



DR. BHIMRAO AMBEDKAR UNIVERSITY, AGRA

(Formerly Agra University, Agra)

A+ Accredited by NAAC

Report on

Sustainable Development Goal 7



SDG 7 AFFORDABLE AND CLEAN ENERGY

Ensure access to affordable, reliable, sustainable
and modern energy for all

About this Report

This report sets out how Dr. Bhimrao Ambedkar University, Agra (DBRAU) is working towards Sustainable Development Goal 7, Affordable and Clean Energy. It covers the reporting year **July 2025 to June 2026** and is organised around the five evidence areas used by the Times Higher Education (THE) Impact Rankings for SDG 7: research on clean energy, university measures, energy use density, energy and the community, and low-carbon energy use.

We have tried to keep the report grounded in records rather than intentions. Most of the numbers come from three independent reports prepared for the University by EHS Alliance LLP, Gurugram, after its site assessment on 18 July 2026: the **Energy Audit Report 2025-26**, the **Environment Audit Report 2025-26** and the **Green Audit Report 2025-26**. These are supported by the University's electricity bills for twelve months, the technical sheets of our two solar plants, the policies published on the University website, and the SDG portal maintained by the SDG Cell. Where a document is available online, its link is given in the text so that a reader can check it directly. Scanned pages of the audit reports are reproduced in Annexure A as proof.

A word on honesty of the figures. Where the audits give a number, we have used it as it stands. Where we have derived a number ourselves (for example, the CO₂ avoided by solar generation), the working is shown. Some statements in earlier SDG documents could not be matched with the new audit data, and these have been revised or left out.

Table 1: Report at a glance

Item	Details
Institution	Dr. Bhimrao Ambedkar University, Agra (formerly Agra University), Paliwal Park, Agra, Uttar Pradesh 282004
Accreditation	NAAC A+; centenary year 1927–2027
Reporting period	1 July 2025 – 30 June 2026
Prepared by	SDG Cell and Centre of Excellence for Sustainability, DBRAU
Chairperson, SDG Cell	Prof. Ashu Rani, Hon'ble Vice-Chancellor
Coordinator	Prof. Manu Pratap Singh, Dean Academics
Audit Coordinator (2025-26 audits)	Prof. B. S. Sharma, Professor, EVS & DSW
External auditors	EHS Alliance LLP, Gurugram (Lead Auditor: Mr. Vijay Singh; Co-Auditor: Dr. Uday Pratap)
SDG portal	https://www.dbrausdg.in/

Contents

1 Introduction: SDG 7 and our University

2 Our Energy Year in Numbers (2025-26)

7.1 Research on Clean Energy

7.2 University Measures towards Affordable and Clean Energy

7.2.1 Energy-efficient renovation and new buildings · 7.2.2 Upgrading existing buildings · 7.2.3 Carbon and emission reduction process · 7.2.4 Plan to reduce energy consumption · 7.2.5 Identifying energy wastage · 7.2.6 Divestment policy · 7.2.7 Policy framework

7.3 Energy Use Density

7.4 Energy and the Community

7.4.1 Local community outreach · 7.4.2 Public pledge towards 100% renewable energy · 7.4.3 Energy efficiency services for industry · 7.4.4 Policy development for clean energy technology · 7.4.5 Assistance to low-carbon innovation

7.5 Low-Carbon Energy Use

8 Looking Ahead

A Annexure A: Audit Certificates and Proof Pages

B Annexure B: Policies, Reports and Web Links

1. Introduction: SDG 7 and our University

SDG 7 asks the world to ensure access to affordable, reliable, sustainable and modern energy for all by 2030. Behind that one line sit a few concrete targets: universal access to electricity (7.1), a substantially larger share of renewables in the energy mix (7.2), a doubling of the rate of improvement in energy efficiency (7.3), and more international cooperation and investment in clean energy research and infrastructure (7.a and 7.b).

A university touches all of these at once. It is a large energy consumer in its own right, with lecture halls, laboratories, hostels, a library that stays open late and computer labs that rarely switch off. It is also where engineers, chemists, physicists and life scientists do the research that makes clean energy cheaper, and where thousands of young people form habits they will carry into their homes and workplaces.

Our University's motto, *Tamso Ma Jyotirgamay*, "lead me from darkness to light", was chosen long before anyone spoke of SDGs. It still reads well in an energy report. The University was founded on 1 July 1927 as Agra University and renamed Dr. Bhimrao Ambedkar University in 1995. Today it serves the seven districts of the Agra Division (Agra, Aligarh, Mainpuri, Hathras, Firozabad, Etah and Mathura), with around 200 affiliated colleges and 15 residential institutes spread over its campuses at Paliwal Park, Khandari (Vivekanand Campus), Civil Lines (Bag Farzana) and Chhalesar.



Figure 1: Satellite view of the University campuses (Chhalesar, Sanskriti Bhawan, Paliwal Park, Khandari and the Boys' Hostel) as mapped for the audits

🔗 University campuses: <https://dbrau.ac.in/university-campus/>

Energy on these campuses is shared across seven electricity accounts with the local distribution company, two rooftop solar plants, two small diesel generator sets for backup and LPG for the canteen and hostel mess. The rest of this report explains how that energy is used, how much of it comes from the sun, what it costs in carbon, and what the University is doing to bring each of those numbers in the right direction.

2. Our Energy Year in Numbers (2025-26)

Before going into the detail, the figures below give the overall picture for July 2025 to June 2026. All are taken from, or calculated directly from, the 2025-26 audit reports.

8,41,299 kWh Total electricity used (grid + solar)	1,87,200 kWh Generated by our rooftop solar plants	22.3% Share of electricity met by solar
19.69% Renewable share of all energy used	130 kWp Solar capacity in operation (60 + 70 kW)	≈133 t CO₂ Emissions avoided by solar in the year
2,644 LED light fixtures on campus	402 Old 36 W tube lights left to replace (458 in 2022-23)	535 litres Diesel used by DG sets in a full year

Campus energy mix, 2025-26

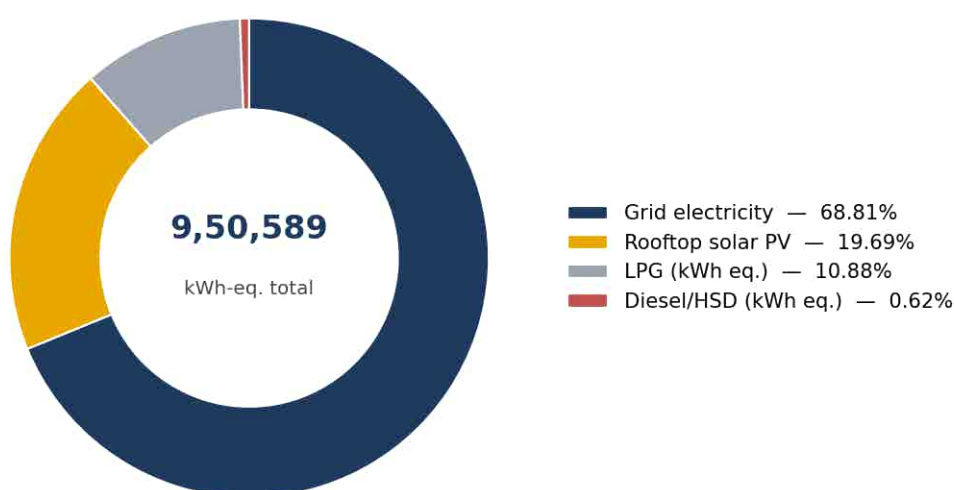


Figure 2: Campus energy mix for 2025-26 in kWh-equivalent (source: Environment Audit Report 2025-26, p. 14)

