O.P. JINDAL GLOBAL UNIVERSITY

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GREENLOOP CLEAN TECH

GREENHOUSE GAS EMISSIONS REPORT

O.P. Jindal Global University, Sonipat, Haryana

REPORTING YEAR

January 1, 2025 – December 31, 2025

SCOPE 1

Direct Emissions

SCOPE 2

Electricity Indirect

SCOPE 3

Other Indirect (Partial)

GHG Report prepared by **Greenloop Cleanteach,** Gurugram, India

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Reporting Year: January 1, 2025 – December 31, 2025

Scope 1 | Scope 2 | Scope 3 (Partial)

Year-on-Year Comparison and Change Driver Analysis

GHG Protocol Corporate Standard | DEFRA 2025 | CEA India Emission Factors

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1. Executive Summary

This report presents the Greenhouse Gas (GHG) Emissions Inventory for O.P. Jindal Global University (JGU), Sonipat, Haryana, for the reporting period January 1, 2025 to December 31, 2025. It is prepared in accordance with the GHG Protocol Corporate Accounting and Reporting Standard and uses DEFRA 2025 emission factors for fuel combustion and ICAO 2025 methodology for aviation. This is the third GHG disclosure by JGU, with 2024 serving as the base year

The most significant development in the 2025 inventory is the formal exclusion of Hostel Blocks SB1 through SB11, which are operated by a third-party facility management company. This boundary change, applied consistently across Scope 1 (stationary combustion and electricity) and Scope 2, results in a substantially reduced reported footprint relative to 2024. All comparisons in this report account for this boundary change and are clearly annotated.

3,463.39 tCO_2e Scope 1 (Direct)	7,823.04 tCO_2e Scope 2 (Electricity)	13,750 tCO_2e Scope 3 (Partial)	27,978.65 tCO_2e TOTAL 2025

The 2025 total of 14,270.50 tCO_2e compares with a 2024 base-year total of 33,399.09 tCO_2e, representing a reduction of 19,128.59 tCO_2e (-57.3%). This reduction is driven by the hostel boundary exclusion, particularly the removal of approximately 28,900 tCO_2e of grid electricity previously attributed to student residences. On a like-for-like operational boundary, Scope 1 emissions increased by 1,900.47 tCO_2e (+42.2%), driven by expanded mobile fuel data capture and large chiller refrigerant recharges.

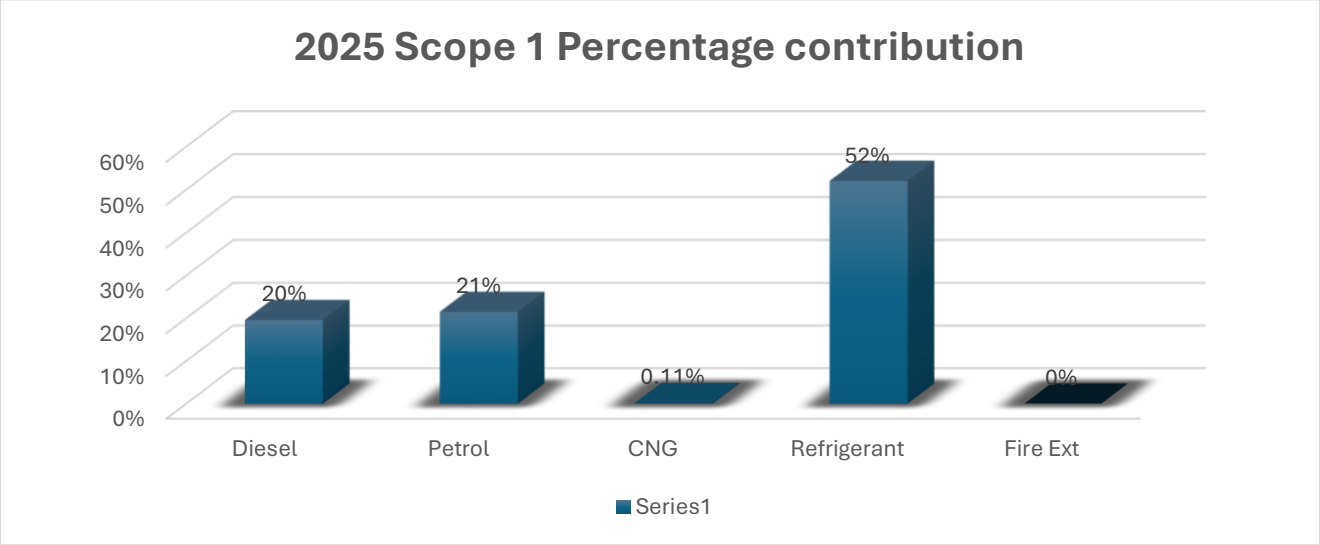
1.1 Key Changes in 2025 vs 2024 — At a Glance

Emission Category	2025 (tCO_2e)
S1 Mobile Combustion	1,662.39
S1 Fugitive — Refrigerants	1,801.00
Scope 1 TOTAL	3463.39
Scope 2 — Grid Electricity	7,823.04
Scope 1+2 TOTAL	**11,286.43**

Scope 3 TOTAL	**13,750.24**
GRAND TOTAL (Scope 1+2+3)	**27,978.89**

In 2024 Scope 2 included all campus buildings including SB1–SB11 hostels. 2025 excludes hostels (third-party managed the undertaking by the third party was used as an evidence of ownership to define boundary.

