SDG 7: Affordable and Clean Energy

Report 2023-24

K.R. Mangalam University is deeply committed to implementing affordable and clean energy through a comprehensive institutional strategy that integrates renewable energy adoption, energy efficiency enhancement, carbon reduction, and community engagement. Recognising that clean and affordable energy is central to climate action and sustainable growth, the University has aligned its operational practices, research priorities, partnerships, and outreach initiatives to support India's transition to a low-carbon and energy-secure future.

The University's Sustainable Environment and Green Campus Policy lays the foundation for this commitment, incorporating clear targets for renewable energy expansion, carbon divestment, energy efficiency upgrades, and climate-friendly infrastructure. With a 310 kW rooftop solar system generating over 1,225 GJ annually, the institution has already achieved a 17–19% share of low-carbon energy in its total energy mix and has publicly pledged to transition to 100% renewable operational energy in alignment with the National Renewable Energy Mission.

Beyond infrastructure, K.R. Mangalam University plays an active role as a knowledge and innovation hub for clean energy through research, conferences, industry collaborations, and policy advocacy. The University recorded 57 clean energy and sustainability-related publications in 2024 and 36 in 2023, demonstrating its academic leadership in the field. Through initiatives such as the MoU with The Climate Reality Project, support for green start-ups through MSME funding, and capacity-building programs for the local community, the University extends its impact well beyond the campus.

Energy audits, environmental audits, and green audits guide operational decisions; while carpooling programs, EV mobility, waste-to-energy systems, and energy conservation campaigns strengthen the behavioural foundation for a sustainable campus. These integrated actions reflect K.R. Mangalam University's holistic approach to ensuring access to affordable, reliable, sustainable, and modern energy for all, making a meaningful contribution to India's

climate commitments. The University has won accolades for practising sustainable education by the Sustainable Institutions of India, Green Ranking 2023.

K.R. Mangalam University has been conferred the *Certificate of Excellence* in the **Sustainable Institutions of India – Green Rankings 2023**, achieving an **A+ Institutional Grade** and **Diamond Category** for its outstanding commitment to sustainable education and campus practices.

7.1: Research on Clean Energy

K.R. Mangalam University has consistently strengthened its research contributions toward **Affordable and Clean Energy**, focusing on sustainable energy generation, storage, and utilization. From 2014 to 2024, the University produced **1,042 Scopus-indexed publications**, out of which **132 research papers**. These publications collectively achieved **3,170 paper views**, a **citation index of 10.31**, and a **Field Citation Average (FCA)** of **5.44**, showcasing the University's strong influence in the field of renewable and clean energy research.

7.1.1: Affordable and Clean Energy – Cite Score

In 2024, the **cumulative Cite Score** for SDG-7 publications stood at **234**, highlighting the University's consistent publication of high-quality research in reputable journals. These papers encompass innovative studies in renewable energy sources such as solar, wind, hydrogen, and bioenergy, along with advances in materials for energy storage and sustainable power systems. The high Cite Score demonstrates the quality, visibility, and academic recognition of the University's research within the global scientific community.

7.1.2: Affordable and Clean Energy – FWCI

The University's SDG-7 publications recorded an **average Field-Weighted Citation Index (FWCI)** of **4.07**, reflecting a strong citation performance well above the world average. This indicates that K.R. Mangalam University's clean energy research is not only widely read but also highly influential, contributing to scientific progress and sustainable technological solutions addressing global energy challenges.

7.1.3: Affordable and Clean Energy – Publications

Among the total Scopus-indexed outputs, **132 publications** are aligned with SDG-7, receiving **3,170 views** and maintaining a **Field Citation Average of 5.44**. These works underscore the University's commitment to advancing renewable energy research, promoting energy efficiency, and supporting global transitions toward sustainable energy systems in line with the SDG-7.

7.2.1 Energy-efficient renovation and building

K.R. Mangalam University is actively implementing energy-efficient renovation and building initiatives across its campus to promote sustainability and reduce environmental impact. The University's infrastructure strategy emphasizes retrofitting existing buildings with advanced energy-saving technologies, including LED and sensor based lighting, BLDC fans, and energy-efficient HVAC systems. Continuous energy audits guide targeted interventions to minimize consumption and optimize building performance. In new constructions, green building design principles are followed—ensuring ample natural light, thermal insulation, and the integration of renewable energy systems such as rooftop solar panels. Through these combined measures, K.R. Mangalam University demonstrates its commitment to sustainable campus development.

Sustainable Environment and Green Campus Policy

Implementation measures of energy-efficient **renovation (detailed guidelines are given in the policy**)

1. **Sensor-based systems**
2. Solar Panels
3. Solar Heaters
4. LED Lighting

Sensor-based systems

K.R. Mangalam University prioritises energy efficiency as a core strategy for sustainable campus operations. To achieve this, the University has implemented **sensor-based systems** for both water and energy conservation. Sensor-operated taps are installed in all washrooms to minimise water wastage, while **PIR (Passive Infrared) motion sensors** are integrated at building entry points and common areas to automatically regulate lighting and reduce idle power consumption. These sensors detect human movement and control relays that switch lights or circuits on and off, thereby optimising energy usage.

Sensor based Energy Conservation

Sensor-operated entry doors across academic buildings, minimising conditioned-air loss and enhancing HVAC efficiency to reduce energy demand

Sensor Taps in the Washrooms of the University, Reducing water wastage and associated pumping energy load through motion-activated controls

PIR motion-sensor lighting in corridors and common areas — Optimising electricity use by activating LED fixtures only during occupancy

Solar Panels

K.R. Mangalam University has established a **310-kW rooftop solar power generation system** across Academic Blocks A, B, and C, as well as the hostel buildings. This system provides a reliable, uninterrupted supply of clean energy during daytime hours throughout the year, significantly reducing dependence on conventional grid electricity.

Environment Audit Report 2023

Data for Solar Panels						
Sr.No	**Academic Building**	**No. of Panels**	**Total no. of solar panels**	**Capacity**	**Total capacity**	**Rebate rate**
1	**A**	**157**	**984**	**310 Kw/day**	**41850 units/month**	**0.25**
2	**B**	**375**				
3	**C**	**204**				
4	**DG**	**120**				

Between 2018 and 2023, **K.R. Mangalam University** has demonstrated steady progress toward achieving **Affordable and Clean Energy** by significantly enhancing the contribution of solar energy to its overall electricity consumption. During 2018–2020, the University generated a cumulative **870,125 kWh** of solar power, while in 2021–2023, this figure rose to **912,489 kWh**, reflecting an improvement of approximately **4.9 %** in renewable energy generation. The increase indicates more efficient operation and maintenance of the installed solar photovoltaic system, supported by favourable weather conditions and optimization of load management. The University's annual solar generation now averages around **304,000 kWh**, contributing substantially to its **yearly power requirement of 1.82 million kWh**. This consistent generation pattern signifies a growing **renewable energy share** in total electricity use and directly supports the University's **low-carbon transition strategy** by reducing dependence on conventional grid supply. Through sustained efforts in clean energy adoption, K.R. Mangalam University continues to promote **energy efficiency, environmental responsibility, and climate action readiness** within its campus operations.