Table 2: Energy consumed by source, 2025-26

Energy source	Quantity	kWh / kWh-eq.	Share
Grid electricity (7 accounts)	6,54,099 kWh	6,54,099.00	68.81%
Rooftop solar PV	1,87,200 kWh	1,87,200.00	19.69%
High-speed diesel (DG sets)	535 litres	5,863.60	0.62%
LPG (canteen and hostel mess)	14,817.6 kg	1,03,426.85	10.88%
Total		9,50,589.45	100%

Two things stand out. The first is that electricity dominates: almost nine-tenths of the University's energy comes as electricity, which makes it the obvious place to act. The second is that fossil fuel burned directly on campus is small. Our two generator sets used only 535 litres of diesel in the whole year, because the grid supply is dependable and the solar plants carry part of the daytime load.

7.1 Research on Clean Energy

Energy research at DBRAU grew out of the physics, chemistry and engineering departments and is now spread across several institutes. Work led by B. P. Singh and A. S. Mathur has built a steady line of solar cell modelling studies; other groups work on perovskites and the use of machine learning to screen them; chemists and material scientists work on supercapacitors and hydrogen; and the School of Life Sciences studies bioenergy. The University's new Centre of Excellence for Sustainability lists renewable energy and clean technologies as one of its core research areas.

🔗 University research publications database: <https://dbrau.ac.in/research-papers-publications/>

🔗 Centre of Excellence for Sustainability: <https://www.dbrausdg.in/coe>

7.1.1 Affordable and Clean Energy: Citation performance

For this report we identified **26 peer-reviewed publications** by DBRAU authors that are directly about affordable and clean energy. Together they have received **242 citations**, an average of **9.3 per paper**. Eight of the 26 (30.8%) have been cited more than five times, so close to a third of this work is being picked up and used by other researchers.

The most cited paper is "Surfactant decorated polypyrrole-carbon materials composites electrodes for supercapacitor" (Bhardwaj et al., *Diamond and Related Materials*, 2020), with 55 citations. Two solar papers follow closely: the CZTSe solar cell defect study in *Optik* (34 citations) and the Cu₂O/TiO₂ heterojunction study in *Solar Energy* (31 citations). Several papers are from 2025 and 2026 and have not yet had time to gather citations, which tells us the pipeline is active.

Table 3: Citation profile of DBRAU clean energy research

Metric	Value
Total SDG 7 publications	26
Total citations	242
Average citations per paper	9.3
Publications with more than 5 citations	8 (30.8%)
Highest citations recorded	55 (Bhardwaj et al., <i>Diamond and Related Materials</i> , 2020)

7.1.2 Affordable and Clean Energy: Field-Weighted Citation Impact (FWCI)

Raw citation counts favour older papers and busy fields. The Field-Weighted Citation Impact corrects for that by comparing each paper with the world average for papers of the same type, subject and year; a value of 1.0 means "cited exactly as often as expected". When we look at the wider group of 30 energy- and resource-related outputs assessed for FWCI, values range from 0.1 to 17.55. Eighteen of them (60%) are above 1.0, and the overall average sits roughly between 2.5 and 3.0.

The highest value, 17.55, belongs to "Agriculture Waste Management and Bioresource: The Circular Economy Perspective" (2023), a paper that links farm residues to bioenergy and resource recovery. A paper on environmental pollution follows with an FWCI of 7.14. These are applied, systems-level papers, and they sit comfortably alongside the device-level solar and storage work described above.

Table 4: FWCI profile of DBRAU energy-related research

Metric	Value
Outputs assessed for FWCI	30
Outputs with FWCI above 1.0	18 (60%)
Average FWCI	approximately 2.5 – 3.0
Highest FWCI recorded	17.55 (Agriculture Waste Management and Bioresource: The Circular Economy Perspective, 2023)

7.1.3 Affordable and Clean Energy: Publications

The 26 papers fall into four broad groups. **Solar photovoltaics** is the largest, with simulation and optimisation studies of perovskite, organic (non-fullerene), kesterite, chalcogenide and transition-metal-dichalcogenide cells, many of them modelled in SCAPS-1D. **Energy storage** is the second group, covering supercapacitor electrodes built on polypyrrole-carbon composites, cerium oxide, cobalt-iron phosphates and metal tellurides. The third group covers **hydrogen and bioenergy**: photoelectrochemical hydrogen generation using doped hematite, systems biology for bioenergy crops, and thermo-catalytic conversion of plastic waste into fuel. The last is **buildings**, with work on phase-change materials in building-integrated photovoltaic (BIPV) envelopes and on photovoltaic-thermal air collectors.

One more paper deserves mention because it links to our own campus plans: Purushottam Kumar, Prateek Arora and B. P. Singh (2026), "Study of thermal effects and management in lithium batteries for electric vehicles", in *Advances in Applied Research*. Battery thermal management is exactly the kind of knowledge the University will need as it adds battery storage to its solar plants.

Table 5: DBRAU publications related to SDG 7 (DOIs are clickable)

No.	Authors	Title	Year	Journal / Source	Cit.	DOI
1	Gardner S.; Thomas L.M.; Singh B.P.; Gardner B.S.	Photovoltaic Thermal Air Collectors: Recent Advances in Performance Enhancement and Solar Thermal Applications	2025	Thermal Engineering, 72(8), 638–656	0	10.1134/S0040601524600251
2	Kumari N.; Ranjan R.; Srivastava N.; Tiwari R.N.; Sharma A.K.; Srivastava N.	Performance optimization study of lead-free CsSnGeI ₃ based perovskite solar cell heterostructure with different inorganic electron transport layers	2024	J. Physics and Chemistry of Solids, 190, 112003	21	10.1016/j.jpcs.2024.112003
3	Baghel A.; Singh D.; Kumar A.	A Literature Review on the Advancements in Hybrid Perovskite Solar Cells	2024	Proc. 1st Int. Conf. on Electronics, Communication and Signal Processing	0	10.1109/ICECSP61809.2024.10698100
4	Sharma B.; Mathur A.S.; Singh I.K.; Singh B.P.	Performance optimization of non-fullerene acceptor organic solar cell by incorporating carbon nanotubes as flexible transparent electrode	2022	Results in Optics, 9, 100315	7	10.1016/j.rio.2022.100315
5	Deshmukh T.B.; Agarwal A.; Mendhe A.C.; Thosare M.; Sankapal B.R.	Prototype symmetric solid-state supercapacitor designed through Co ₃ Fe ₄ (PO ₄) ₆ /MWCNT electrodes	2025	Chemical Physics Letters, 870, 142070	9	10.1016/j.cplett.2025.142070
6	Sharma B.; Mathur A.S.; Rajput V.K.; Singh I.K.; Singh B.P.	Device modeling of non-fullerene organic solar cell by incorporating CuSCN as a hole transport layer using SCAPS	2022	Optik, 251, 168457	39	10.1016/j.jlleo.2021.168457

