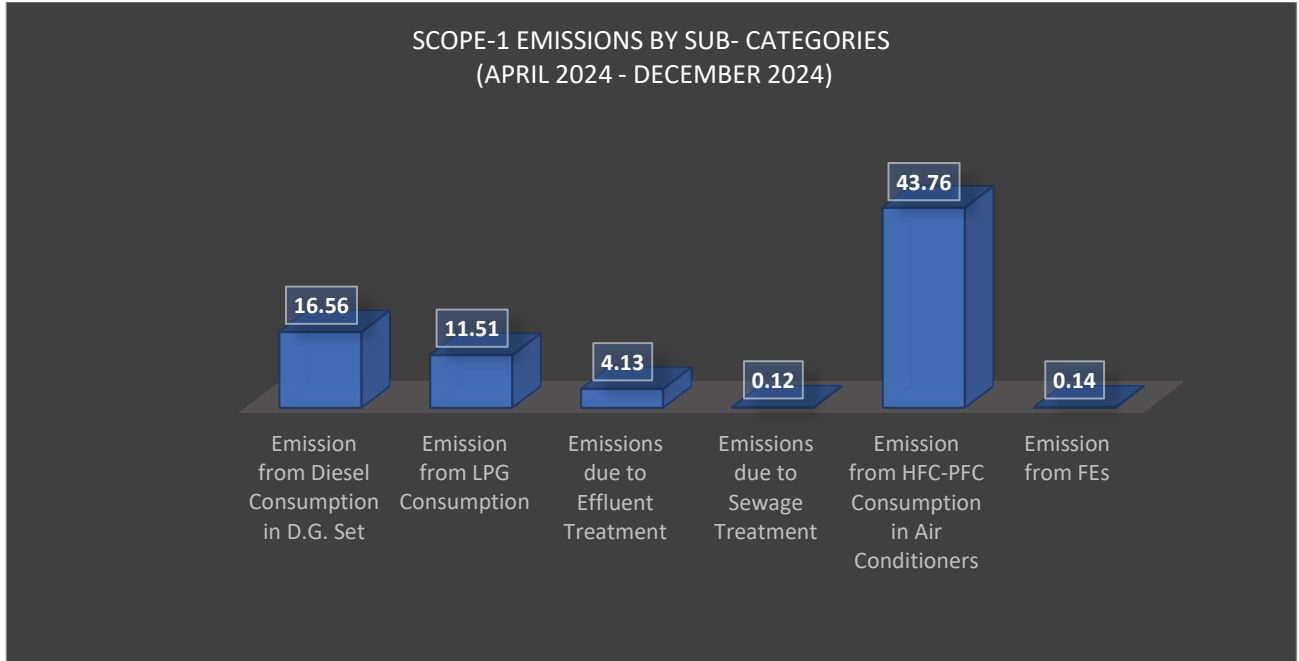


Figure 8: Scope-1 Emission by Sub-categories (April 2024- December 2024)

5.2.2 SCOPE-2 EMISSIONS

5.2.2.1 Purchased Electricity

Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Inventys Research Company Pvt. Ltd., didn't purchase any heat, steam or cooling during the reporting period. Thus, Scope 2 emissions only include purchased electricity emissions.

The indirect GHG emissions from purchased electricity have been calculated using emission factor for Combined grid derived from CEA database (Version 19). The tool provides a method to calculate combined margin emission factor as a weighted average of operation margin and build margin emission factors of grid.

$$E_{Electricity,y} = Q_{Electricity,y} * EF_{NEWNE}$$

Where:

$E_{Electricity,y}$: Emissions from consumption of purchased electricity during year y at site (MWh)

$Q_{Electricity,y}$: Quantity of electricity consumed during year y (MWh)

EF_{NEWNE} : Emission factor for Combined grid (0.716 mtCO₂/MWh; calculated as per tool to calculate emission factor for electricity system, using CEA version 19).

EMISSION FROM PURCHASED ELECTRICITY



2127.88

tCO₂e⁻
In FY 2023-24



2547.01

tCO₂e⁻
in Apr 24- Dec 24

Purchased electricity for plant operation constitutes the entirety of Inventys Research Company Pvt. Ltd. Scope 2 emissions and represents a significant portion of the company's total carbon footprint. The company relies on grid electricity for powering its manufacturing processes, lighting, and other facility operations.