Figure 5: Grand Total Emissions — 2024 vs 2025 Component Breakdown (tCO_2e)



2. Introduction and Organizational Context

2.1 About O.P. Jindal Global University

O.P. Jindal Global University (JGU) is a non-profit, multi-disciplinary, research-oriented institution located on an 80-acre fully residential campus in Sonipat, Haryana. Established in 2009 and recognized as an Institution of Eminence by the University Grants Commission, JGU hosts over 14,000 students, 1,100+ full-time faculty from 50+ countries, and approximately 2,900 administrative staff. The campus encompasses 14 academic and residential buildings with a combined built-up area of 346,811 m² as of December 2024, and features 55% green cover with over 1,40,000 trees across 41 acres of lawns and gardens.

2.2 Reporting Scope and Standards

This report covers the calendar year January 1, 2025 to December 31, 2025. The inventory adheres to the GHG Protocol Corporate Accounting and Reporting Standard and applies the following emission factors:

- Scope 1 stationary and mobile combustion: UK Government / DEFRA 2025 GHG Conversion Factors
- Scope 2 grid electricity: Central Electricity Authority (CEA) India, 0.727 kg CO_2e/kWh
- Scope 3 aviation (Category 6): ICAO Carbon Emissions Calculator 2025
- Scope 3 commuting (Category 7): DEFRA 2025 GHG Conversion Factors
- Scope 3 upstream fuel (Category 3): US EPA Supply Chain Emission Factors (USEEIO), 2018 USD basis
- Global Warming Potentials: IPCC AR6 (CO_2=1, CH_4=27, N_2O=273)

2.3 Organizational Boundary

JGU applies the Operational Control approach for defining its organizational boundary, consistent with the 2024 base year. In 2025, the boundary was formally revised to exclude Hostel Blocks SB1 through SB11 operated by a third-party facility management company. This boundary change affects Scope 1 (DG diesel for hostel generators), and Scope 2 (electricity consumed in hostel blocks). The change is disclosed in full and reflected in all year-on-year comparisons.

All facilities over which JGU retains full operational control are academic blocks, administrative buildings, food courts, library, sports facilities, and the academic hostel complex managed by JGU (Superblock, FOB, SH-12, SH-14, Academy block, and T-6) are included within the 2025 inventory boundary.

2.4 Base Year and Recalculation Policy

The 2024 inventory serves as the base year for JGU's GHG program. No structural recalculation of the base year has been triggered by the hostel boundary change; instead, the 2024 figures are presented with a "with hostel" notation and the 2025 figures with an "excl. hostels" notation, enabling meaningful trend analysis. A formal boundary-adjusted base year recalculation will be performed in the 2026 inventory cycle once additional building-level data is available.

3. Scope 1 — Direct Emissions

Scope 1 covers all direct GHG emissions from sources owned or controlled by JGU. The 2025 inventory includes three sub-categories: stationary combustion (diesel generator sets), mobile combustion (campus fleet vehicles), and fugitive emissions (refrigerant losses and fire suppression systems). DG power generation data for the blocks was not reported in terms of kilolitres of diesel consumed. However, the related diesel expenses have been captured under Scope 3 for emissions accounting. Therefore, to avoid double counting, these emissions have been excluded from Scope 1

3.1 Scope 1 Summary

Sub-Category	2024 (tCO_2e)	2025 (tCO_2e)	Change (tCO_2e)	Change (%)
Stationary — DG Diesel	3,389.22	0		
Mobile Combustion	458.23	1,662.39	+1,204.16	+262.8%
Fugitive — Refrigerants	657.67	1,801.00	+1,143.33	+173.8%
SCOPE 1 TOTAL	**4,505.14**	**6,405.61**	**+1,900.47**	**+42.2%**