No.	Authors	Title	Year	Journal / Source	Cit.	DOI
7	Prakash O.; Verma K.D.; Upadhyay L.; et al.	Biphasic cerium oxide nanoparticles: a dual-functional approach for dielectric and supercapacitor applications	2025	Ionics, 31(10), 10993–11020	4	10.1007/s11581-025-06643-0
8	Mathur A.S.; Singh B.P.	Computational approach for synthesis of perovskite solar cells	2021	Perovskite Materials for Energy and Environmental Applications, pp. 1–36	2	10.1002/9781119763376.ch1
9	Mathur A.S.; Amita; Singh B.P.	Temperature stability analysis of non-fullerene thin-film organic solar cell with kesterite as a hole transport layer	2026	Functional Materials, 33(2), 246–255	0	10.15407/fm33.02.246
10	Chauhan H.; Jain S.; Kumar P.; Gupta A.; Asthana M.; Mahajan S.	Systems biology approaches in bioenergy research	2026	Emerging Technologies in Yield Optimization and Production of Biomass Feedstock, pp. 153–185	0	10.1016/B978-0-443-40488-7.00008-3
11	Tiwari R.; Botle A.; Dubey S.; Singh P.P.	A critical review of opportunities, challenges and environmental assessment in global bioenergy production	2026	J. Iranian Chemical Society, 23(1), art. 32	0	10.1007/s13738-025-03321-w
12	Sharma Bharti; Mathur A.S.; Sharma G.; Sharma S.; Singh B.P.	Device Modelling of ITIC-OE Organic Solar Cell by High Band Gap Carbon Nanotubes as Transparent Conductive Electrode	2025	Applied Solar Energy, 61(4), 394–402	0	10.3103/S0003701X25600468
13	Mathur A.S.; Singh B.P.	Performance simulation of metal chalcogenide Sb ₂ S ₃ solar cells using SCAPS-1D	2025	MRS Advances, 10(19), 2320–2324	1	10.1557/s43580-025-01383-9
14	Mathur A.S.; Singh P.P.; Upadhyay S.; Yadav N.; Singh K.S.; Singh D.; Singh B.P.	Role of absorber and buffer layer thickness on Cu ₂ O/TiO ₂ heterojunction solar cells	2022	Solar Energy, 233, 287–291	31	10.1016/j.solener.2022.01.047
15	Tiwari R.; Rajouriya K.; Botle A.; Singh P.P.; Taneja A.	A technical review of the thermo-catalytic conversion of plastic wastes for energy production and its environmental effects	2026	J. Iranian Chemical Society, 23(6), art. 161	0	10.1007/s13738-026-03459-1
16	Singh S.; Jain V.P.; Singh V.K.; Jaiswar G.	Tailoring photovoltaic properties through As ₂ O ₃ and GaN doping in silicon monoxide	2026	J. Materials Science: Materials in Electronics, 37(9), art. 596	0	10.1007/s10854-026-16925-6
17	Mathur A.S.; Singh B.P.	Study of effect of defects on CdS/CdTe heterojunction solar cell	2020	Optik, 212, 164717	26	10.1016/j.ijleo.2020.164717
18	Sharma B.; Singh B.P.	Incorporation of Carbon Nanotubes in Non-Fullerene Acceptor Organic Solar Cells: A Review	2023	Applied Solar Energy, 59(4), 441–458	3	10.3103/S0003701X23600364
19	Mathur A.S.; Singh B.P.	Simulation Study of the Photovoltaic Performance of WS ₂ Based Transition Metal Dichalcogenide Solar Cell	2023	Applied Solar Energy, 59(6), 851–856	1	10.3103/S0003701X24600061
20	Agarwal A.; Pande S.A.; Sankapal B.R.	Metal tellurides: Proof of concept toward current trends for high-performance supercapacitor applications	2026	Journal of Energy Storage, 142, 119538	4	10.1016/j.est.2025.119538
21	Mathur A.S.; Kumar R.; Amita; Kumar A.; Singh B.P.	Simulation of PBDB-T/ITIC-based organic solar cell using SCAPS-1D	2025	MRS Advances	0	10.1557/s43580-025-01506-2

No.	Authors	Title	Year	Journal / Source	Cit.	DOI
22	Baghel A.; Singh D.; Kumar A.	Applications of Machine Learning in Exploration of the Perovskite Solar Cells	2024	IEEE Students Conference on Engineering and Systems	1	10.1109/SCES61914.2024.10652432
23	Kumar P.; Yadav K.; Satsangi V.R.; Sharma S.B.; Upadhyaya S.C.	Effect of silicon doping in nanostructured hematite thin films for photoelectrochemical hydrogen generation	2025	Int. J. Modern Physics B, 39(19), 2550171	1	10.1142/S0217979225501711
24	Singh D.; Buddhi D.; Rajput P.; Singh K.Y.; Mahor H.S.; Kushwaha P.K.	Phase change materials in building integrated photovoltaic (BIPV) envelopes: A SWOT analysis	2025	Int. J. Modern Physics B, 39(11), 2540041	3	10.1142/S0217979225400417
25	Bhardwaj P.; Singh S.; Kharangarh P.R.; Grace A.N.	Surfactant decorated polypyrrole-carbon materials composites electrodes for supercapacitor	2020	Diamond and Related Materials, 108, 107989	55	10.1016/j.diamond.2020.107989
26	Mathur A.S.; Dubey S.; Nidhi; Singh B.P.	Study of role of different defects on the performance of CZTSe solar cells using SCAPS	2020	Optik, 206, 163245	34	10.1016/j.ijleo.2019.163245

7.2 University Measures towards Affordable and Clean Energy

The University's commitments on energy are written down in its **Policy on Green Clean Campus**, which is published on the University website. Among its stated objectives are "to continuously improve the efficient use of all resources, including energy and water" and "to conduct environmental and energy audits from time to time". Under its infrastructure section, the policy commits the University to cut the use of electricity from non-renewable sources "by switching to clean energy sources like solar energy", and to install environment-friendly appliances such as LED lighting. The sections that follow show how these commitments are being carried out.

Policy extract: Policy on Green Clean Campus, DBRAU (energy provisions)

Renewable sources of energy. The University is dedicated to minimising and sustainably managing its use of electricity, and to reducing consumption of electricity produced from non-renewable resources by switching to clean sources such as solar energy for purposes like lighting the campus.

Energy-saving and energy-efficient equipment. The University commits to installing environment-friendly electrical appliances that save energy and reduce wasteful inefficiencies, and to using cleaner options such as LED lighting.