FY 2023-24

The emissions are based on the total electricity drawn from the grid during this period. From April 2023 to 31st March 2024, the total electricity consumed from the grid amounted to **2971.90 MWh**, resulting in emissions equivalent to **2127.88 metric tons of CO₂e**.

April 2024- December 2024

From April 2024 to December 2024, the total electricity consumed from the grid amounted to **3557.28 MWh**, resulting in emissions equivalent to **2547.01 metric tons of CO₂e**.

Table 19: Summary of Scope-2 Emissions

Site	Total Electricity consumption from Indian Grid (MWh)	Emission from Electricity usage (tCO _{2e})
FY 2023-24	2971.90	2127.88
April 2024- December 2024	3557.28	2547.01

5.2.3 SCOPE-3 EMISSIONS

The organization has decided to report on scope 3 emissions as well. Under this scope the sources of emissions are divided into 15 categories of GHG emissions which happen due to operations of organization but are not controlled by the organization (upstream and downstream indirect emissions).

Quantification of this scope necessitates assessing GHG emissions across the entire value chain. However, quantification of scope 3 GHG emissions is limited to the most material categories. For remaining categories either the data is insufficient or negligible emission. Also, there are some categories which don't apply to the scope of operating activities of the company.

5.2.3.1 Purchased Goods and Services

EMISSION FROM PURCHASED GOODS AND SERVICES



1018.69
tCO₂e⁻
In FY 2023-24

Purchased goods and services represent a significant portion of of Inventys Research Company Pvt. Ltd. Scope 3 emissions profile. This category encompasses all upstream emissions from the production of products and services acquired by the company, primarily raw materials used in manufacturing operations.

Inventys Research Company Pvt. Ltd. primary purchases include raw materials, along with various services required for business operations.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Emission Factor}$$

Where:

- Activity Data is the monetary value of purchased goods and services in USD
- Emission Factor varies by product category (kgCO₂e/\$)



1712.13
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, the emissions associated with purchased goods and services amounted to **1018.69 metric tons of CO₂e.**

April 2024-December 2024

For the reporting period from April 2024 to December 2024, the emissions associated with purchased goods and services amounted to **1712.13 metric tons of CO₂e,**

Table 20: Emissions from Purchased Goods and Services

Reported Year	Emission from Purchased Goods and Services (tCO ₂ e ⁻)
FY 2023-24	1018.69
April 2024-December 2024	1712.13

5.2.3.2 Capital Goods

EMISSION FROM CAPITAL GOODS



454.94
tCO₂e⁻
In FY 2023-24

Capital goods represent emissions associated with the production of equipment, machinery, buildings, and other capital assets purchased by Inventys Research Company Pvt. Ltd. during the reporting period. These are items that are not completely consumed within the reporting year and provide long-term value to the organization.

Inventys Research Company Pvt. Ltd. made investments in various capital assets including manufacturing equipment during this reporting period.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e}^-) = \text{Activity Data} \times \text{Emission Factor}$$

Where:

- Activity Data is the monetary value of capital goods purchased in USD
- Emission Factor varies by capital good category (kgCO₂e/\$)



230.71
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, the emissions associated with capital goods acquisition amounted to **454.94 metric tons of CO₂e⁻**, representing a relatively small portion of the company's total Scope 3 emissions.

April 2024 – December 2024

For the reporting period from April 2024 to December 2024, the emissions associated with capital goods acquisition remained consistent at **230.71 metric tons of CO₂e⁻**, reflecting similar investment patterns to the previous year.

Table 21: Emissions from Capital Goods

Reported Year	Emission from Capital Goods (tCO ₂ e)
FY 2023-24	454.94
April 2024-December 2024	230.71

5.2.3.3 Upstream Transportation and Distribution

EMISSION FROM UPSTREAM TRANSPORTATION AND DISTRIBUTION



33.27
tCO₂e⁻
In FY 2023-24

Upstream transportation and distribution emissions encompass the carbon footprint associated with transporting raw materials and components from suppliers to Inventys Research Company Pvt. Ltd. manufacturing facility. These emissions form a significant portion of the company's Scope 3 inventory.

Inventys Research Company Pvt. Ltd. relies on medium-duty vehicles for transporting raw materials from suppliers to its facility, with cold-rolled steel being the primary material transported.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Distance} \times \text{Emission Factor}$$

Where:

- Activity Data is the quantity of raw material transported in tons
- Distance is measured in kilometers
- Emission Factor is 0.186 kgCO₂/short ton-mile for medium-duty vehicles



95.81
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, a total of **134.16 tons of raw materials** were transported over a cumulative distance of 7086.50 km, resulting in emissions equivalent to **33.27 metric tons of CO₂e**.