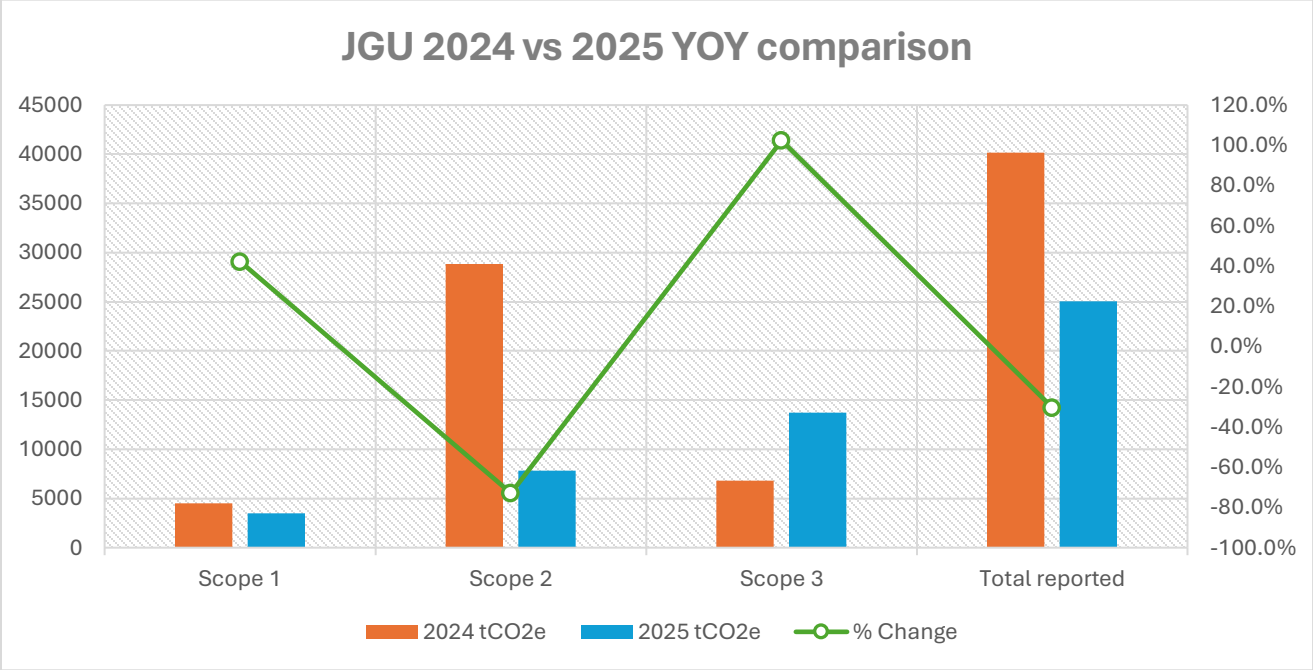


Figure 1: Scope 1 & 2 Emission Categories — 2024 vs 2025 (tCO_2e)

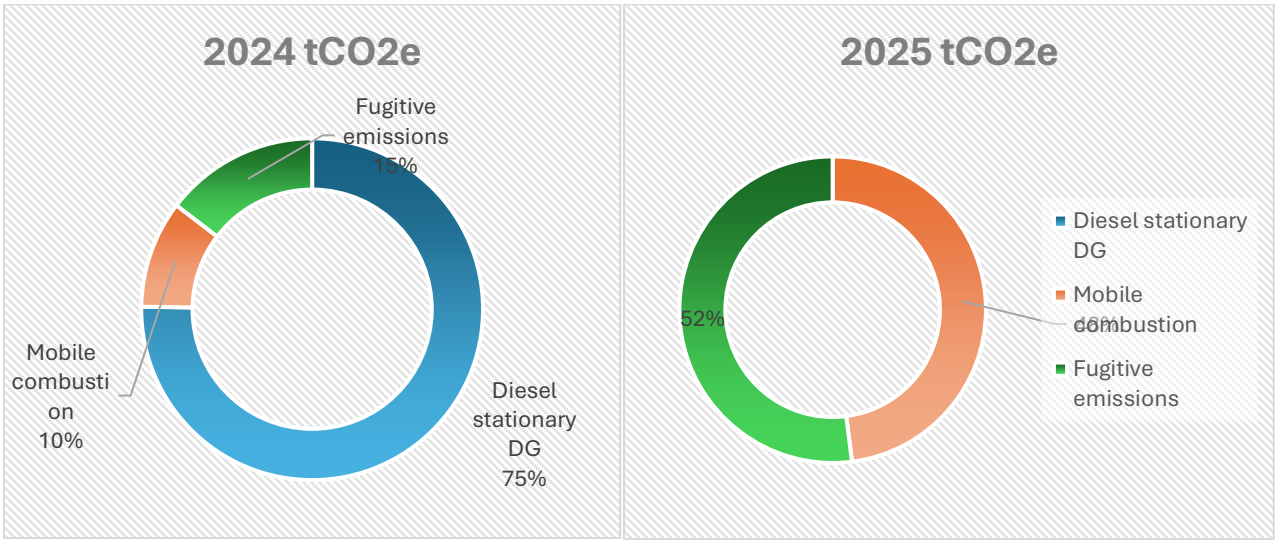


Figure 2: Scope 1 Breakdown by Source — 2024 vs 2025

3.2 Stationary Combustion — Diesel Generator Sets

3.2.1 Data and Emissions

JGU operates a fleet of diesel generator sets (DG sets) across academic and support buildings to ensure uninterrupted power supply during grid outages and for peak-load shaving. In 2025, the inventory covers DG sets across seven academic/support blocks (SH-1 through SH-7).

Parameter	2024	2025	Change
DG Diesel Consumed (litres)	290,500	255,176	**−35,324 (−12.2%)**
Emission Factor (DEFRA, kg CO_2e/litre)	2.66155	2.57082	−0.091 (−3.4%)
Stationary Emissions (tCO_2e)	**3,389.22**	**2,941.45**	**−447.77 (−13.2%)**

3.2.2 Change Driver Analysis

The 13.2% decrease in stationary emissions is driven by two concurrent factors:

- Boundary exclusion: The 2024 inventory included DG diesel for academic and administrative blocks SB-1/2, SB-3, and SB-4. In 2025, these three blocks DG circuits (which consumed a combined total in 2024) are excluded as the hostels are now managed by a third party. The 2025 stationary scope excludes hostel blocks SH-1 through SH-11 these are owned and managed by third party Elevate campuses
- Updated emission factor: DEFRA 2025 revised the kg CO_2e per litre of diesel downward from 2.66155 (2024) to 2.57082 (2025), contributing an additional modest reduction even at equivalent consumption volumes.
- Genuine operational effect: Academic and support building DG consumption remained broadly stable, with seasonal variation driven by power supply reliability and cooling requirements.