Energy audit. An energy audit is to be conducted as and when required to reduce the carbon footprint further, using specialised tools to identify energy wastage that would otherwise go unnoticed.

Clean air. Students and staff are encouraged to use public transport and carpooling; entry of automobiles inside the campus is restricted to discourage private vehicles.

Full policy: <https://dbrau.ac.in/wp-content/uploads/2024/01/Policy-on-Green-Clean-Campus.pdf>

7.2.1 Energy-Efficient Renovation and New Buildings

New buildings at DBRAU are designed to be energy-efficient and in line with GRIHA (Green Rating for Integrated Habitat Assessment), the national green building rating system developed by TERI and the Ministry of New and Renewable Energy. In practice this means a set of features that are now standard in our construction and renovation work: good day-lighting and cross-ventilation so that lights and fans are needed less; insulation and shading to reduce heat gain in Agra's long summer; LED lighting from the start; provision for rooftop solar; and rainwater harvesting and water-efficient fixtures. The Green Audit 2025-26 photographs our well-ventilated building blocks as one of the environment-friendly features of the campus.

Maintenance is treated as part of energy efficiency, not separately from it. The University's **Infrastructure Maintenance Policy** sets out routine upkeep of buildings, electrical systems and equipment, and the 2025-26 Energy Audit adds specific instructions for ACs, fans and generator sets, which are described below. Sensor-based switches and timer controls are used in common areas such as corridors, washrooms and the library, and computers and ACs are configured to run in power-saving mode (Environment Audit 2025-26, pp. 13–14).

The next step being planned is a phased programme of solar-powered "smart" buildings: rooftop solar with battery energy storage on selected high-use buildings such as the Central Library, the administrative blocks and departmental buildings. The Library is a natural first choice because of its long opening hours, and the Computer Centre because it already hosts solar training. Successful pilots will be extended building by building.



Energy-efficient AC, star-rated labelling and solar lighting

LED panel lighting in renovated interiors

Figure 3: Energy-efficient fittings installed during renovation work

🔗 **Infrastructure Maintenance Policy:** <https://dbrau.ac.in/wp-content/uploads/2024/04/Infra-Maint-policy.pdf>

🔗 **Policy on Green Clean Campus:** <https://dbrau.ac.in/wp-content/uploads/2024/01/Policy-on-Green-Clean-Campus.pdf>

7.2.2 Upgrading Existing Buildings to Higher Energy Efficiency

Most of the University's buildings are old; some date back to the 1920s. Rebuilding them is neither affordable nor desirable, so the practical path is to change what is inside them. The 2025-26 Energy Audit counted every light, fan and air conditioner on the six campus zones and the Vice-Chancellor's residence, which gives us a clear baseline.

Lighting

The switch to LEDs has gone a long way. The audit counted **3,072 light fittings**, of which **2,644 (about 86%) are LED** fixtures: battens, panels, round lights and flood lights. The remaining **402 conventional 36 W tube lights** are the last large group to replace. For comparison, the 2022-23 Energy Audit had listed 458 such tube lights, so 56 have been replaced in the interval and the rest are now scheduled. The audit also recommends motion-sensor lighting in common areas and solar lights for open spaces such as parking, grounds and streets.

Table 6: Lighting inventory, 2025-26 (Energy Audit Report 2025-26, p. 19)

Fixture type	VC Bungalow	Campus 1	Campus 2	Campus 3	Campus 4	Campus 5	Campus 6	Total
50 W flood light	1	5	4	4	4	4	4	26
18 W LED flood light	9	17	21	24	6	17	8	101
9 W LED	17	34	34	14	11	18	11	139
10 W LED	31	25	48	22	46	25	66	263
18 W LED light	36	76	87	25	82	45	56	407
20 W LED	57	54	63	36	73	34	57	374
12 W LED round	13	6	13	14	20	11	16	92
36 W LED	73	87	150	231	199	190	339	1,268
36 W tube light (to be replaced)	12	46	50	34	72	112	76	402

The audit is candid about the limits of what has been done. Its lux measurements found illumination in some rooms 20–50% below recommended levels, dust on diffusers cutting output by 10–20%, a number of failed

lamps, and blackboards in several classrooms receiving less than 300 lux. These are not reasons to add more lights; they point to regular cleaning, prompt replacement of failed lamps and better placement of fittings.

Ceiling fans

Fans are the single largest group of appliances on campus: **1,596** of them. Many are older models rated at 60, 70, 80 or even 100 watts, while BEE 5-star fans rated at around 30 W are now widely available. The audit worked out what replacing the higher-wattage fans would mean in money and energy.

Table 7: Fan replacement analysis (Energy Audit Report 2025-26, p. 18)

Item	Unit	Value
Ceiling fans 50 W / 60 W / 70 W / 80 W / 100 W	Nos.	433 / 641 / 126 / 279 / 39
Connected load of existing higher-wattage fans	W	95,150
Load after replacement with BEE 5-star 30 W fans	W	45,540
Reduction in connected load	W	49,610
Operating assumption		8 hours/day, 180 days/year, ₹10 per unit
Annual saving	₹	7,14,384
Investment required	₹	31,56,000
Simple payback	years	4.42

A payback of under four and a half years on equipment that lasts well over ten is a sound investment. The audit advises that all future fan purchases be BEE 5-star rated. The University plans to replace the higher-wattage fans in batches, starting with the 100 W and 80 W units.

Air conditioning

There are **204 air conditioners** on campus (split, window and cassette units) with a combined capacity of about **475.5 tonnes of refrigeration**. The audit found their efficiency to be satisfactory on the whole, and many of the newer units are already inverter models. Its recommendations are practical ones: buy only BEE 5-star inverter ACs from now on; replace units older than eight to ten years first; insulate exposed refrigerant lines; clean filters and coils regularly; and set thermostats to 24–26 °C. The Environment Audit notes that ACs are already run at optimum temperatures according to the class timetable rather than left on all day.

DR. BHIMRAO AMBEDKAR UNIVERSITY
ENERGY AUDIT REPORT

Investment (Cost of machine/equipment/accessories of machine) will increase or decrease because cost of investment is taken on tentative basis.

6. ANALYSIS OF LIGHTING SYSTEM

6.1 Brief description of existing system

For assessing energy efficiency of lighting system, Inventory of the Lighting System has been noted / collected, with the aid of a lux meter, measurement and documentation of the lux levels at various locations at working level has been done.