April 2024- December 2024

For the reporting period from April 2024 to December 2024, a total of 176 tons of raw materials were transported over a cumulative distance of 4925 km, resulting in emissions equivalent to **95.81 metric tons of CO₂e**.

Table 22: Emissions from Upstream Transportation

Reported Year	Emission from Upstream Transportation (tCO ₂ e)
FY 2023-24	33.27
April 2024- December 2024	95.81

5.2.3.4 Downstream Transportation and Distribution

EMISSION FROM DOWNSTREAM TRANSPORTATION AND DISTRIBUTION



13518.21
tCO₂e⁻
In FY 2023-24

Downstream transportation and distribution represents the largest category of Inventys Research Company Pvt. Ltd. Scope 3 emissions. These emissions result from transporting finished products from the company's manufacturing facility to customers and end-users.

Inventys Research Company Pvt. Ltd. distributes its finished products to various customers across the country, primarily using medium-duty vehicles for transportation.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Distance} \times \text{Emission Factor}$$

Where:

- Activity Data is the quantity of finished products transported in tons
- Distance is measured in kilometers
- Emission Factor is 0.186 kgCO₂/short ton-mile for medium-duty vehicles



61813.88
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, a total of 503784.04 tons of finished products were transported over a cumulative distance of 56935.00 km by road, 79.55 tons of finished products were transported distance of 48000.00 km by air, resulting in emissions equivalent to **13518.21 metric tons of CO₂e**.

April 2024-December 2024

For the reporting period from April 2024 to December 2024, a total of 97775.60 tons of finished products were transported over a cumulative distance of 47024.00 km by road and ship, 8647.71tons of finished products were transported distance of 80000.00 km by air, resulting in emissions equivalent to **61813.88 metric tons of CO₂e**.

Table 23: Emissions from Downstream Transportation

Reported Year	Emission from Downstream Transportation (tCO ₂ e)
FY 2023-24	13518.21
April 2024-December 2024	61813.88

5.2.3.5 Operational Waste

EMISSION FROM OPERATIONAL WASTE



3.57

tCO₂e⁻

In FY 2023-24

Operational waste emissions are associated with the disposal and treatment of waste generated during Inventys Research Company Pvt. manufacturing processes and facility operations. This includes both non-hazardous and hazardous waste streams.

Inventys Research Company Pvt. Ltd. generates various types of waste, primarily consisting of plastic, papers, wood, oil, glass, cardboard, tins and metals.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \text{Activity Data} \times \text{Emission Factor}$$

Where:

- Activity Data is the quantity of waste generated in tons
- Emission Factor varies by waste type and disposal method (tCO₂e/ton)



1.33

tCO₂e⁻

in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, waste was generated, plastic, papers, wood, oil, glass, cardboard, tins and metals, resulting in emissions equivalent to **3.57 metric tons of CO₂e**.

April 2024-December 2024

For the reporting period from April 2024 to December 2024, the waste generation patterns decreased as compared to the previous year, resulting in emissions equivalent to **1.33 metric tons of CO₂e**.

Table 24: Emissions from Operational Waste

Reported Year	Emission from Operational Waste (tCO ₂ e)
FY 2023-24	3.57
April 2024- December 2024	1.33

5.2.3.6 Business Travel

EMISSION FROM BUSINESS TRAVEL



74.98
tCO₂e⁻
In FY 2023-24

Business travel emissions result from the transportation of Inventys Research Company’s employees for business-related activities, including client meetings, supplier visits, conferences, and training. This includes travel by air, rail, and road.

Inventys Research Company Pvt. Ltd. employees undertake business travel for site visits and other business purposes, utilizing various modes of transportation including flights, cars, and railways.

The emissions are calculated using the formula: Emissions (tCO₂e) = Activity Data × Emission Factor

Where:

- Activity Data is the distance traveled in kilometers
- Emission Factor varies by mode of transport (kgCO₂/passenger-km)



88.18
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, employees traveled a total of 266384 kilometers by flight for business purposes, resulting in emissions amounting to **74.98 metric tons of CO₂e**.

