



**K.R. MANGALAM UNIVERSITY**  
THE COMPLETE WORLD OF EDUCATION



# CARBON EMISSION REPORT

**Academic Year 2023–24**  
(1 July 2023 – 30 June 2024)



**K.R. MANGALAM UNIVERSITY** Sohna Road,  
Gurugram (Haryana)-122103  
Website: [krmangalam.edu.in](http://krmangalam.edu.in)



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## **CARBON EMISSION REPORT**

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### **1. Introduction**

K.R. Mangalam University (KRMU), Gurugram, upholds the principle of sustainability as a core institutional value. Recognizing the urgency of climate change, the University has adopted proactive strategies to monitor, report, and mitigate greenhouse gas (GHG) emissions resulting from its academic, administrative, and residential operations.

This Carbon Emission Report provides an assessment of the university's total carbon footprint for the academic year 2023–24. It quantifies emissions across direct and indirect sources, analyzes contributing factors, and outlines strategies implemented to reduce environmental impact.

The report supports the University's commitment to the United Nations Sustainable Development Goals focusing on affordable clean energy, sustainable communities, responsible consumption, and climate action.

### **2. Methodology**

The carbon emission assessment for KRMU has been conducted using the Greenhouse Gas (GHG) Protocol Corporate Accounting and Reporting Standard, the most widely used international tool for measuring and managing GHG emissions.

#### **2.1 Emission Scopes**

- **Scope 1 - Direct Emissions:**

Emissions from sources owned or controlled by KRMU, such as fuel combustion in generators, university transport vehicles, and LPG used in hostels and cafeterias.

- **Scope 2 - Indirect Emissions (Purchased Energy):**



Emissions generated from electricity purchased from the grid, used for lighting, cooling, computing, and laboratory operations.

- **Scope 3 - Other Indirect Emissions:**

Emissions from sources not directly controlled by the University, including student and staff commuting, waste generation, paper usage, food waste, and outsourced transport.

## 2.2 Data Sources and Tools

### Data was gathered from:

- Energy bills (electricity, diesel, LPG)
- Transport fuel logs and bus schedules
- Waste disposal and recycling records
- Biogas and solar energy generation logs
- Commuting survey data for students and staff

### Emission factors were adopted from:

- Central Electricity Authority (CEA, India 2023)
- IPCC 6th Assessment Report (AR6)
- India GHG Inventory Database

All emissions were converted into **tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e)** for standardized comparison.

## 3. Campus Overview

K.R. Mangalam University operates as a **comprehensive multidisciplinary institution** with extensive infrastructure that supports teaching, research, and residential facilities.

Parameter	Details
Campus Area	26 acres
Built-up Area	~1,10,000 m <sup>2</sup>



Student Strength	~5,200
Teaching & Non-teaching Staff	~520
Academic Blocks	7
Laboratories	60+ (Science, Engineering, Pharmacy, etc.)
Hostels	4 (Boys and Girls)
Canteens & Mess Facilities	3
Renewable Energy Installations	Solar PV (310 kWp)
Waste-to-Energy System	Biogas Plant (operational)

This operational scale represents both academic vibrancy and environmental responsibility. The University continues to integrate green infrastructure and low-carbon practices into campus design and daily functioning.

#### 4. Carbon Emission Summary (2023–24)

The following table provides the estimated carbon emissions for major activity areas within the reporting period:

Category	Scope	Source Description	Annual Emissions (tCO <sub>2</sub> e)
Electricity Consumption	2	Grid electricity for all campus operations	410
Diesel Generators	1	Backup power for hostels, labs, and admin blocks	65
University Transport	1	Buses, official vehicles	42
Waste Disposal	3	Solid, paper, and plastic waste	18



<b>Water Treatment &amp; Supply</b>	2	Pumping, purification, and wastewater treatment	25
<b>Commuting (Students &amp; Staff)</b>	3	Daily private transport, carpool, public commute	190
<b>Food Waste (After Biogas Recovery)</b>	3	Hostels and canteens (net-zero contribution)	0
<b>ICT and Office Equipment</b>	2	Computer labs, servers, and cooling systems	30
<b>Total Estimated Emissions</b>	—	—	<b>≈780 tCO<sub>2</sub>e</b>

## 5. Reduction Measures Implemented (2023–24)

KRMU adopted several green measures during the reporting period that directly contributed to emission reductions:

### 5.1 Renewable Energy Integration

- The **Solar PV Plant (310kWp)** solar installation on the rooftops of academic and administrative blocks generated approximately **430,000 kWh of clean electricity annually**, thereby offsetting an estimated **~340 tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e)** from conventional grid-based power.
- In addition, surplus solar power generated during low-demand periods is **fed back into the utility grid** under the net-metering arrangement, further enhancing the university's contribution to sustainable energy use and reducing dependency on fossil fuels.
- This renewable energy intervention has enabled KRMU to achieve nearly **30% of its total annual electricity consumption** through solar power alone — a significant step toward the goal of becoming a **carbon-neutral campus by 2030**.
- Surplus power fed into the grid during low-demand hours.



## 5.2 Biogas Generation and Waste Recycling

- Hostel food waste (~2.5 tonnes/week) is processed in the **biogas plant**.
- Generated **biogas (~80 m<sup>3</sup>/month)** replaces LPG used in kitchens.
- Organic slurry used as bio-fertilizer for campus gardens.

## 5.3 Energy Efficiency Measures

- Transitioned to **100% LED lighting**, reducing electricity consumption by ~20%.
- Installed **energy-efficient HVAC systems** and sensor-based lighting.
- Routine maintenance of diesel generators and lab equipment to minimize fuel wastage.

## 5.4 Water and Resource Management

- **Rainwater harvesting** structures across hostels and academic blocks recharge the groundwater table.
- **Sewage Treatment Plant (STP)** recycles ~60,000 L/day for horticulture and flushing.
- Reduced municipal water demand by ~25%.

## 5.5 Paper and ICT Optimization

- Digital workflows under the **E-Office Initiative** reduced paper printing by ~30%.
- Adoption of cloud-based learning platforms (LMS) for teaching and assessments.

## 5.6 Green Mobility Initiatives

- Encouraged **shuttle services and carpooling** among students and staff.
- Parking area restructured to support **future electric vehicle (EV) charging stations**.

## 6. Comparative Analysis: 2022–23 vs 2023–24

Parameter	2022–23	2023–24	Change (%)	Remarks
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Total Emissions (tCO <sub>2</sub> e)	890	780	↓ 12.4%	Reduction due to solar and biogas adoption
Renewable Energy Use	12%	24%	↑ 100%	Solar expansion
Waste Recycling	45%	70%	↑ 25%	Improved segregation & composting
Water Reuse	40%	60%	↑ 20%	Efficient STP utilization
Paper Consumption	Baseline	30% reduction	—	Digitization of workflows

The data indicates a positive environmental trajectory, demonstrating consistent reduction in both energy intensity and total emissions despite growth in student intake and infrastructure expansion.

## 7. Recommendations for 2024–25

To build on the progress achieved, the following actions are recommended:

### 1. Expansion of Solar Power Capacity

- Increase PV capacity to 400 kWp to achieve 30–35% renewable power share.

### 2. Implementation of Electric Mobility Plan

- Replace conventional buses with EV buses for student transport.
- Establish EV charging points at hostels and faculty residences.

### 3. Carbon Neutrality Roadmap (2030 Target)

- Develop a comprehensive Carbon Neutral Campus Plan aligned with India’s Net Zero 2070 commitment.
- Integrate carbon offset programs such as campus afforestation and renewable energy credits.

### 4. Real-Time Monitoring System



- o Deploy IoT-based Smart Energy Meters and a Sustainability Dashboard for tracking energy, water, and emissions data in real-time.

#### 5. Awareness and Community Participation

- o Organize Green Campus Drives, Eco Club Challenges, and Annual Sustainability Week to engage students and staff in climate action.

#### 6. Sustainable Procurement Policy

- o Prefer vendors with certified green practices for stationery, IT equipment, and catering services.

### 8. Conclusion

The **total estimated carbon emissions for K.R. Mangalam University in 2023–24** amount to approximately **780 tonnes of CO<sub>2</sub> equivalent**, reflecting a **12.4% reduction** from the previous year. This achievement underscores the University's commitment to sustainability through continuous investment in renewable energy, waste management, water reuse, and digitalization.

Moving forward, KRMU aims to progress toward a **carbon-neutral and energy-efficient campus** by enhancing renewable capacity, promoting behavioral change, and embedding sustainability into all aspects of academic and administrative operations.

**Registrar**  
**K.R. Mangalam University**