6.2 Inventory of Lighting

Sl. No.	Location / Identification	50W Flood Light	85W LED Flood Light	9W LED	30W LED	18W LED Light	20W LED	12W LED Round	30W LED	30W Tube Lights
1	VC Bungalow	1	9	17	31	36	57	13	73	12
2	Campus-1	5	17	34	25	76	54	6	87	46
3	Campus-2	4	21	34	48	87	63	13	150	50
4	Campus-3	4	24	14	22	25	36	14	231	34
5	Campus-4	4	6	11	46	82	73	20	199	72
6	Campus-5	4	17	18	25	45	34	11	190	112
7	Campus-6	4	8	11	66	56	57	16	339	76
TOTAL		26	101	139	263	407	374	92	1268	402

6.3 Lux Measurement

Observation

- University has initiated LED based lighting solution, but still there are 402 (36W) tube lights. LEDs save energy, the life span is much greater and emit virtually no heat. We recommend to replace the tube lights with LEDs.
- Illumination levels are generally 20-50% lower than recommended standards.
- Aged T12/T8 fluorescent tube lights and magnetic chokes reduce lighting efficiency.
- Dust accumulation on luminaires and diffusers decreases light output by 10-20%.
- Several luminaires are non-functional or have failed lamps.
- Uneven lighting distribution creates dark spots, particularly near room corners.
- Classroom blackboards/whiteboards often receive inadequate illumination (<300 lux).
- Existing lighting systems have high installed load but deliver inadequate illumination because of lumen depreciation.

Additionally, we recommend to install motion sensor-based lights in common areas such as library, washrooms, corridors, etc.

JULY 2026 Page 19

Lighting inventory and observations

DR. BHIMRAO AMBEDKAR UNIVERSITY
ENERGY AUDIT REPORT

5. FANS ANALYSIS

In the Dr. Bhimrao Ambedkar University, there are 1596 fans installed, of different wattage. Details of the same are shown below.

Sl. No.	Location / Identification	Ceiling Fan-35W	Ceiling Fan-50W	Ceiling Fan-60W	Ceiling Fan-70W	Ceiling Fan-80W	Ceiling Fan-100W	Pedestal 45W	Pedestal 60W	Pedestal 100W
1	VC Bungalow	3	4	1	0	0	0	1	0	0
2	Campus-1	3	45	76	14	46	8	12	2	2
3	Campus-2		56	79	22	32	12	10	6	3
4	Campus-3		52	134	18	71	4	6	5	0
5	Campus-4		76	54	9	19	4	14	0	0
6	Campus-5		88	200	42	60	7	5	0	2
7	Campus-6		112	97	21	51	4	4	0	0
TOTAL		6	433	641	126	279	39	52	13	7

Observation and Suggestions:-

In the University, all the ceiling fans and pedestal fans are of different wattage. BEE 5 Star Rated of 30W Ceiling Fans are present in the market. We recommend to replace the high wattage fans (70W, 80W and 100W) to BEE 5 Star rated 30W fans, and consider purchasing BEE 5-star fans for all future purchases.

Total no of Ceiling Fans (50W)	Nos.	433
Total no of Ceiling Fans (60W)	Nos.	641
Total no of Ceiling Fans (70W)	Nos.	126
Total no of Ceiling Fans (80W)	Nos.	279
Total no of Ceiling Fans (100W)	Nos.	39
Total wattage of higher wattage Ceiling Fans	Watt	95150
Total wattage of BEE 5 Star rated Fans (30W)	Watt	45540
Total saving in Wattage after replacement	Watt	49610
Operating hours per day	Hours	8
Operating days per annum	Days	180
Energy charges per unit in Rs.	INR	10
Saving in Rs./Annum	INR	714384
Investment INR	INR	3156000
Payback period:-	YEARS	4.42

Note:- Energy saving will increase or decrease if operating hours of machine / equipment will be increased or decreased and payback period will also increase or decrease if cost of

JULY 2026 Page 18

Fans analysis and payback

Figure 4: Proof: pages from the Energy Audit Report 2025-26 (EHS Alliance LLP)

🔗 Earlier Energy Audit Report 2022-23 (for comparison): <https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Energy-Audit-Report-2022-23.pdf>

7.2.3 Carbon Reduction and Emission Reduction Process

Reducing emissions starts with knowing them. The Green Audit 2025-26 calculated the University's carbon footprint for the year from four sources, using standard emission factors: 0.71 kg CO₂ per kWh of grid electricity, 2.99 kg CO₂ per kg of LPG and 2.68 kg CO₂ per litre of diesel.

Table 8: Campus carbon footprint, 2025-26 (Green Audit Report 2025-26, pp. 15–16)

Source	Activity data	Calculation	CO ₂ (tonnes)
Grid electricity	6,54,099 kWh	654.099 MWh × 0.71	464.41
LPG / PNG	14,817.6 kg	14,817.6 × 2.99 kg	44.30
Diesel (DG sets)	535 litres	535 × 2.68 kg	1.43
University vehicles	6 vehicles	as per audit	0.86
Total emissions			511.01
Carbon absorbed by campus trees, hedges and lawns	1,249 full-grown and 1,487 semi-grown trees; 18,632 hedge plants		– 73.11
Net emissions after absorption			437.90

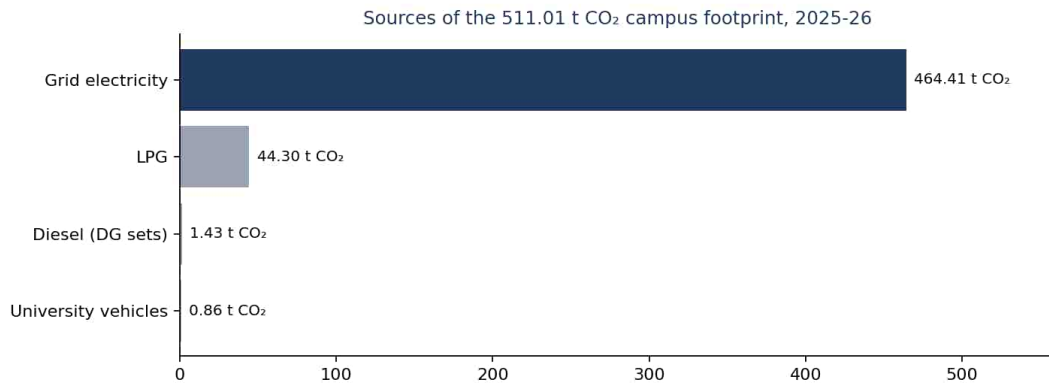


Figure 5: Sources of the 2025-26 campus carbon footprint: grid electricity accounts for about 91%

The table makes the priority obvious: **about 91% of our emissions come from grid electricity**. Every kWh we avoid, or generate from the sun, reduces emissions directly. The solar plants already make a measurable difference. Their 1,87,200 kWh in 2025-26, at the same 0.71 kg/kWh factor, avoided about **132.9 tonnes of CO₂**. Without them the footprint would have been close to 644 tonnes rather than 511.

Our emission reduction process runs as an annual cycle, and 2025-26 is the second full cycle after the 2022-23 audits:

1. **Measure.** Independent energy, environment and green audits, as required by NAAC and our own Green Clean Campus Policy, establish consumption and emissions for the year.
2. **Set targets.** The results feed into the University's Net-Zero roadmap (Section 7.2.4), which sets phased targets for solar capacity, LED coverage and efficiency.
3. **Act.** The Estate Department and institutes carry out replacements, maintenance and new installations, while the SDG Cell and Eco Club run awareness work.
4. **Review.** The next audit checks progress against the baseline. Tube lights, for example, fell from 458 in 2022-23 to 402 in 2025-26.