April 2024-December 2024

For the reporting period from April 2024 to December 2024, business travel activities increased slightly, resulting in emissions equivalent to **88.18 metric tons of CO₂e**.

Table 25: Emissions from Business Travel

Reported Year	Emission from Business Travel (tCO ₂ e)
FY 2023-24	74.98
April 2024-December 2024	88.18

5.2.3.7 Employee Commute

EMISSION FROM EMPLOYEE COMMUTE



0.16

tCO₂e⁻

In FY 2023-24

Employee commuting emissions result from the transportation of Inventys Research Company Pvt. Ltd 310 employees between their homes and the workplace. This category includes various modes of transport such as bikes, cars, public transportation, and walking.

Inventys Research Company Pvt. Ltd. employees use various modes of transportation for their daily commute to and from the workplace, including bikes, cars, trains, and buses.

The emissions are calculated using the formula:

$$\text{Emissions (tCO}_2\text{e)} = \sum (\text{Distance} \times \text{Emission Factor})$$

Where:

- Distance is the total distance traveled by employees in kilometers
- Emission Factor varies by mode of transport (kgCO₂/passenger-km)



0.11

tCO₂e⁻

in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, employees collectively traveled 2486 kilometers for commuting purposes, with bikes accounting for 1970 kilometers, 351 kilometers by car and 165 kilometers by private car. This resulted in emissions equivalent to **0.16 metric tons of CO₂e**.

April 2024-December 2024

For the reporting period from April 2024 to December 2024, the total distance traveled for employee commuting resulted in emissions equivalent to **0.11 metric tons of CO₂e**.

Table 26: Emissions from Employee Commute

Reported Year	Emission from Employee Commute (tCO ₂ e)
FY 2023-24	0.16
April 2024-December 2024	0.11

5.2.3.8 Processing of Sold Products

EMISSION FROM PROCESSING OF SOLD PRODUCTS



954.35
tCO₂e⁻
In FY 2023-24

This category accounts for emissions from the processing of intermediate products sold by Inventys Research Company Pvt. Ltd. by third parties (e.g., manufacturers) subsequent to sale. These emissions occur when the company's products require further processing before they reach their final state.

Inventys Research Company Pvt. Ltd. manufactures various components that may undergo further processing at customers' facilities before being integrated into final e products.

The emissions are calculated using the formula: Emissions (tCO₂e) = Activity Data × Emission Factor

Where:

- Activity Data is the quantity of sold products in tons
- Emission Factor varies by product type and processing method (tCO₂e/ton)



2630.30
tCO₂e⁻
in Apr 24- Dec 24

FY 2023-24

For the reporting period from 1st April 2023 to 31st March 2024, the emissions associated with the processing of sold products by downstream companies amounted to **954.35 metric tons of CO₂e**.

April 2024- December 2024

For the reporting period from April 2024 to December 2024, the emissions associated with the processing of sold products decreased significantly to **2630.30 metric tons of CO₂e**.

Table 27: Emissions from Processing of Sold Products

Reported Year	Emission from Processing of Sold Products (tCO ₂ e)
FY 2023-24	954.35
April 2024- December 2024	2630.30

5.2.3.9 Summary of Scope-3 Emission

Table 28: Summary of Scope-3 Emissions (FY 2023-2024)

Category	Emissions tCO ₂ e- in Scope 3 in FY 2023-24
Purchased Goods and Services	1018.69
Capital Goods	454.94
Upstream Transportation and Distribution	33.27
Downstream Transportation and Distribution	13518.21
Operational Waste	3.57
Business Travel	74.98
Employee Commute	0.16
Processing of Sold Products	954.35
Total	16058.16