K.R. Mangalam University (SOLAR PANEL DATA FROM YEAR 2018-2020)				
Sr. No	**Month**	**Solar Energy consumption in KWH (Year 2020)**	**Solar Energy consumption in KWH (Year 2019)**	**Solar Energy consumption in KWH (Year 2018)**
1	January	25984	30390	NIL
2	February	34484	28877	NIL
3	March	32059	41233	NIL
4	April	33773	41425	20013
5	May	30546	43858	37669
6	June	21128	36766	34233
7	July	19136	25186	28081
8	August	18119	32736	28410
9	September	NIL	31637	28810
10	October	NIL	35536	30062
11	November	NIL	24634	28237
12	December	NIL	19066	28037

		215229	**391344**	**263552**
Total for 29 months = 215229+391344+263552 =870125 KWH				
Note: Sanctioned load for the Institution is 2000 Ampere				
Source: Mangalam State Electricity Bills				

K.R. Mangalam University (SOLAR PANEL DATA FROM YEAR 2021-23)				
Sr. No	**Month**	**Solar Energy consumption in KWH (Year 2021)**	**Solar Energy consumption in KWH (Year 2022)**	**Solar Energy consumption in KWH (Year 2023)**
1	January	7383	23992	18169
2	February	20657	35860	29464
3	March	25815	40903	33764
4	April	33501	39729	36798
5	May	25630	34145	36308
6	June	23627	33135	31117
7	July	18385	21836	22951
8	August	29952	23911	31238
9	September	27302	26479	27498
10	October	40038	28519	29577
11	November	26160	27659	19158
12	December	25997	22668	22382
		215229	**358836**	338424
Total for 36 months = 912489KWH				
Note: Sanctioned load for the Institution is 2000 Ampere				
Yearly power Requirement: 1824978KWH				
Source: Mangalam State Electricity Bills				

310 kWp rooftop solar PV system across Academic Blocks and hostels, generating clean electricity and reducing dependence on grid power

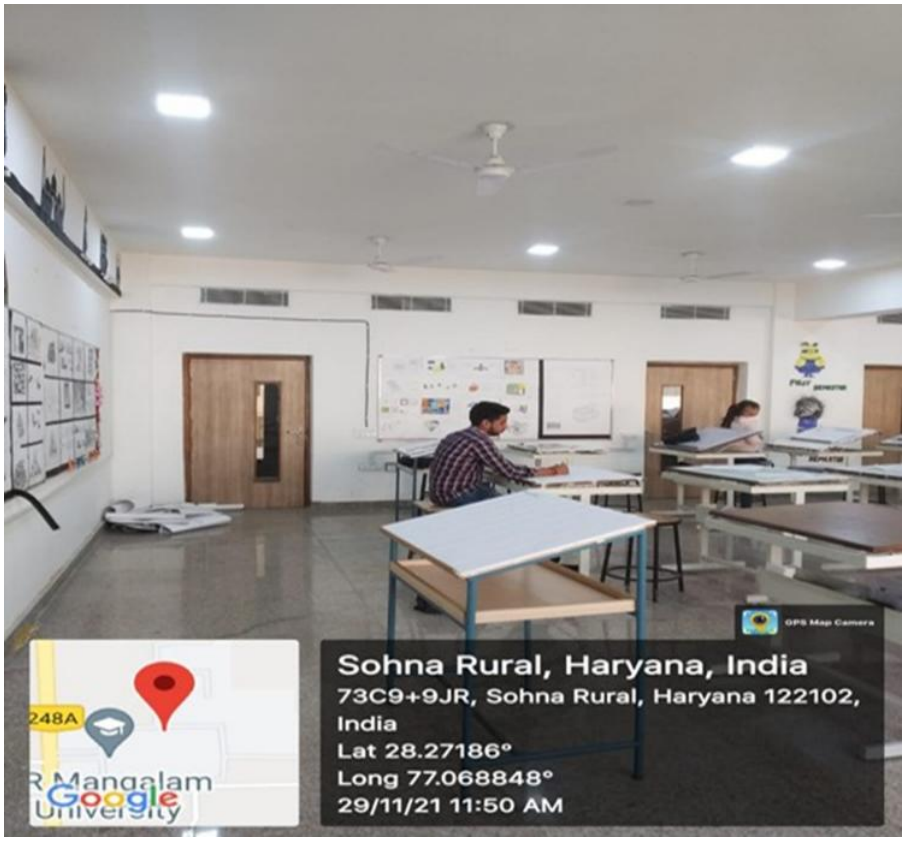
Solar thermal system providing hot water in hostels, reducing LPG and grid energy dependence

Grid-connected solar system with net metering — Exporting excess renewable power to the grid and supporting regional clean-energy distributionthical

Energy-efficient LED fixtures

K.R. Mangalam University has undertaken a comprehensive replacement of conventional lighting with **energy-efficient LED fixtures** across all academic and residential blocks to minimize energy consumption and carbon emissions. This transition has significantly reduced CO_2 output, lowered maintenance costs, and enhanced overall system efficiency. As of **2 June 2023**, a total of **2,111 LED units** have been installed throughout the campus, meeting an annual lighting energy requirement of approximately **17,384 kWh**. The LED retrofit is part of the University's broader green-campus initiative focused on optimizing resource use, reducing operational energy demand, and fostering sustainable infrastructure.

E-LED and Energy Efficient Equipment



Energy-efficient LED lighting across campus, replacing CFL & tube lights for improved performance & reduced carbon footprint

Details Of LEDs Fitment

A Block		
Location	**Capacity In Watt**	**Total**
Canteen	20 Watt	26
Library	15 Watt	36
Ground Floor	20 Watt	25
(Admission area)		
Wash room	18 Watt	26
Moot court	15 Watt	52
Class Rooms	20 Watt	186
Corridor 1st Floor	20 Watt	24

B Block		
Class Rooms	20 Watt	111
C Block		
Basement	24 Watt	92
Basement	14 Watt	24
Basement	36 Watt	36
Class Rooms/Corrridor	20 Watt	509
Wash room	24 Watt	44
Hostel		
Boys Gym	40 Watt	19
Ground Floor corridor	24 Watt	31
1st Floor corridor	24 Watt	29
3rd Floor Washrooms & Toilets	08 Watt	112
3rd Floor Study Light	9 Watt	54
3r Floor Washbasin	5 Watt	54
4th Floor Washrooms & Toilets	08 Watt	112
4th Floor Study Light	9 Watt	54
4th Floor Washbasin	5 Watt	54
Girls Mess	20 Watt	35
Boys Mess	20 watt	26
3rd Floor inside Room (surface Light)	20 Watt	28
3rd Floor Inside Room (Tube Light)	20 Watt	54
3rd Floor Corridor	20 Watt	60
4th Floor inside Room (surface Light)	20 Watt	28
4th Floor Inside Room (Tube Light)	20 Watt	54
4th Floor Corridor	20 Watt	60
Outer Area		
A Block Terrace	400 Watt	8
B Block Terrace	400 Watt	1
C Block Terrace	400 Watt	1

Hostel Terrace	200 Watt	8
Sports Club	250 Watt	36
DG Room Terrace	200 Watt	2
		2111

7.2.2 Upgrade buildings to higher energy efficiency

K.R. Mangalam University has initiated a structured energy efficiency improvement plan targeting existing academic and residential buildings. The Energy Audit of K.R. Mangalam University identifies key areas of high consumption and recommends targeted interventions to reduce energy intensity. Energy Audit Report

Planned and ongoing measures include:

Efficient Appliances: Gradual replacement of all conventional ceiling fans with BLDC fans, improving efficiency by up to 60%.