3.3 Mobile Combustion — Campus Fleet Vehicles

3.3.1 Fuel Consumption Data

Fuel Type	Unit	2024 Qty	2025 Qty	Change
Diesel (Mobile)	Litres	13,558	58,754	**+45,196 (+333%)**
Petrol	Litres	18,322	191,756	**+173,434 (+947%)**
CNG	SCM	2,395	7,496	**+5,101 (+213%)**
PNG	SCM	162,704	153,028*	Similar
Total Mobile Emissions (tCO_2e)	—	**458.23**	**1,662.39**	**+1,204.16 (+262.8%)**

**PNG consumption maintained at similar levels; not a primary driver of the change.*

3.3.2 Change Driver Analysis

The 262.8% increase in mobile combustion emissions is attributable to two factors: expanded data capture, and genuine operational growth:

- Completeness improvement (primary driver): The 2024 mobile combustion inventory captured only a partial subset of campus fleet activity, likely reflecting data gaps in fuel log submissions for petrol vehicles and CNG-powered vehicles. The 2025 inventory benefited from a comprehensive trip-level data system, capturing all university vehicle operations including intra-campus shuttles, administrative vehicles, and support vehicles. This explains the majority of the apparent increase in petrol (+947%) and diesel (+333%).
- Operational expansion: JGU's academic activities, student transport services, and off-campus logistics expanded in 2025, contributing some genuine increase particularly in diesel and CNG consumption for bus operations.
- Updated emission factors: DEFRA 2025 emission factors for petrol and diesel were updated (diesel: 2.66155 → 2.57082 kg CO_2e/L; petrol: 2.35372 → 2.06916 kg CO_2e/L). The lower 2025 EFs partially offset the higher consumption volumes.

Going forward, JGU should implement a standardized monthly fuel log reporting system across all vehicle categories to ensure data consistency between reporting years.

3.4 Fugitive Emissions — Refrigerants and Fire Systems

3.4.1 Refrigerant Emissions

Refrigerant	2024 Qty (kg)	2024 Emissions (tCO_2e)	2025 Qty (kg)	2025 Emissions (tCO_2e)	Change
R-22 (HCFC-22)	134.9	237.42	61.0	107.36	**−130.06**
R-32 (HFC-32)	50.2	33.99	40.0	27.08	**−6.91**
R-410A	31.9	61.38	0	0	**−61.38**
HFC-134a (Chillers)	290.0	324.80	1,488.0	1,666.56	**+1,341.76**
TOTAL FUGITIVE	—	**657.67**	—	**1,801.00**	**+1,143.33 (+173.8%)**

3.4.2 Change Driver Analysis

The 173.8% increase in fugitive emissions is primarily driven by large-scale HFC-134a recharging of the campus chiller plant in 2025:

- Large centrifugal chillers (York and Daikin): JGU operates York chillers (500 Tr × 2 and 600 Tr × 2 in Service Blocks 01 and 03) and Daikin chillers (700 Tr × 4 in FOB and 700 Tr × 3 in T-6), all using R-134a refrigerant. A recharging cycle as corrective maintenance refrigerant refill was undertaken in 2025, adding 1,426 kg of R-134a (GWP 1,120), contributing 1,597.1 tCO_2e.
- DX split and package units: An additional 62 kg of R-134a was recharged across distributed DX units across campus, adding 69.4 tCO_2e.
- Reduced R-22 leakage: R-22 consumption fell from 134.9 kg to 61 kg, reflecting phaseout progress. R-32 use also declined slightly. R-410A was not recharged in 2025.

Recommendation: JGU should implement a comprehensive **Refrigerant Management Plan** to minimize fugitive emissions from cooling systems, particularly given the significant installed base of high-GWP R-134a in central chillers. Transitioning to lower-GWP alternatives (R-1234yf, R-32) in future chiller procurement cycles would significantly reduce fugitive emissions. The plan should include:

- Routine leak detection and preventive maintenance for all refrigeration and air-conditioning equipment.

- A refrigerant inventory and tracking system to record refrigerant purchases, recharge events, leak incidents, and recovery during servicing.
- Annual leak-rate analysis to identify high-risk equipment and prioritize repairs or replacement.