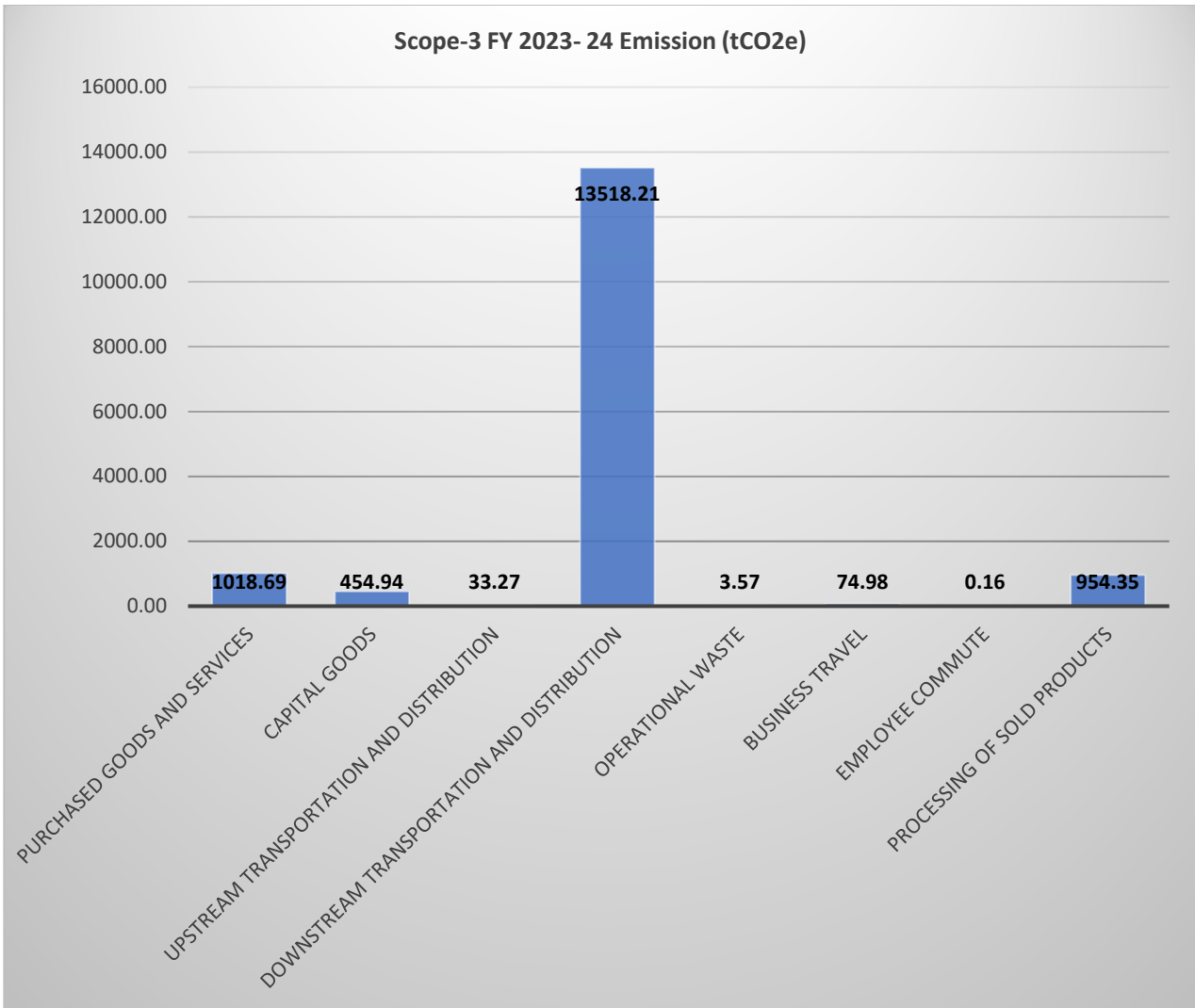


Figure 9:Scope-3 Emission by Sub-categories (FY 2023-24)

Table 29: Summary of Scope-3 Emissions (April 2024- December 2024)

Category	Emissions tCO ₂ e- in Scope 3 in April 2024-December 2024
Purchased Goods and Services	1712.13
Capital Goods	230.71
Upstream Transportation and Distribution	95.81
Downstream Transportation and Distribution	61813.88
Operational Waste	1.33

Category	Emissions tCO ₂ e- in Scope 3 in April 2024-December 2024
Business Travel	88.18
Employee Commute	0.11
Processing of Sold Products	2630.30
Total	66572.44