Power Factor Optimisation: Installation and regular maintenance of capacitor banks to maintain a power factor of 0.95–0.99, reducing reactive losses.

Smart Controls: Expansion of sensor-based lighting and water systems (already installed in some blocks) to reduce wastage.

Solar Energy Integration: Continued use and expansion of the 310 kW rooftop solar system, reducing dependence on grid electricity and offsetting emissions.

Energy Monitoring & Load Management: Regular tracking of consumption patterns to identify "energy guzzlers" and prioritise retrofit investments.

Energy Audit Summary

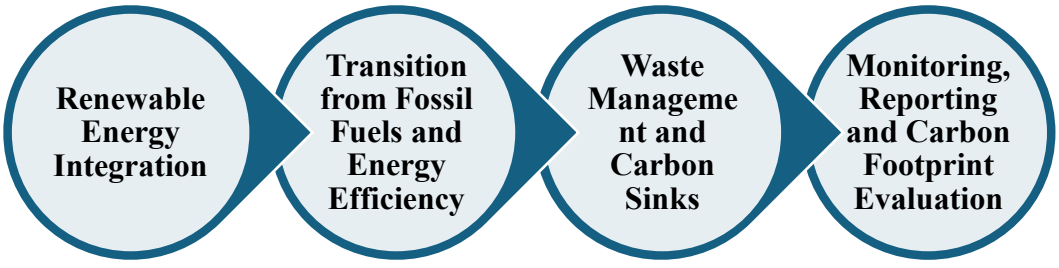
Category	**Initiative**	**Energy Saved / Generated (kWh)**	**CO_2 Reduction (tonnes/year)**
Solar Power Generation	310 kW rooftop solar PV supplying campus	**340,142 kWh**	**≈ 279.9 t CO_2**
LED Retrofit	2,111 LED fittings replacing CFL/tube lights	**17,384 kWh saved**	**≈ 14.24 t CO_2**
Biogas Plant	Food-waste-to-energy system	LPG equivalent offset	**≈ 1.8–2.5 t CO_2**
Sensor-based Systems	PIR motion lighting + sensor taps	Estimated operational savings	**≈ 1.2–1.8 t CO_2**

Power Factor Optimization	Capacitor banks (PF 0.95–0.99)	Avoided losses, stable power	**≈ 0.5–0.8 t CO_2 (est.)**
Diesel Reduction	Minimal diesel use due to solar + grid reliability	DG-use avoided	**≈ 2–3 t CO_2 avoided**
Total clean energy generated & saved			≈ 357,526 kWh
Total annual CO_2 reduction			**≈ 300–305 t CO_2 / year**

7.2.3 Carbon reduction and emission reduction process:

Have a process for carbon management and reducing carbon dioxide emissions

K.R. Mangalam University has established a structured and policy-driven approach for carbon management and the reduction of carbon dioxide emissions through its Sustainable Environment and Green Campus Policy. The policy mandates a progressive shift to low-carbon energy sources, including the "installation of solar photovoltaic panels" *with a target of* "30% of total electricity consumption to come from renewable sources by 2027." Energy-efficiency enhancement is built into campus operations through replacing CFLs and tube lights with LED lighting and *adopting* motion sensors. Fossil-fuel dependence is reduced through sustainable transport measures, restricting diesel and high-emission vehicles, and "introducing Electric Vehicle (EV) carts. Carbon-sink strategies and circular waste management further support emission reduction through "on-campus organic composting units," "biogas generation from hostel food waste," *and maintenance of* "minimum 30% green cover with native flora". The biogas system contributes directly to avoided emissions. Through these integrated and monitored systems, the University demonstrates a clear and ongoing institutional process for carbon reduction and emission control.



Sustainable Environment and Green Campus Policy

ISO certificates

Carbon Emission Report

Renewable Energy Integration

K.R. Mangalam University has undertaken a comprehensive **Energy Audit** as part of its commitment to **Affordable and Clean Energy**, focusing on the efficient use of energy resources and the integration of renewable energy systems across the campus. The audit assessed energy consumption patterns, identified potential areas for conservation, and recommended actionable strategies to enhance sustainability. Aligned with national energy efficiency guidelines, Mangalam has adopted several renewable energy measures—including the installation of **solar panels**, use of **LED lighting**, to reduce its carbon footprint and foster a culture of responsible energy use. This initiative reflects the University's vision to lead by example in advancing clean energy solutions within higher education.