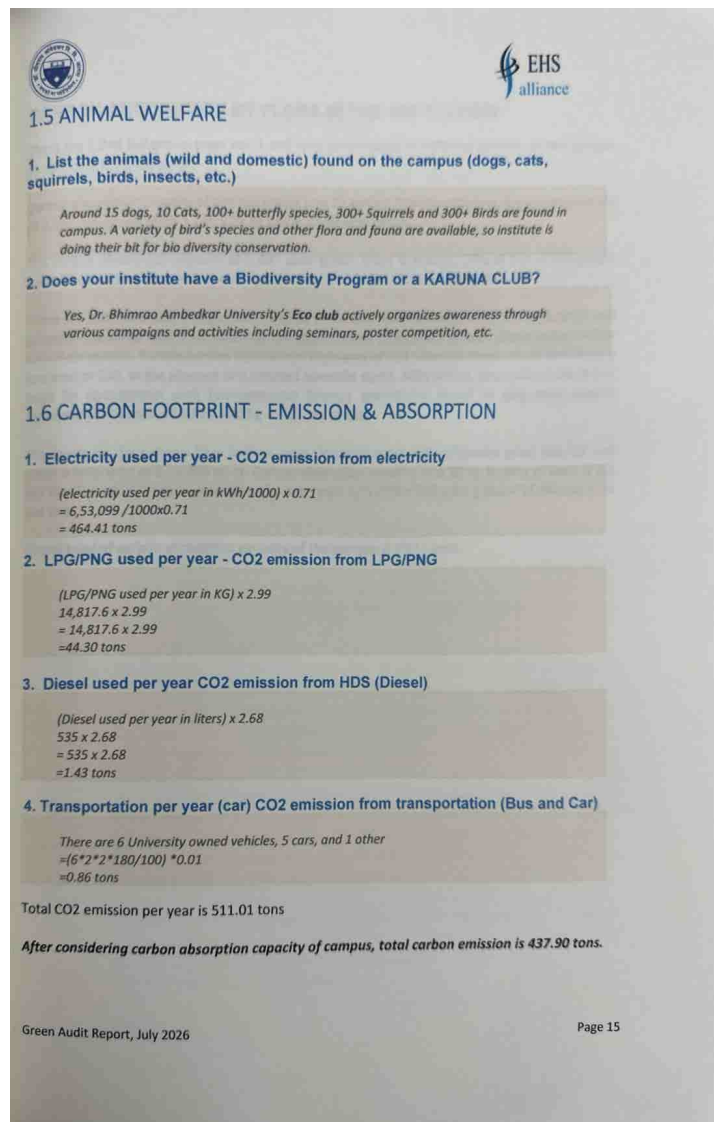


Figure 6: Proof: carbon footprint calculation in the Green Audit Report 2025-26

7.2.4 Plan to Reduce Energy Consumption

The University has adopted a phased roadmap towards a Net-Zero campus. It is deliberately practical: each phase lists things that can be bought, installed and checked, and the 2025-26 figures now give us a baseline against which progress can be measured.

Table 9: Net-Zero campus roadmap

Phase	Planned actions
Phase 1 (Years 1–2)	Replace the remaining 402 tube lights with LEDs; begin replacing 80–100 W fans with BEE 5-star fans; expand solar capacity towards 300 kWp; install motion sensors in all common areas; start building-level metering as the first step of a campus energy management system.
Phase 2 (Years 3–5)	Reach 500 kWp of solar capacity; add battery energy storage for round-the-clock use of solar power; expand biogas from organic waste; set up solar-powered charging points for e-cycles and electric vehicles.
Phase 3 (Years 6–10)	Meet as much of campus demand as possible from on-site and contracted renewables; introduce smart (AI-assisted) energy management; achieve Net-Zero through renewables, efficiency and verified offsets.

Progress will be tracked with a small set of indicators, each with a 2025-26 starting value:

Table 10: Key performance indicators for the energy plan

Indicator	Baseline 2025-26	Direction
Solar share of electricity (solar kWh ÷ total kWh)	22.3%	Increase
Renewable share of total energy	19.69%	Increase
Net campus CO ₂ emissions	437.90 t	Decrease
Conventional tube lights remaining	402	Reach zero
Diesel used by DG sets	535 litres	Keep minimal
Energy use density (see 7.3)	0.171 kWh/m ² /year (electricity)	Decrease

Alongside the capital projects, the audit's low-cost recommendations are being followed through: preventive maintenance of the DG sets and running them in their best load range (70–80% of rated capacity); a fuel logbook; filter and coil cleaning on ACs before summer; programmable thermostats where possible; and replacement of computers and printers more than three to five years old with efficient models.

7.2.5 Identifying Energy Wastage

We collected twelve months of electricity bills for all seven accounts and looked at them month by month. The pattern is sharply seasonal. Grid use peaks in September 2025 (76,091 kWh) and May 2026 (74,199 kWh) and bottoms out in November 2025 (32,351 kWh), a difference of more than two to one. That swing is almost entirely cooling load. It tells us that ACs and fans are where savings will count most, and that summer is when solar output and battery storage will be most valuable.

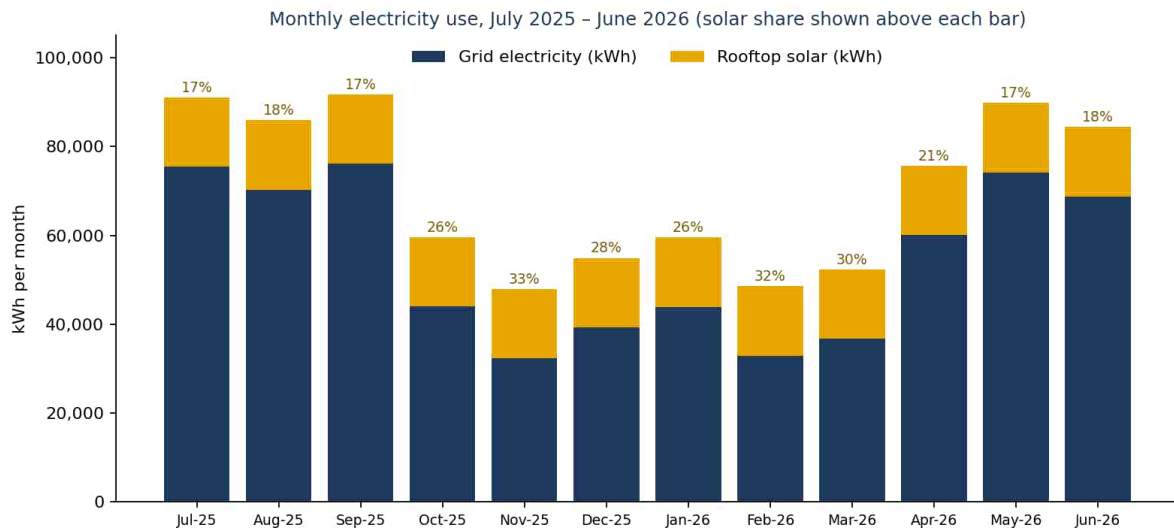


Figure 7: Monthly grid and solar electricity, July 2025 – June 2026 (*Energy Audit Report 2025-26, p. 10*)

The account-wise figures show where to look first. The Dau Dayal Institute account on the Khandari campus alone accounts for **43%** of grid electricity, followed by the New Library at Paliwal Park (21%) and the A/C Building at Gopal Ganj (16%). Building-level sub-metering will start with these three.