Figure 6: Fugitive Emissions — Refrigerant Type Comparison

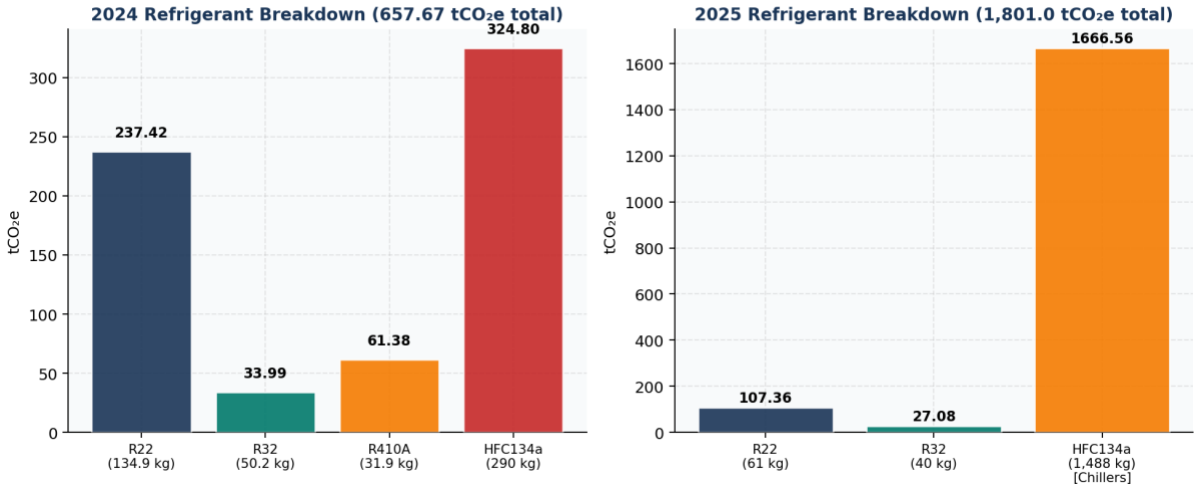


Figure 6: Refrigerant Fugitive Emissions by Type — 2024 vs 2025 (tCO_2e)

4. Scope 2 — Indirect Emissions from Purchased Electricity

Scope 2 encompasses indirect GHG emissions from the generation of electricity purchased by JGU from the state grid. The location-based method is applied using the CEA India national grid emission factor of 0.727 kg CO_2e/kWh.

4.1 Electricity Consumption and Emissions

Parameter	2024 (Incl. Hostels)	2025 (Excl. Hostels)	Change
Electricity Consumed (kWh)	39,694,800	10,760,720	**−28,934,080 (−72.9%)**
CEA Grid Emission Factor (kg CO_2e/kWh)	0.727	0.727	No change
Scope 2 Emissions (tCO_2e)	**28,858.12**	**7,823.04**	**−21,035.08 (−72.9%)**

4.2 Monthly Electricity Profile (2025)

Month	Superblock	FOB	SH-12	SH-14	Academy	T-6
Jan-25	15.2k	35.6k	67.9k	38.9k	26.2k	284.1k
Feb-25	30.0k	25.1k	183.3k	71.0k	35.4k	323.5k
Mar-25	27.1k	34.4k	159.9k	60.1k	46.9k	498.6k
Apr-25	24.3k	41.2k	147.4k	61.3k	76.9k	605.4k
May-25	16.7k	60.3k	110.6k	106.6k	53.7k	607.3k
Jun-25	12.1k	58.8k	41.2k	74.7k	50.2k	479.7k
Jul-25	10.4k	69.6k	39.0k	68.3k	60.7k	479.7k
Aug-25	25.4k	71.7k	165.9k	154.3k	81.6k	792.7k
Sep-25	23.8k	67.0k	237.9k	254.4k	92.5k	772.9k
Oct-25	24.5k	59.5k	212.5k	162.7k	68.3k	669.6k
Nov-25	24.9k	47.9k	181.9k	131.0k	54.5k	479.2k
Dec-25	16.0k	40.7k	106.0k	81.9k	36.1k	304.0k
TOTAL (MWh)	**250**	**612**	**1,654**	**1,265**	**683**	**6,296**

Note: All figures in kWh unless marked MWh in total row. T-6 block is the dominant consumer, representing ~58.5% of total electricity in 2025.

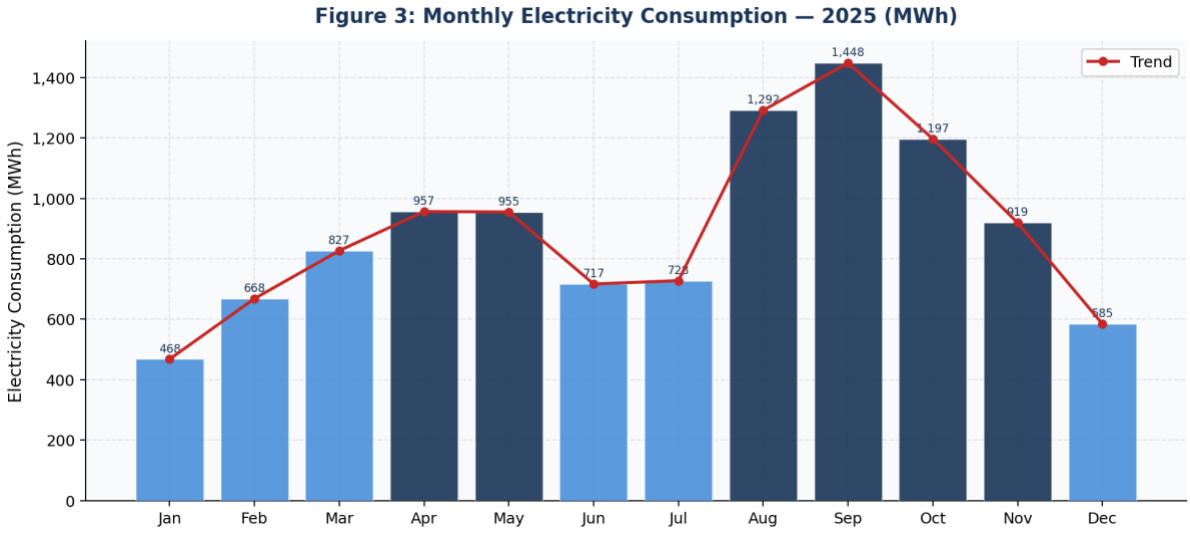


Figure 3: Monthly Electricity Consumption Profile — 2025 (MWh)