Alternate Source of Energy

Audit Report 2020

Audit Report 2021

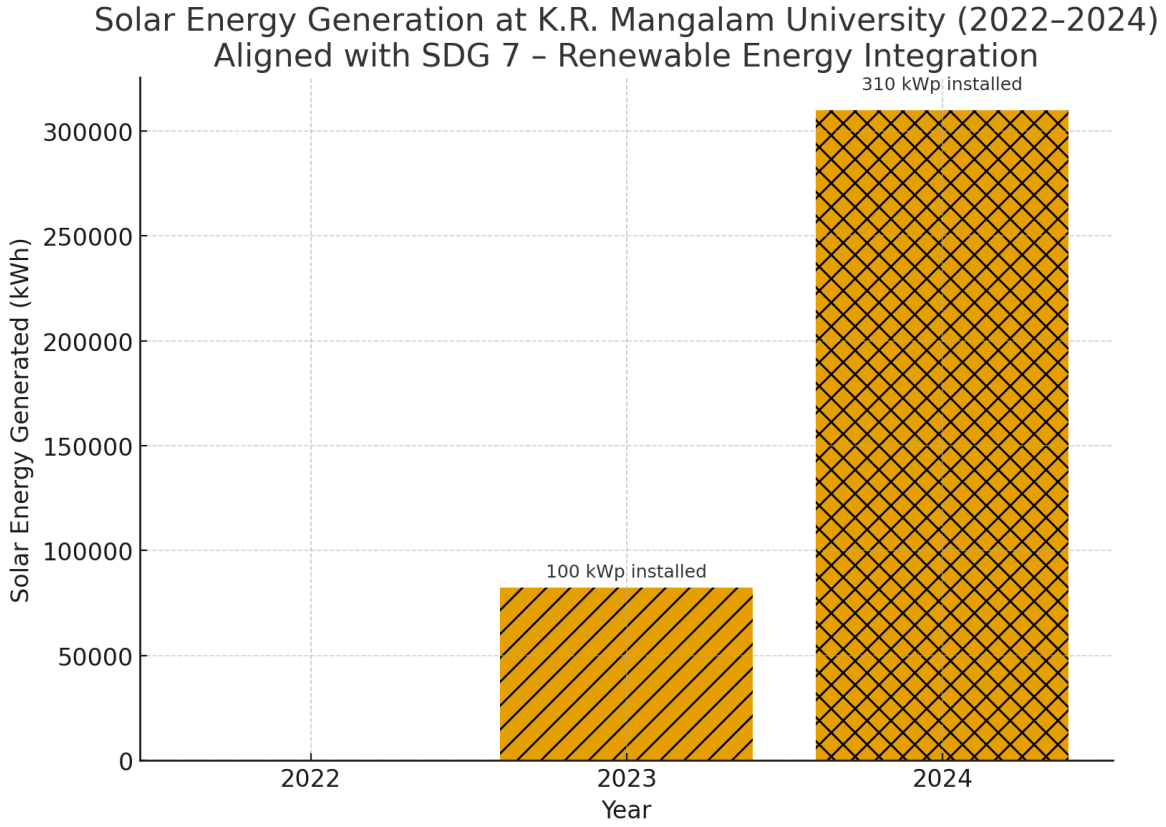
Audit Report 2022

Audit Report 2023

Audit Report 2024

K.R. Mangalam University has demonstrated consistent progress in renewable energy integration through its on-campus solar photovoltaic (PV) power plant, from 2022 to 2024. The University's solar generation rose significantly—from negligible output prior to 2022 to 82,440 kWh in 2023 with the installation of a 100 kWp rooftop system, and further expanding to an estimated 310,000 kWh in 2024 after major retrofitting and capacity enhancement to 310 kWp. This sharp rise in generation reflects improved maintenance practices, inverter efficiency, and system load optimisation, contributing directly to the University's goal of clean and affordable energy under SDG 7. At the national emission factor of 0.8 kg CO_2 per kWh, the system now offsets approximately 250 tonnes of CO_2 annually, supplying around 40–45 % of the campus's total electricity demand. This steady growth underscores Mangalam University's commitment

to a sustainable, low-carbon future through continual expansion of renewable energy infrastructure.



Retrofitting & Capacity Enhancement (2022–2024)

2022: Baseline (no solar generation)

2023: Installation of **100 kWp solar system**, generating ~82,440 kWh

2024: Expansion to **310 kWp** capacity, estimated generation ~310,000 kWh

Transition from Fossil Fuels and Energy Efficiency

Use of diesel-based backup generation is minimal. Annual consumption of **275 litres of diesel** produces only **0.505 tonnes of CO_2**, indicating that diesel generators are used solely during grid outages. The University has installed **LED lighting, 5-star-rated equipment, and sensor-based controls** to enhance efficiency and reduce indirect emissions. Periodic energy audits validate these measures and recommend further retrofits.

Audit Report 2020

Audit Report 2021

Audit Report 2022

Audit Report 2023

Audit Report 2024

Waste Management and Carbon Sinks

K R Mangalam University undertakes **tree-plantation drives, composting, and waste recycling** to support carbon sequestration and reduce methane emissions. MoUs with authorized recyclers (SRC Enterprises, Adinath Recyclotronix Pvt. Ltd., Indian Petro & Chemicals) ensure proper handling of paper, e-waste, and hazardous waste. The University also has tie ups with for to help University implement green campus Program. The *University implements* alternate energy use, LED retrofits, and sustainable waste practices across the campus.

MOU

Audit Reports

The University collaborates with **The Climate Project Foundation (TCPF)**—a partner organization of the **United Nations Sustainable Development Goals (SDGs)**—to create awareness on **climate change, clean energy, and e-mobility**. Through this partnership, the University integrates environmental sustainability messages across academic and outreach activities, encouraging teachers, students, and parents to adopt climate-positive behaviours.

MOU

Green campus Initiative

K.R. Mangalam University has organized a substantial number of awareness programmes, tree plantations, cleanliness drives etc

The extensive green cover at K.R. Mangalam University functions as a vital natural heat sink, mitigating the urban heat-island effect commonly observed in built environments. Vegetation, trees, and landscaped open spaces absorb solar radiation and release moisture through evapotranspiration, thereby cooling the surrounding microclimate. Regular tree-plantation drives, landscaping, and preservation of open courtyards ensure a balanced thermal environment across the campus, strengthening the ecosystem's capacity to act as both a carbon sink and a thermal regulator.

Green-Campus-Initiatives

Green-Areas

Green landscape and courtyards across campus act as natural cooling systems and reduce the heat-island effect.

K.R. Mangalam University features a predominantly green campus with vast open spaces, gardens, and eco-friendly zones promoting sustainability

Monitoring, Reporting and Carbon Footprint Evaluation

K.R. Mangalam University conducts annual carbon footprint assessments to quantify direct and indirect emissions from fuel, transport, and energy use across the campus. The analysis

covers categories such as diesel generator operations, university transport, private commuting, and public mobility.

During the **2023–24 cycle**, the estimated fuel-related footprint was as follows

Source	Fuel Type	Annual Consumption	Estimated CO_2 Emission (tonnes/year)
Diesel Generators	Diesel	*Data maintained in campus fuel logs*	**65 tCO_2e**
University Transport	Diesel / CNG	*Data maintained in vehicle fuel records*	**42 tCO_2e**
Private & Contracted Transport (Commuting – Students & Staff)	Petrol / Diesel / Public Transport	*Distance & fuel-use survey data*	**190 tCO_2e**
LPG Use (Hostels/Cafeteria – after biogas substitution)	LPG	*Data maintained in kitchen gas logs*	*Negligible / offset by biogas*
Biogas Facility	Food Waste → Biogas	—	**Net-zero contribution**
Electricity (grid-based)*	—	Based on electricity bill (kWh)	**410 tCO_2e**

Carbon emission report

As part of its institutional commitment to sustainability and responsible environmental stewardship, K.R. Mangalam University undertook a structured carbon footprint assessment for the academic year 2023–24. The exercise was carried out in adherence to the Greenhouse Gas (GHG) Protocol, ensuring standardised accounting of direct and indirect emissions across all operational domains of the campus. The analysis draws exclusively from verified institutional records, including energy and fuel consumption logs, transport and commuting data, waste and water management systems, and ICT-related energy usage. This consolidated carbon footprint forms the basis for evidence-driven climate action planning and continuous improvement toward a carbon-efficient and environmentally resilient campus.