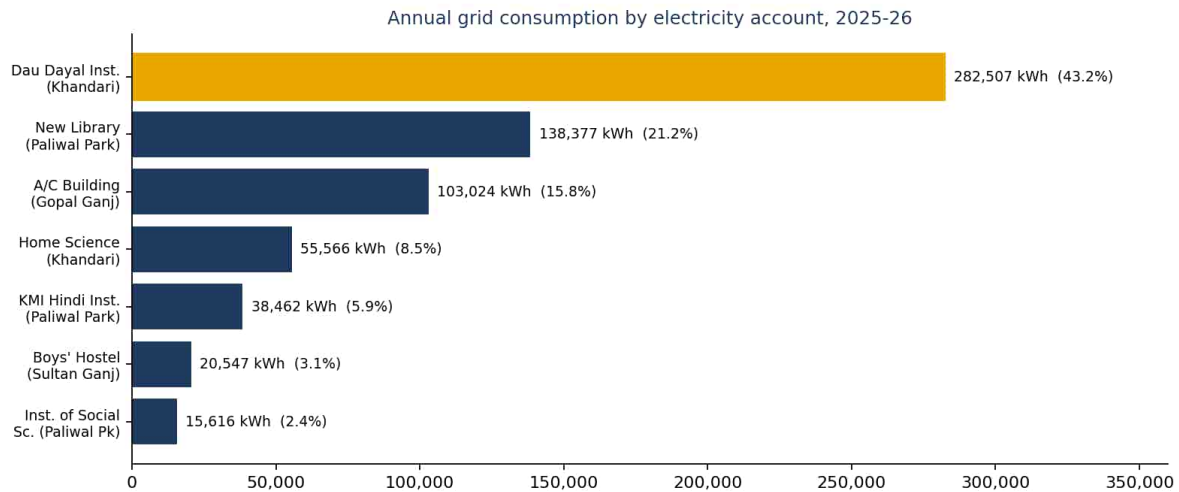


Figure 8: Grid electricity by account, 2025-26 (Energy Audit Report 2025-26, p. 12)

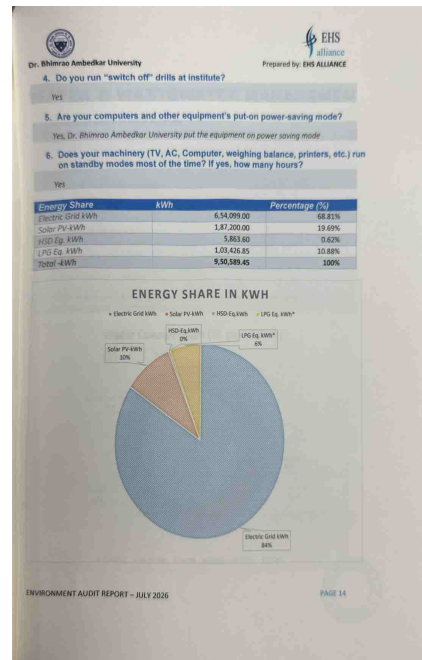
The audits also identified wastage directly. Some of it is behavioural: equipment such as computers, printers and ACs is often left on standby, which the Environment Audit records frankly. Some is technical: the 402 tube lights with magnetic chokes, dusty luminaires, exposed AC refrigerant lines and fans rated at two or three times the wattage of modern models. The University already runs "switch-off" drills, keeps computers and ACs in power-saving mode, and uses sensor-based lighting in common areas.

To move from periodic audits to continuous monitoring, the University proposes a **Campus Energy Management System** with building-level metering, automatic alerts when a building crosses its usual consumption, tracking of solar generation against grid draw, and an annual dashboard that feeds the energy audit.



Sensor-Based Energy Conservation in University

Sensor-based solar lighting



Energy share table, Environment Audit 2025-26

Figure 9: Sensor-based lighting on campus, and proof of the energy-share analysis

7.2.6 Divestment Policy

Dr. Bhimrao Ambedkar University has adopted a **Policy on Ethical Divestment and Responsible Resource Management**. It was approved through the IQAC, applies across all departments, financial resources,

institutional assets and partnerships, and comes into force from the date of approval by the Executive Council. Its next scheduled review is in 2027–28.

The policy links the management of University resources to ethical and sustainability criteria instead of leaving such decisions to case-by-case judgement. For SDG 7 this matters because it provides a formal instrument through which fossil-fuel-linked investments, procurement and partnerships can be screened. The 2027–28 review gives the University an opportunity to add explicit energy and climate criteria as the Net-Zero roadmap matures.

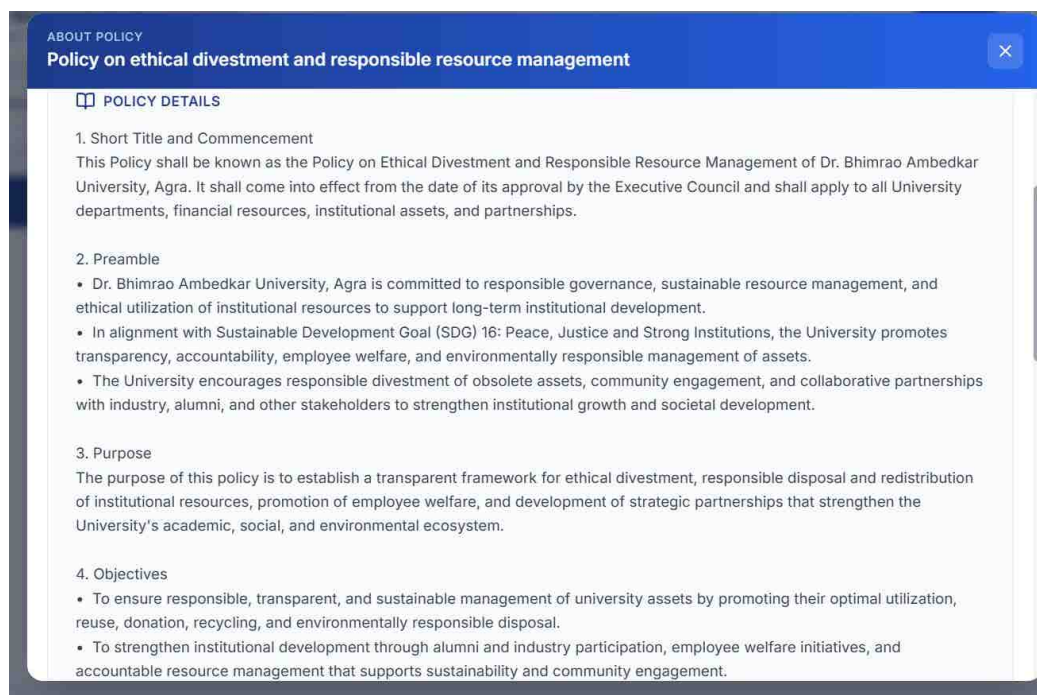


Figure 10: Policy on Ethical Divestment and Responsible Resource Management, as published on the University's SDG portal

SDG policies portal: <https://www.dbrausdg.in/policies>

7.2.7 Policy Framework Supporting SDG 7

Energy does not sit in a single policy. The table below lists the University policies that bear on clean energy and efficiency, with direct links to the documents on the University website.