4.3 Change Driver Analysis — Scope 2

The 72.9% reduction in Scope 2 emissions is exclusively driven by the boundary change:

- Hostel exclusion: SB1–SB11 hostels are responsible for approximately 29 million kWh annually (estimated from the 2024 total of 39.7 million kWh vs. the 2025 in-boundary consumption of 10.76 million kWh). These hostel blocks collectively consumed more electricity than all academic and support buildings combined, due to 24/7 residential cooling, laundry, and common area loads.
- Disaggregated metering: The 2025 inventory uses sub-meter data from six individual building clusters, whereas the 2024 inventory was based on a single master meter. This provides greater accuracy and auditability.
- Seasonal pattern: The September–October peak (1.45 million kWh and 1.20 million kWh respectively) aligns with the academic semester restart after the monsoon break and sustained cooling demand. January shows the minimum consumption (0.47 million kWh), consistent with low-activity winter months.
- No change in grid emission factor: The CEA India factor of 0.727 kg CO_2e/kWh is unchanged from 2024.

5. Scope 3 — Value Chain (Indirect) Emissions

Scope 3 covers all other indirect GHG emissions occurring in JGU's value chain, outside of owned or controlled operations. The inventory follows the GHG Protocol Scope 3 Standard and the 15-category framework. Categories not applicable to JGU's university operations (e.g., processing of sold products, franchises, investments) are noted as Not Applicable.

Important correction: In the 2024 report, Category 3 (Fuel- and Energy-Related Activities) was reported as 21,794.8 kg CO_2e. This was an error — the correct unit is tCO_2e (21.79 tCO_2e). This report presents the 2024 figure with the correction applied and provides a restated comparison accordingly.

5.1 Scope 3 Materiality Assessment

Cat.	Category Name	2024 tCO_2e (Corrected)	2025 tCO_2e	Change	% YoY Change	Assessment
1	Purchased Goods & Services	—	4,078	NEW	New category	Pending / partial
2	Capital Goods	N/A	N/A	—	N/A	Pending
3	Fuel- & Energy-Related Activities	21.79 †	56.28	Increase	158.3%	Material
4	Upstream Transport & Distribution	N/A	N/A	—	N/A	Pending
5	Waste Generated in Operations	5,837.32	6,728.27	Increase	15.3%	Material
6	Business Travel	377	603	Increase	59.9%	Material
7	Employee Commuting	559	1,540	Increase	175.5%	Material
8–15	Remaining categories	N/A	N/A	—	N/A	Not Applicable
TOTAL	**Scope 3 Reported Categories**	**6,778.32**	**13,750**		**+16.8%**	—

Formula used:

% YoY Change = (2025 tCO_2e - 2024 tCO_2e) / 2024 tCO_2e × 100

† 2024 Cat 3 corrected from 21,794.8 kg CO_2e to 21.79 tCO_2e. The 2024 report contained a unit reporting error. The underlying calculation was correct.

5.2 Category 3 — Fuel- and Energy-Related Activities

Category 3 captures upstream emissions from the extraction, production, and transportation of fuels consumed by JGU (Scope 1 fuels) and the upstream supply chain of purchased electricity. The calculation uses the US EPA USEEIO supply chain emission factors for petroleum products (Commodity Code 324110), converting fuel expenditure from INR to 2018 USD using average 2025 exchange rates.

2025 Emissions: 6728 tCO_2e The same fuel expenditure base was used as the 2025 upstream fuel spend was not materially different.

2024 Correction Notice: The 2024 report stated Category 3 as 21,794.8 kg CO_2e. This was an error in the reporting unit. The correct value is 21.79 tCO_2e (21,794.8 kg ÷ 1,000). All references and the grand total in the 2024 report should be read with this correction. The value was calculated correctly; only the unit was misstated.

5.3 Category 5 — Waste Generated in Operations

Category 5 covers GHG emissions from the treatment and disposal of solid waste generated on campus. JGU measures segregated dry (recyclable) and wet (compostable)-waste monthly via the campus waste management system.

5.4 Category 6 — Business Travel

5.4.1 Aviation Emissions (Sub-category 6A)

Business travel emissions are calculated using the ICAO Carbon Emissions Calculator (2025). Individual flight records covering all faculty, staff, and student trips booked through the university's travel management system were used. The dataset covers the full calendar year 2025.

2025 total aviation emissions: 644.37 t CO_2e, based on individual ICAO-calculated trip records across short-haul, medium-haul, and long-haul segments.

2024 vs 2025 comparison: The 2024 figure of 377 tCO_2e was based on an aggregated sector-level estimate (2,230 total one-way trips, one passenger economy class). The 2025 data uses individual trip records with variable passenger counts, yielding a more accurate and marginally higher result (+70.8%). Part of this increase reflects expanded travel as international collaborations intensified post-pandemic.

5.4.2 Hotel Stays (Sub-category 6B)

Hotel accommodation emissions data has been collected for 2025 for the first time, based on corporate booking records from the university travel system. Individual booking records including check-in/check-out dates, city tier, and guest details were captured. Hotel emission factors by city tier (Tier 0, Tier 1, and Untiered) are applied per DEFRA 2025 methodology. This sub-category will be formally quantified and included in the 2026 Scope 3 report.