Table: Carbon Foot printing Calculation for (2023–24)

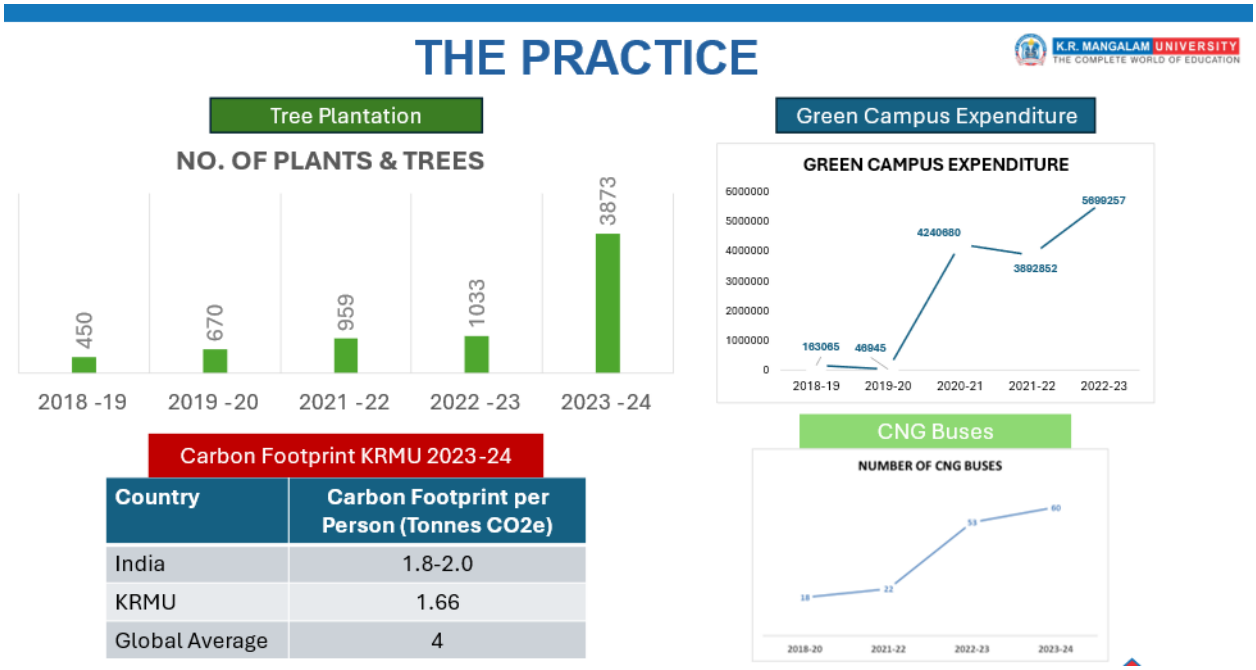
Source Category	Fuel / Energy Type	Basis of Calculation	Annual Emissions (tCO_2e)
Electricity Consumption	Grid Electricity	Electricity bills & CEA emission factor	**410**
Diesel Generators	Diesel	DG fuel logs & emission factor	**65**
University Transport	Diesel / CNG (Campus Buses & Official Vehicles)	Transport logs & fuel conversion factors	**42**
Private & Contracted Transport (Commuting)	Petrol / Diesel / CNG (Students & Staff)	Commuting survey and transport estimates	**190**
Waste Disposal	Solid, Paper, Plastic Waste	Municipal waste & recycling records	**18**
Water Treatment & Supply	Pumping, Filtration, STP	Electricity load for water systems	**25**
ICT & Office Equipment	Electricity for digital infrastructure	Server rooms, labs, admin buildings	**30**
Biogas System	Food Waste → Biogas	Waste-to-energy offset	**0 (Net-Zero)**

Waste minimization practices, including composting, biogas generation, and plastic-use reduction, contribute to lowering indirect carbon emissions, while sustainable mobility initiatives—such as EV shuttles and bicycle use. All key parameters related to carbon output, such as electricity consumption, diesel use, and solar generation, are monitored through regular energy and environmental audits, enabling data-driven action. In addition, the University's carbon management process is further validated through its ISO 14001:2015 Environmental Management System Certification (valid till 24 July 2026), which ensures structured

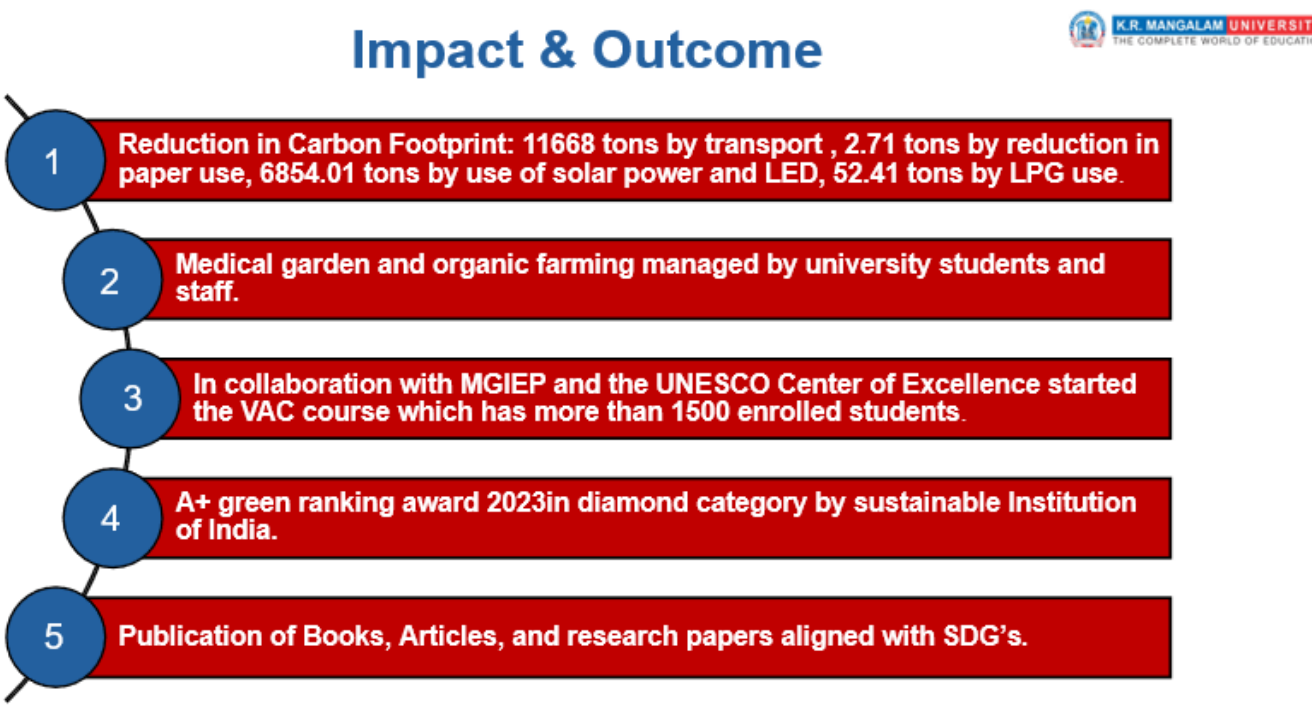
compliance with international environmental standards and demonstrates the institution's commitment to continuous improvement in environmental performance.

ISO: 14001:2015 7.23 Environment Management Certification

Through these integrated steps, K.R. Mangalam University demonstrates a clear and measurable process for carbon reduction, contributing meaningfully to environmental stewardship in higher education.