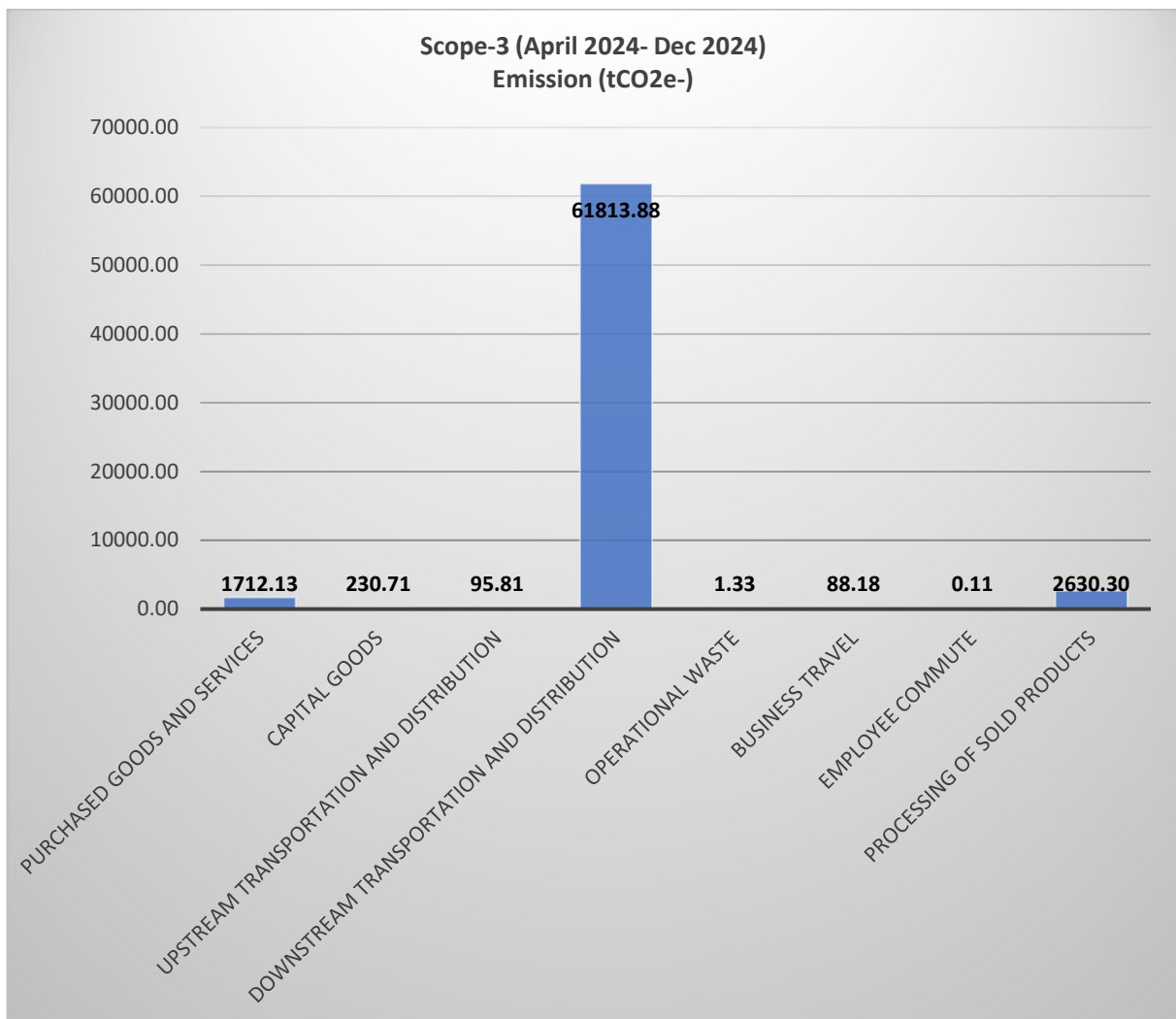


Figure 10:Scope-3 Emission by Sub-categories (April 2024- December 2024)

5.3 Quantification of Carbon Sequestration by Trees

Inventys Research Company Private Limited has undertaken a tree plantation initiative to mitigate its carbon footprint. The carbon sequestration potential of the planted trees was assessed based on tree parameters such as Number of trees, its species, Average height and average diameter at breast height (DBH). The total biomass is then converted to carbon content using species-specific conversion factors. The annual CO₂ sequestration is determined based on the tree's growth rate and the number of years since planting.

Volume equation in cm³: $V = 0.00855 + 0.4432 \times DBH^2 + 0.28813 \times DBH^2 \times Height \times 100$

The assessment revealed that the trees planted have sequestered a total of annual sequestration rate of **4.11 metric tons of CO₂**.

Note:

- The trees and shrubs were planted in June 2022, July 2022, August 2023, and May 2024, with their ages calculated accordingly.
- Current GBH and height values estimated for young saplings based on typical growth rates
- As trees grow, their carbon sequestration rate will increase substantially

Carbon sequestration calculated based on when the trees are planted, meaning the total carbon sequestration has been divided by the average age of trees to determine the annual rate.