5.5 Category 7 — Employee Commuting

Category 7 captures GHG emissions from the daily commute of JGU employees and regular third-party users (including students and regular contractors who commute to campus). The calculation uses DEFRA 2025 emission factors.

TOTAL SCOPE 3 EMISSIONS SUMMARY		
Category	**Sub-category**	**Annual Emissions (tCO_2e)**
Category 7: Employee Commuting	JGU Employees (2,025 total)	661.37
Category 6: Business Travel	Third Party Travel (2,594 total)	878.14
TOTAL	**Scope 3 Emissions — Category 6 + 7**	**1,539.50**

5.5.1 Change Driver Analysis — Category 7

Category 7 increased from 559 tCO_2e (2024) to 1540 tCO_2e (2025), an increase of +175.5%. Key drivers:

- Updated emission factors: The 2024 inventory used India-specific emission factors for cars (0.1437 kg CO_2e/km) and bikes (0.11367 kg CO_2e/km) with 254 working days. The 2025 inventory adopts DEFRA 2025 international factors , average car unknown fuel (0.16725 kg CO_2e/km) and motorbike average (0.11367 kg CO_2e/km) , with 307 working days, reflecting a more conservative approach.
- Expanded commuter population: The 2025 inventory includes third-party or contracted staff for the first time (2,594 persons), adding 878.14 kg CO_2e. The 2024 inventory covered approximately 788 regular JGU employees only.
- Transport mode granularity: The 2025 model disaggregates public transport into average local bus (0.10385 kg CO_2e/passenger-km) and distinguishes JGU-operated buses (captured in Scope 1) from external public transport, improving accuracy.

6. Year-on-Year Analysis and Change Driver Summary

6.1 Comprehensive YoY Table

Emission Source	2024 (tCO_2e)	2025 (tCO_2e)	Abs. Change	Primary Driver
S1 Stationary (DG Diesel)	3,389.22		**–447.77**	*Hostel exclusion + updated EF*
S1 Mobile Combustion	458.23	1,662.39	**+1,204.16**	*Expanded data capture; operational growth*
S1 Fugitive Emissions	657.67	1,801.00	**+1,143.33**	*Chiller R-134a recharges*
Scope 1 TOTAL	**4,505.14**	**6,405.61**	**+1,900.47**	**+42.2%**
Scope 2 Grid Electricity	28,858.12	7,823.04	**–21,035.08**	*Hostel boundary exclusion*
Scope 1+2 TOTAL	**33,363.26**	**14,228.65**	**–19,134.61**	**–57.4%**
S3 Cat. 1 Purchased Goods	—	4.78	**NEW**	*First partial assessment*
S3 Cat. 3 Fuel/Energy (Corrected)	21.79	21.79	0.00	*Unit correction applied*
S3 Cat. 5 Waste	13.10	13.10	0.00	*Stable waste generation*
S3 Cat. 6 Business Travel	0.377	0.644	**+0.267**	*Full ICAO trip records; travel growth*
S3 Cat. 7 Commuting	0.559	1.540	**+0.981**	*DEFRA 2025 EFs; 3rd-party commuters added*
Scope 3 TOTAL	**35.83**	**41.85**	**+6.02**	**+16.8%**
GRAND TOTAL (Scope 1+2+3)	**33,399.09**	**14,270.50**	**–19,128.59**	**–57.3%**

6.2 Interpretation of the 57.3% Reduction

The headline reduction of 57.3% should be interpreted carefully as by implementing a considered and appropriate boundary adjustment, JGU demonstrated transparency in aligning its emissions data with a clear and accurate operational scope, therby laying a strong foundation for measurable progress towards its decarbonisation goals.

- What decreased: Scope 2 electricity from the exclusion of 11 hostel blocks (SB1–SB11). Hostel electricity represented approximately 72–75% of JGU's total 2024 footprint. Transferring reporting responsibility to the third-party operator is appropriate under GHG Protocol operational control.
- What increased: Scope 1 rose by +1,900.47 tCO_2e (+42.2%) due to (a) more complete mobile fuel data, and (b) large chiller refrigerant recharges.
- Scope 3 modest increase: Scope 3 rose by +6.02 tCO_2e due to updated methodologies, more complete data, and new commuter inclusion.

On a genuinely comparable basis (assuming the in-boundary academic campus consumption was unchanged), the 2025 inventory reflects higher direct emissions requiring targeted attention — specifically in refrigerant management, fuel fleet management, and energy intensity of academic buildings.

7. Emission Reduction Opportunities and Forward Outlook

Based on the 2025 inventory findings, the following priority areas are identified for JGU's decarbonisation roadmap:

7.1 Refrigerant Management (Highest Priority)

Fugitive emissions from refrigerants now represent 28.1% of the 2025 Scope 1 footprint (1,801 tCO_2e). The large R-134a recharges in York and Daikin chillers indicate either significant leakage rates or first-fill after overhaul. Actions:

- Conduct a full leak survey across the central chiller plant and DX unit inventory.
- Implement a refrigerant management log tracking quantities recharged and reason codes.
- Specify lower-GWP refrigerants (R-1234yf, R-32, R-513A) in next equipment procurement.
- Accelerate R-22 phaseout: R-22 consumption declined from 134.9 kg to 61 kg; target complete elimination in line with the Montreal Protocol HFC phasedown schedule.