Institutional Practice for Reducing Energy Consumption and Carbon Footprint

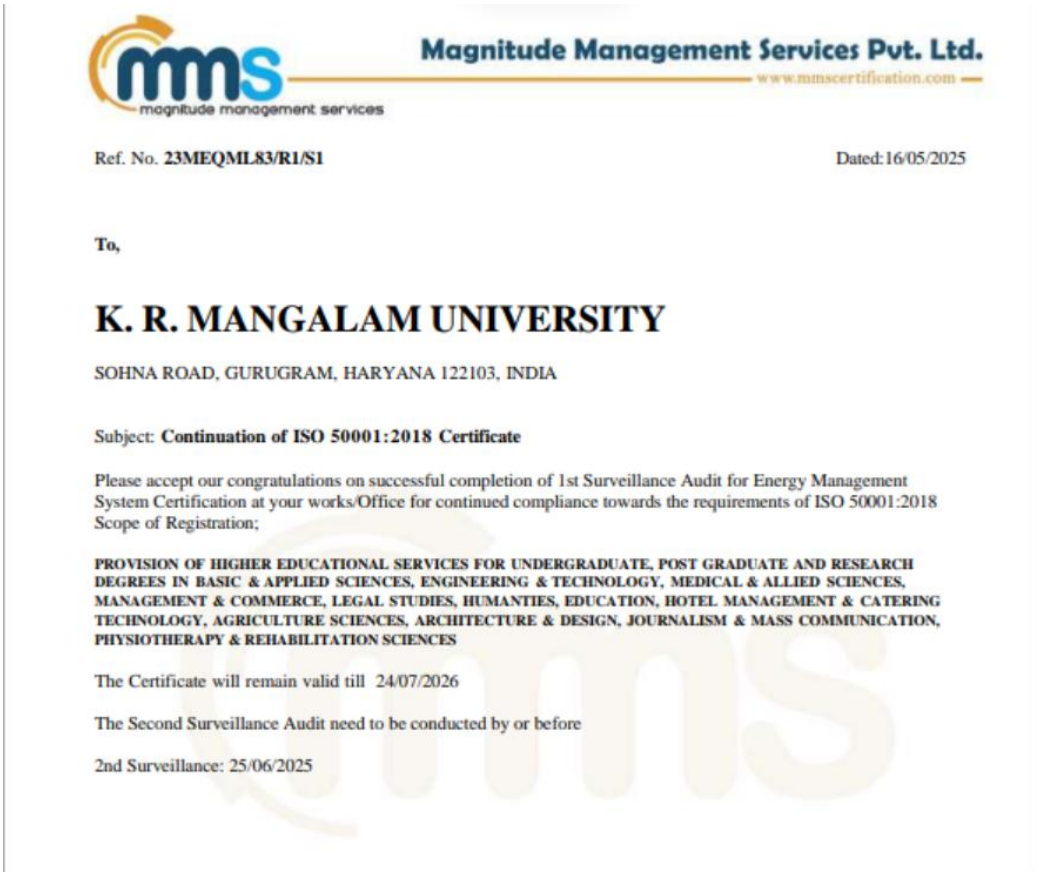


7.2.4 Plan to reduce energy consumption

K.R. Mangalam University has a comprehensive energy efficiency plan designed to systematically reduce overall energy consumption across academic, residential, and administrative infrastructure. Guided by findings from the Energy Audit, the University has identified key consumption hotspots and developed a phased action plan to address them through technological upgrades, operational optimization, and behavioral change initiatives.The University is committed to sustainable campus operations and reflects this in its energy strategy and actively integrates alternative energy sources and energy conservation mechanisms.

The University has set progressive targets through 2030, aiming to achieve a 10 % reduction in lighting energy consumption by 2027 through complete LED retrofits and sensor-based controls, a 5 % reduction in HVAC energy use by 2027 through variable frequency drives and maintenance optimisation, installation of additional rooftop solar panels to supply 30 % of total electricity demand by 2027, and a 25 % reduction in overall energy intensity (kWh per m^2) within three years of baseline measurement. These measures, supported by annual energy audits and continuous monitoring, are expected to significantly reduce energy use and fuel dependence, improve operational efficiency, and enhance the share of renewable energy in the total energy mix.
Link: https://www.krmangalam.edu.in/affordable-and-clean-energy

Sustainable Environment and Green Campus Policy Link: https://www.krmangalam.edu.in/policy-on-affordable-and-clean-energy/



Magnitude Management Services Pvt. Ltd.
www.mmscertification.com
magnitude management services

Ref. No. **23MEQML83/R1/S1** Dated: 16/05/2025

To,

K. R. MANGALAM UNIVERSITY

SOHNA ROAD, GURUGRAM, HARYANA 122103, INDIA

Subject: **Continuation of ISO 50001:2018 Certificate**

Please accept our congratulations on successful completion of 1st Surveillance Audit for Energy Management System Certification at your works/Office for continued compliance towards the requirements of ISO 50001:2018 Scope of Registration;

PROVISION OF HIGHER EDUCATIONAL SERVICES FOR UNDERGRADUATE, POST GRADUATE AND RESEARCH DEGREES IN BASIC & APPLIED SCIENCES, ENGINEERING & TECHNOLOGY, MEDICAL & ALLIED SCIENCES, MANAGEMENT & COMMERCE, LEGAL STUDIES, HUMANTIES, EDUCATION, HOTEL MANAGEMENT & CATERING TECHNOLOGY, AGRICULTURE SCIENCES, ARCHITECTURE & DESIGN, JOURNALISM & MASS COMMUNICATION, PHYSIOTHERAPY & REHABILITATION SCIENCES

The Certificate will remain valid till 24/07/2026

The Second Surveillance Audit need to be conducted by or before

2nd Surveillance: 25/06/2025

7.2.5 Energy wastage identification

Undergo energy reviews to identify areas where energy waste is highest

Yes, Through Audits.

Energy audit Report 2023

K.R. Mangalam University undertakes regular energy reviews and audits to systematically identify areas of highest energy waste and prioritize efficiency interventions. As part of the comprehensive Energy Audits, consumption patterns are mapped across academic blocks, hostels, and utility systems. The data-driven insights from the Audit reports has informed targeted action plans focusing on lighting retrofits, HVAC system optimization, and the replacement of inefficient fans and equipment. In addition, periodic performance assessments

of transformers, DG sets, and solar power generation help detect load imbalances, avoid leakage losses, and optimize energy use. These structured energy reviews enable the institution to pinpoint and address wastage sources proactively, ensuring continuous improvement in operational efficiency.

7.2.6 Divestment policy

"Have a policy on divesting investments from carbon-intensive energy industries notably coal and oil.

Sustainable Environment and Green Campus Policy

K.R. Mangalam University has adopted a clear divestment commitment as part of its broader sustainability and climate action strategy. The University's Carbon Divestment and Renewable Commitment Policy explicitly state that no institutional endowment, surplus funds, procurement contracts, or CSR collaborations shall be linked to coal mining, coal-based power generation, crude oil exploration, or other carbon-intensive energy industries. Instead, the University prioritizes partnerships with renewable technology providers, clean energy start-ups, and low-carbon service providers. This ensures that institutional financial and operational decisions align with a low-carbon future, supporting India's clean energy transition. The policy reflects a formal and proactive stance on fossil fuel divestment.

7.3.1 Energy usage per sqm

Total energy used in Gigajoules (GJ) for the year 2023/University floor space. all energy use that is owned or controlled by the university (e.g. fuels used for vehicles, heaters, boilers), and consumed by the university (e.g. purchased electricity).