The table below presents the breakdown of CO₂ sequestered by each tree species:

Table 30: CO₂ Sequestration by Tree Species (FY 2024-25)

S.No.	Species Name	Total no. of trees	Total biomass (tonnes)	CO ₂ sequestered per annum
1	Trees	922	3.315	3.31
2	Shrubs	2308	0.86	0.80
	TOTAL	3230	4.18	0.02

As part of its green initiative for emission reduction, a total of 16,268 trees have been planted under various Miyawaki projects. The Miyawaki plantations, known for their dense and fast-growing native forests, include Miyawaki A (2,000 trees), Miyawaki B (2,500 trees), Miyawaki C (4,500 trees), and

Miyawaki D (6,500 trees), contributing significantly to carbon sequestration and biodiversity enhancement. Additionally, Froot Zones A to F collectively account for the remaining 768 trees, supporting emission reduction.

Table 31: Miyawaki Plantation

	Name	Total no. of trees
SZ1415	Miyawaki A	2000
	Miyawaki B	2500
	Miyawaki C	4500
	Miyawaki D	6500
	Froot Zone A	90
	Froot Zone B	68
	Froot Zone C	80
	Froot Zone D	180
	Froot Zone E	130
	Froot Zone F	220
	TOTAL	16268
	TOTAL Trees K-38	3230
	TOTAL Trees SZ1415	16268

5.4 Emission Reduction through Biomass Briquettes and Biomass Pellets

Biomass briquettes and Biomass pellets are utilized at Inventys Research Company Private Limited as an alternative fuel source, primarily in boiler operations. This represents a significant sustainability initiative that reduces the company's dependence on conventional fossil fuels.

The emission reduction is calculated using the formula:

$$\text{Emissions Avoided (tCO}_2\text{e)} = \text{Biomass Quantity} \times \text{NCV} \times \text{Emission Factor}$$

Where:

- Biomass Quantity is the amount of biomass briquettes and biomass pellets consumed in tons
- NCV is the Net Calorific Value of briquettes (2,560 Kcal/kg)
- Emission Factor is 112,000 kg CO₂/TJ for avoided emissions

FY 2023-24

Inventys Research Company Pvt. Ltd. utilized a total of 76.91 MT of biomass briquettes and 1,666.291 MT of biomass pellets from 1st April 2023 to 31st March 2024, resulting in emission reductions equivalent to 92.33 metric tons of CO₂e from briquettes and 2,312.83 metric tons of CO₂e from pellets.

April 2024-November 2024

Inventys Research Company Pvt. Ltd. utilized a total of 65.58 MT of biomass briquettes and 2253.69 MT of biomass pellets from April 2024 to December 2024, resulting in emission reductions equivalent to 78.72 metric tons of CO₂e from briquettes and 3128.14 metric tons of CO₂e from pellets.

Table 32: Biomass Consumption and Emission Reduction

Reported Year	Biomass Briquettes and Biomass Pellets Used (MT)	Emissions Avoided (tCO ₂ e)
FY 2023-24	76.91	92.33
FY 2023-24	1666.29	2312.83
Total	1743.2	2405.16
% of Total Emissions Avoided		13.16%

Table 33: Biomass Consumption and Emission Reduction

Reported Year	Biomass Briquettes and Biomass Pellets Used (MT)	Emissions Avoided (tCO ₂ e)
April 2024-December 2024	65.58	78.72
April 2024- December 2024	2253.69	3128.14
Total	2319.27	3206.86
% of Total Emissions Avoided		4.63%

6 DATA SOURCES AND QUALITY

All the information used to compute the various footprints comes from Inventys Research Company Pvt. Ltd. database. The data quality has been evaluated and presented below, with data from each business sector evaluated independently to enable for better analysis and display of resolution and further explanations. The most used types of data are:

- ❖ **Primary Data:** Data taken from documents that are directly linked to the assessment, such as electricity invoices, to calculate emissions caused due to electricity.
- ❖ **Secondary Data:** Such as databases, studies, and reports.
- ❖ **Assumptions:** Assumptions made based on internationally recognized standards and studies.