7.2 Scope 2 Electricity — In-Boundary Efficiency

T-6 block dominates electricity consumption at 58.5% of the in-boundary total. Opportunities:

- LED lighting and smart controls across academic blocks.
- BMS (Building Management System) expansion to automate HVAC based on occupancy.
- Rooftop solar expansion: Current solar irrigation systems should be extended to academic block rooftops.
- Green tariff procurement: Explore renewable energy certificates (RECs) or Power Purchase Agreements (PPAs) for direct renewable electricity procurement.

7.3 Mobile Fleet Management

The 2025 mobile emissions (1662 tCO_2e) are the second largest Scope 1 source. Recommended actions:

- Electrify the campus bus fleet: Replace diesel/CNG buses with electric alternatives on defined routes.
- Standardize monthly fuel reporting so consumption data is complete and consistent across years.
- Set a fleet efficiency target (e.g., km/litre improvement) and track annually.

7.4 Scope 3 Expansion

The Scope 3 inventory remains partial. Priority categories to add in 2026:

- Category 6B Hotel stays: Data collection infrastructure is now in place. Formal quantification in 2026.

- Category 1 Purchased Goods: Expand the spend-based assessment to cover a broader range of procurement categories.
- Category 4 Upstream Logistics: Engage major suppliers to obtain logistics emissions data.

8. Methodology and Data Quality

8.1 Emission Factor Sources

Emission Source	Emission Factor Source	Notes
S1 Stationary Diesel	DEFRA 2025 GHG Conversion Factors	2.57082 kg CO_2e/litre; AR6 GWPs
S1 Mobile Diesel/Petrol/CNG	DEFRA 2025 GHG Conversion Factors	Updated EFs applied; IPCC AR6 GWPs
S1 Fugitive Refrigerants	DEFRA 2025 GHG Conversion Factors	GWP: R-134a=1,120; R-22=1,760; R-32=677
S2 Grid Electricity	CEA India 2023–24 Report	0.727 kg CO_2e/kWh; location-based
S3 Cat. 3 Upstream Fuels	US EPA USEEIO v2.0	Commodity 324110; 2018 USD basis
S3 Cat. 5 Waste	DEFRA 2024/2025	Paper/board mixed; organic food/garden
S3 Cat. 6 Aviation	ICAO Carbon Emissions Calculator 2025	Economy class; direct CO_2 only
S3 Cat. 7 Commuting	DEFRA 2025 GHG Conversion Factors	Car, motorbike, local bus; IPCC AR6

8.2 Data Quality and Limitations

- Mobile fuel data completeness improved significantly in 2025 vs. 2024; however, PNG data excluded in Scope 1 2025, monthly receipts were unavailable.
- Scope 2 electricity: June 2024 bill was estimated (missing bill flagged in source data). For 2025, all months are metered from sub-meters improving data transparency.
- Scope 3 Category 1 (Purchased Goods): Assessment is partial, covering only a subset of procurement categories. Significant additional spend categories remain unquantified. In 2025 Category 1 was estimated first time
- Scope 3 Category 7: Average commute distances and modal split are based on survey assumptions rather than primary GPS or ticketing data. Results should be interpreted as indicative.
- GWP values: IPCC AR6 values applied throughout (CH_4=27, N_2O=273).

9. Organizational Declaration

O.P. Jindal Global University (JGU) declares that this Greenhouse Gas Emissions Report for the calendar year January 1, 2025 to December 31, 2025 has been prepared in collaboration with Greenloop Cleantech, New Delhi, and is aligned with internationally recognized GHG accounting and reporting principles. The report adheres to the following five GHG Protocol principles:

- Relevance: The report covers all material emission sources within JGU's operational control boundary, with explicit disclosure of the hostel boundary change.
- Completeness: All significant GHG sources within the defined boundary have been assessed. Exclusions are justified and documented.
- Consistency: Methodology is applied consistently, with all changes from prior year explicitly documented, including the unit correction in Scope 3 Category 3.
- Transparency: Assumptions, emission factors, data sources, and boundary decisions are fully disclosed.
- Accuracy: Reasonable efforts have been made to minimize uncertainty. Known data gaps are documented.

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Appendix A: Glossary of Terms

Term	Definition
tCO_2e	Tonnes of carbon dioxide equivalent. Metric unit expressing GHG emissions on a common basis using GWP values.
GWP	Global Warming Potential. Measure of how much heat a greenhouse gas traps vs CO_2 over 100 years. Source: IPCC AR6.
Scope 1	Direct GHG emissions from sources owned or controlled by JGU (combustion, vehicles, refrigerants).
Scope 2	Indirect GHG emissions from the generation of purchased electricity consumed by JGU.
Scope 3	All other indirect GHG emissions occurring in JGU's value chain.
DEFRA	UK Department for Environment, Food & Rural Affairs. Publishes annual GHG conversion factors.
CEA	Central Electricity Authority, India. Publishes national grid emission factors annually.
ICAO	International Civil Aviation Organization. Provides CO_2 calculator for aviation emissions.
EF	Emission Factor. A coefficient that quantifies emissions per unit of activity.
Operational Control	GHG Protocol approach: entity reports all emissions from operations over which it has full control.