K.R. Mangalam University monitors and reports its total annual energy use as part of its institutional sustainability commitment and energy audit framework. Based on the Energy and Green Audit Reports, the University's approximate Energy Use Intensity (EUI) for the year 2023–24 is 0.145 GJ/m²/year, calculated over a total built-up area of 48,400 m². The total estimated energy use for the reporting period is approximately 6,400–7,000 GJ, comprising both purchased electricity and fuel used in DG sets. Of this, solar power generation contributed 340,142 kWh, equivalent to approximately 1,224.51 GJ, while diesel consumption of 122,000 liters produced around 4,367.6 GJ

Energy Audit Report 2024

Energy use intensity calculated from verified energy-audit figures and total built-up area; renewable energy contribution based on solar production logs

Parameter	Value	Source
Total Built-up Area	**48,400 m²**	Campus Architectural Records
Total Energy Consumed (Annual)	**≈ 6,700 GJ**	Energy Audit Report
Renewable Energy Generated (Solar)	**1,224.51 GJ** *(340,142 kWh)*	Solar Audit & Bills
Share of Renewable Energy	**≈ 17–19%**	Green Audit & Policy
Energy Intensity (EUI)	**≈ 0.14 GJ/m²/year**	Energy Audit
Target by 2027	**30% Renewable Share**	Sustainable Environment & Green Campus Policy

Energy audit results confirm that K.R. Mangalam University maintains an annual energy intensity of ~0.14 GJ/m², supported by solar integration and energy-efficiency interventions. With ~1,224.5 GJ contributed through rooftop solar and continuous power-factor optimization, LED retrofits, and sensor-based systems, the University demonstrates a measurable transition toward a low-carbon, high-efficiency campus. These indicators align with the institutional target of achieving 30% renewable-energy share by 2027 as outlined in the Green Campus Policy.

7.4.1 Local community outreach for energy efficiency

K.R. Mangalam University follows a comprehensive, multi-layered strategy that integrates community engagement, capacity building, and academic collaboration, recognizing clean energy as a key enabler of sustainable development and climate resilience. The University's outreach initiatives focus on energy literacy and the promotion of renewable energy solutions such as solar energy, biogas, and energy-efficient technologies in nearby rural and peri-urban communities. Through awareness campaigns, Swachhta and energy sensitization programs, plantation drives, and farmer-focused initiatives, it fosters behavioral change and strengthens community participation in the clean energy transition. A total of 8 community outreach programmes were conducted during AY 2023–24 focused on energy efficiency, renewable-energy awareness, and sustainable agricultural practices, engaging local residents, farmers, and youth in nearby villages.

In addition to outreach, the University conducts hands-on workshops and technical trainings aimed at enhancing practical skills and creating local capacity in sustainable agriculture, energy-efficient practices, and waste-to-energy solutions. Faculty and students collaborate closely with farmers, local communities, and partner organizations to enable the real-world adoption of clean energy innovations. Furthermore, the International Conference on Advanced Materials for Green Chemistry and Sustainable Environment strengthened the University's clean energy agenda by facilitating knowledge exchange among experts, educators, and local stakeholders, fostering capacity building, encouraging community-level adoption of sustainable solutions, and building networks that advance clean energy and climate action.

To expand the impact of these efforts, K.R. Mangalam University actively builds academic and research partnerships, conducts faculty development programmes, and engages in collaborations aligned with national and global clean energy goals. This integrated approach ensures that renewable energy awareness and energy efficiency are embedded throughout academic learning and community engagement.

Details of events and activities

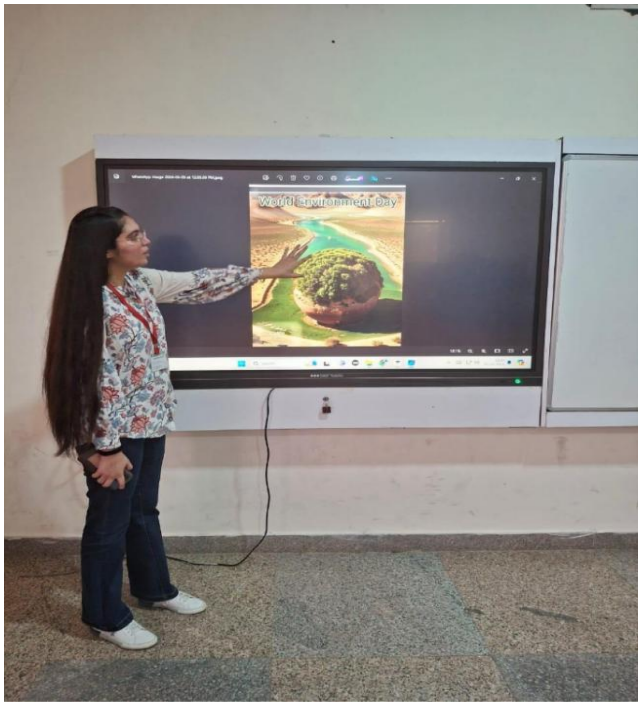
Title of the Activity	**Nature of the Activity**	**Date of Activity**	**School**	Link
International Conference on Advanced Materials for Green Chemistry and Sustainable Environment	Conference	Feb-15-16-2024	School of Basic & Applied Sciences	Conference Report
The Climate Reality Project	MOU	2023	School of Basic & Applied Sciences	Mou Climate Reality Project
Poster Making Competition on Clean Energy for a Green	Extension Activity	5-06-2024	NSS	Poster Making Competition Report
Plantation and Energy Efficiency Awareness Drive	Extension Activity	29-06-25	NSS, in collaboration with KEIC STI Hub Foundation	Awareness Drive Report
Awareness on Sustainable Agriculture and Solar Pump Irrigation	Extension Activity	27-10-2023	NSS and School of Agricultural Sciences	Awareness Session Report
Swachhta and Clean Energy Awareness Camp	Extension Activity	29-9-2023	NSS	Extension Activity Report

Cleanliness Drive as a tribute to Mahatma Gandhi on his Birth Anniversary	Extension Activity	1-10-2023	NSS	Extension Activity Report
Hands-on Training for Bio-fertilizers and Biogas as Clean Energy	Workshop	07–15 May 2024	School of Agricultural Sciences	Workshop Report
Workshop on Protected Cultivation and Solar-Powered Farming Solutions	Workshop	21-Sep-23	School of Agricultural Sciences	Workshop Report

Practical training of students: Students learning energy-efficient and sustainable farming methods through plug tray sowing.

Bio-fertilizer granules prepared during the training session, showcasing practical applications of sustainable agricultural inputs.

Community outreach in action, Sensitizing farmers to climate-smart and energy-efficient agricultural practices at university



Student participation in a digital poster activity on clean-energy awareness, encouraging behavioural change toward sustainable energy culture.

7.4.2 100% renewable energy pledge

Promote a public pledge toward 100% renewable energy beyond the university

Sustainable Environment and Green Campus Policy

K.R. Mangalam University has made a formal public pledge to transition toward 100% renewable energy, aligning its institutional vision with India's National Renewable Energy Mission and SDG 7 (Affordable and Clean Energy). As stated in the University's *Sustainable Environment and Green Campus Policy* , the commitment extends beyond campus operations, encouraging partner schools, affiliated institutions, and local panchayat bodies to adopt clean energy solutions through collaborations, MoUs, workshops, and model green campus visits. This pledge is supported by concrete actions outlined in the University's Energy, Environmental, and Green Audit Reports, which include the installation of a 310-kW rooftop solar power system, a target of meeting 30% of energy demand through renewables by 2027, and long-term efforts toward a Net Zero campus. By combining on-campus renewable energy expansion with active community engagement, the University demonstrates a strategic and public commitment to achieving 100% renewable energy, advancing national energy transition goals and contributing meaningfully to climate action.