Table 34: Quality of Sourced GHG Data

#	SCOPE	ACTIVITY	DATA	NOTES
	1	Diesel Consumption in D.G. Set	11197.25 liters (from Apr 23 to Dec 24)	Data received on a monthly basis of diesel consumption in D.G. Set.
	1	ETP & STP Operations	23550.2 Qww/m3 (Apr 23 – Dec 24)	Data received as total monthly waste water treated.
	1	LPG Consumption	8721 kg (from Apr 23 to Dec 24)	Data received as total monthly LPG consumption through kitchen operations
	1	HFC-PFC Consumption	Multiple Fugitive emission gases utilized	Data received as a total quantity of refrigerant cylinders consumed
	1	Fire Extinguisher	301.5 kg (from Apr 23 to Dec 24)	Data received as a total quantity of cylinders consumed
	2	Purchased Electricity	6529.18 MWh (from Apr 23 to Dec 24)	Data received on a monthly basis from electricity bills

#	SCOPE	ACTIVITY	DATA	NOTES
	3	Purchased Goods and Services	Multiple items	Detail of procurement data for raw materials, various services & operational goods received on monthly basis.
	3	Capital Goods	685.65 tons (from Apr 23 to Dec 24)	Data on various consumable items, equipment's, building materials etc. received on monthly basis.
	3	Upstream Transportation	Roadway	Data received on total quantity of raw material transported and distance transported
	3	Downstream Transportation	Multiple Modes (Road, Air)	Data received on total quantity of finished products transported and the distances
	3	Operational Waste	Multiple items (Glass, cardboard, drum, cans, oil, wood, paper, tins and metals)	Data received on type, weight, and quantity of waste generated, primarily consisting of glass, cardboard, and paper waste etc.
	3	Business Travel	Air Travel	Data received on distance traveled by air mode
	3	Employee Commute	Multiple modes	Data received on total distance traveled by employees using different modes: Bike, Car, private vehicle

#	SCOPE	ACTIVITY	DATA	NOTES
	3	Processing of Sold Products	Multiple Items	Total quantity of finished products data received on monthly basis.

FOUNDATIONAL:
Area for refinement

SATISFACTORY:
Potential for enhancement

GOOD:
No changes recommended

6.1 Relevancy & Exclusions

A few emissions sources due to being negligible or non-availability of appropriate activity data are not included in this GHG inventory. The details of the same are given below.

Table 35: Exclusion of GHG Emissions

#	SCOPE	ACTIVITY	DESCRIPTION	STATUS
	3	Fuel and Energy-Related Activities (Not Included in Scope 1 and 2)	Upstream emissions related to production of fuels used	All material fuel and energy activities are already accounted for in Scope 1 and 2; remaining upstream emissions are negligible
	3	Upstream Leased Assets	Assets leased by Inventys Research Company Pvt. Ltd.	Not applicable as the company operates in owned facilities rather than leased properties
	3	Use of Sold Products	Emissions associated with customer use of automotive components	Not applicable as components do not directly generate emissions during use; emissions are accounted for at vehicle level
	3	End-of-Life Treatment of Sold Products	Disposal of automotive components after use	Negligible impact as components are typically recycled with vehicles at end-of-life; data collection not feasible
	3	Downstream Leased Assets	Assets owned by Inventys Research Company and leased to others	Not applicable as Inventys Research Company Pvt. Ltd. does not lease assets to other entities

#	SCOPE	ACTIVITY	DESCRIPTION	STATUS
	3	Franchises	Operation of franchises	Not applicable as Inventys Research Company Pvt. Ltd. does not operate any franchises
	3	Investments	Financial investments	Not material to Inventys Research Company's carbon footprint as the company's primary investments are in its own operations

FOUNDATIONAL:
Area for refinement

SATISFACTORY:
Potential for enhancement

GOOD:
No changes recommended

6.2 Uncertainty Assessment

The GHG emissions reported in this GHG inventory are based on input (consumption) data from the records of GHG activity data maintained by the company. Also, the emission and GHG removal factors are referenced from IPCC 2006 guidelines and World Resource Institute (GHG Protocol's corporate accounting standard, 2nd edition, Nov 2011). Therefore, the uncertainties considered by IPCC apply to the current GHG inventory.

The IPCC Reports default uncertainty range for fossil fuel combustion data to be plus or minus 5 percent. The description of plus or minus 5% is given below:

- The value in the energy statistics or energy balance is interpreted as the point estimate for the activity data
- The lower limit value of the 95 percent confidence interval is 0.95 times the point estimate.
- The upper limit value of the 95 percent confidence interval is 1.05 times this value.

7. REFERENCES

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