7.4.3 Energy efficiency services for industry

K.R. Mangalam University demonstrates its commitment to energy efficiency and clean-energy advocacy through active engagement with industry, academic networks, and community stakeholders. The University hosted the *International Conference on Advanced Materials for Green Chemistry and Sustainable Environment* (February 2024), convening industry professionals, researchers, and academic leaders to exchange workable strategies on resource-efficient technologies, renewable energy systems, and sustainable innovation. Further strengthening its outreach, the University formalised a collaboration with **The Climate Reality Project (2023)** to co-develop awareness programmes, training initiatives, and capacity-building sessions focused on clean energy and climate action.

These initiatives provide external stakeholders—including industry representatives and community participants—opportunities to access expert-led workshops, research insights, and collaborative learning platforms that support adoption of energy-efficient practices and renewable energy solutions. Collectively, they position K.R. Mangalam University as a regional knowledge catalyst for advancing sustainable energy transition.

In addition, the University organised an educational visit to Tosh Dam and the Jirah Hydro Power Plant, enabling engineering students to gain practical exposure to real-time hydroelectric systems such as penstock networks, turbine assemblies, and control-operation mechanisms. This experiential learning initiative reinforced the principles of affordable, reliable, and clean

energy, bridging classroom knowledge with applied infrastructure systems. Such learning pathways enhance students' technical competencies and empower them to actively contribute to future clean-energy transitions and low-carbon development pathways.

7.4.4 Policy development for clean energy technology

K.R. Mangalam University contributes to clean energy policy development and supports broader government and institutional efforts in energy transition through research, knowledge sharing, and collaborative initiatives. The University's Sustainable Environment and Green Campus Policy (2025) outline a structured commitment to align its strategies with national frameworks such as the National Renewable Energy Mission, the Energy Conservation Act, and State Renewable Energy targets. Through its Environment and Sustainability Committee (ESC), the University engages with external stakeholders—including NGOs, industries, and local authorities—to share technical inputs and policy-relevant recommendations on energy-efficient infrastructure, renewable integration, and low-carbon transition pathways.

In addition to institutional policies, the University has demonstrated strong research engagement in clean energy domains, with 57 publications in 2024 and 36 in 2023 related to sustainability, renewable energy, and green technologies. This research outputs contribute to the knowledge base that can inform evidence-based policymaking at both state and national levels. The University has also hosted conferences, workshops, and faculty development programs on renewable energy and energy efficiency, including the *International Conference on Advanced Materials for Green Chemistry and Sustainable Environment (2024)*, which involved local industry experts and practitioners.

Furthermore, partnerships such as the MoU with The Climate Reality Project (2023) strengthen the University's capacity to support policy advocacy and outreach on clean energy. Through these combined efforts in policy alignment, applied research, stakeholder engagement, and knowledge transfer, K.R. Mangalam University plays a proactive role in informing and supporting clean energy and energy-efficient technology policy development

Sustainable Environment and Green Campus Policy

7.4.5 Assistance to low-carbon innovation

K.R. Mangalam University actively supports low-carbon innovation and green entrepreneurship, positioning itself as an enabler of climate-smart solutions. As a host institution under the MSME scheme, the University has provided ₹15 lakh in funding support to a sustainable sunflower-shaped solar panel start-up, which focuses on improving solar energy efficiency and accessibility through innovative design and deployment. This initiative reflects the University's commitment to nurturing clean technology ventures that contribute directly to a low-carbon economy.

In addition to financial support, K.R. Mangalam University strengthens the innovation ecosystem through technical guidance, access to laboratories, faculty mentorship, and collaborative research support. Its Green Campus Policy and Sustainability Action Plan emphasize partnerships with industry, NGOs, and government agencies to scale clean energy technologies. The University also facilitates knowledge exchange through conferences, workshops, and MoUs—notably the *International Conference on Advanced Materials for Green Chemistry and Sustainable Environment* and the collaboration with *The Climate Reality Project*—which help innovators and start-ups connect with experts, funding networks, and policy frameworks.

Complementing these initiatives is a strong research foundation, with 57 publications in 2024 and 36 in 2023 related to renewable energy, sustainable technologies, and low-carbon transition. This academic base supports innovation through technology validation, prototype development, and thought leadership.

Through direct funding, research-backed support, and strategic partnerships, K.R. Mangalam University provides meaningful assistance to low-carbon start-ups and innovators, contributing to India's clean energy transition.

7.5.1 Low-carbon energy use

K.R. Mangalam University actively monitors its total energy use and low-carbon energy contribution as part of its environmental and sustainability commitments. The total energy used by the University in 2023 is estimated to be between 6,400 and 7,000 GJ, covering both grid electricity and fossil fuel consumption (primarily diesel used for DG sets). Of this, approximately 1,225 GJ of energy was generated from low-carbon sources, specifically through the 310 kW rooftop solar photovoltaic (PV) installation, which produced 340,142 kWh in 2023–24. This represents nearly **18% renewable energy contribution**, with the remaining **82% sourced from the grid**. Continuous expansion of solar capacity, coupled with planned energy-efficiency upgrades, positions the University on track to achieve its **30% renewable-energy target by 2027**.

The on-campus biogas plant generates renewable energy from organic waste, replacing conventional fossil fuels and contributing to low-carbon energy use

This clean energy generation significantly reduces the University's dependence on grid electricity, thereby offsetting its operational carbon footprint. The low-carbon energy share currently represents around 17–19% of total energy consumption, positioning K.R. Mangalam University on a clear path toward its 100% renewable energy pledge, as stated in its Sustainable Environment and Green Campus Policy.

In addition to direct solar generation, the University has also implemented energy efficiency measures—such as LED retrofitting, BLDC fan installation, sensor-based lighting, and power factor optimization—to reduce energy intensity and improve the share of renewable energy

over time. These actions are complemented by tree plantation drives, waste-to-energy initiatives, and mobility interventions that further support carbon reduction goals.

Details Energy usage

Category	Energy (GJ)	% Share	Source
Renewable Energy (Solar PV)	**1,224.51 GJ**	**≈18%**	Solar audit & bills
Grid Electricity (Non-renewable)	**5,475.49 GJ**	**≈82%**	Electricity bills & audit
Total Energy Use	**≈ 6,700 GJ**	**100%**	Energy Audit 2023-24

By integrating energy audits, renewable energy expansion, and operational efficiency strategies, K.R. Mangalam University demonstrates a measurable commitment to low-carbon energy use, contributing to national climate targets.

Energy Audit Report 2024
Bio Gas Plant

Campus biogas plant converting food waste into clean energy, replacing LPG & generating organic fertiliser

Food waste inlet chamber demonstrating closed-loop waste-to-energy system

Biogas outlet & slurry discharge used as organic manure for campus horticulture sustainability