Table 11: University policies relevant to SDG 7

Policy	Relevance to SDG 7	Link
Policy on Green Clean Campus	Solar energy, LED and efficient equipment, energy audits, restricted vehicle entry, carpooling	Open PDF
Infrastructure Maintenance Policy	Maintenance of buildings, electrical systems and equipment	Open PDF
Policy on Ethical Divestment and Responsible Resource Management	Ethical and sustainability screening of investments and assets	SDG portal
e-Waste Policy	Safe disposal of old electronics replaced by efficient models	Open PDF
Waste Management Policy	Organic waste to compost and biogas	Open PDF
Policy on Ban on use of Plastic	Lower-carbon campus practices	Open PDF
Policy on e-governance	Paperless administration; less printing and travel	Open PDF
Research Policy	Support for research, including clean energy	Open PDF
Startup Policy	Support for student and faculty start-ups, including clean-tech	Open PDF
Seed Money Policy	Seed funding for early-stage research ideas	Open PDF

Policy	Relevance to SDG 7	Link
Consultancy Policy	Framework for technical services to industry	Open PDF
University Outreach Programme Policy	Community awareness and extension work	Open PDF
Intellectual Property Right Policy	Protection of inventions such as solar desalination	Open PDF

 **All University policies:** <https://dbrau.ac.in/university-policies/>

7.3 Energy Use Density

Energy use density, also called the Energy Performance Index (EPI), divides a year's energy consumption by the floor area it serves. It lets an institution compare itself with its own past and with similar buildings, even as it grows. For 2025-26 we have calculated it in two ways: for electricity alone (grid plus solar), which is how it is usually reported, and for all energy including LPG and diesel.

Table 12: Energy use density, 2022-23 and 2025-26

Energy Performance Index	2022-23	2025-26
Annual electricity consumption (grid + solar)	8,44,538 kWh	8,41,299 kWh
Annual total energy (incl. LPG and diesel, kWh-eq.)	not reported	9,50,589 kWh
Area basis used	49,30,051.1 m ²	49,30,051.1 m ²
EPI – electricity	0.1713 kWh/m²/year	0.1706 kWh/m²/year
EPI – total energy	–	0.1928 kWh/m²/year

Electricity consumption in 2025-26 was slightly lower than in 2022-23 (by about 3,200 kWh), even though the campus has added teaching, research and hostel activity in the intervening years. At the same time, a larger part of that electricity now comes from the solar plants.

Note on the area figure

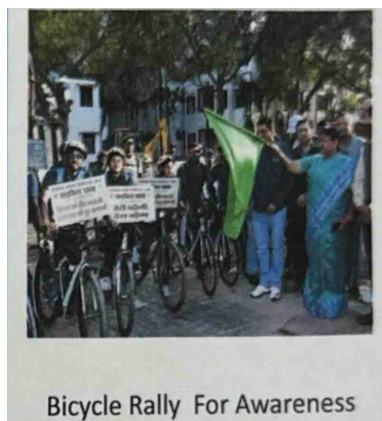
To keep the two years comparable, the 2025-26 index uses the same area figure as the 2022-23 Energy Audit (49,30,051.1 m²). This figure appears to represent total campus land area rather than built-up floor area, which is why the resulting index is much lower than typical values for Indian institutional buildings. The Estate Department's built-up floor area register should be used to recalculate the index for external benchmarking against Bureau of Energy Efficiency norms. The consumption figures themselves are taken directly from the electricity bills and audit reports and are not affected.

7.4 Energy and the Community

7.4.1 Local Community Outreach for Energy Efficiency

A good deal of the University's energy work happens outside its gates. The Department of Environmental Studies, the Eco Club and the NSS units carry the message of energy saving into schools, villages and neighbourhoods, and the campus itself serves as a working example: visitors can see the solar arrays, the solar street lights, the biogas unit and the LED-lit buildings for themselves.

During 2025-26 the Department of Environmental Studies marked World Ozone Day (16 September 2025) with an awareness programme, took students to Keetham Lake (Sur Sarovar) on World Wetland Day (2 February 2026), and celebrated Earth Day on 22 April 2026 with sessions on the environmental challenges facing the planet and the need for collective action (Green Audit 2025-26, p. 17). Energy-conservation messages are displayed in buildings, a bicycle rally was flagged off to promote non-motorised travel, and the University's outreach and cleanliness drives regularly include talks on saving electricity at home, switching to LEDs and using solar energy.



Bicycle rally for awareness



Plantation and awareness drive



Community plantation programme

Figure 11: Community awareness activities in 2025-26

This work has been recognised outside the University. DBRAU received the **Best Clean & Green Campus Award** from the Parijat Foundation, a Certificate of Award from the **Hunkaar Foundation** for exemplary and continuous efforts in environment-friendly practices on campus, and recognition from the **Prosocial Foundation**. The campus trees are geo-tagged, and the map is public.

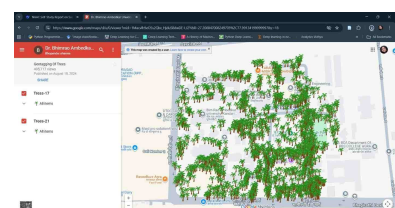


Hunkaar Foundation award



Awards for Green and Clean campus from Prosocial Foundation

Prosocial Foundation certificates



Geo-tagged tree map of the campus

Figure 12: External recognition for green campus practices

 Awards and recognition (SDG portal): <https://www.dbrausdg.in/awards>

 University Outreach Programme Policy: <https://dbrau.ac.in/wp-content/uploads/2024/01/University-Outreach-Programme-Policy.pdf>

7.4.2 Promoting a Public Pledge towards 100% Renewable Energy

The Green Clean Campus Policy asks that students and staff take a pledge every year to care for the campus and its surroundings. At DBRAU these pledges have come to include energy: on occasions such as National Energy Conservation Day and World Environment Day, the Vice-Chancellor, faculty, staff and students take an oath to save electricity, to support the University's move towards clean and renewable energy, and to spread the word about affordable solar options in their homes, villages and affiliated colleges.

The pledge has substance behind it. The University has publicly committed to expanding solar from the present 130 kWp by a further **500 kWp**, a plan recorded in the Green Audit 2025-26. Once complete, it would bring the University much closer to meeting its daytime electricity demand entirely from the sun.



Oath-taking led by the Vice-Chancellor



Faculty and students taking the pledge



Figure 14: Students and staff at a campus-wide environment and energy pledge event

7.4.3 Energy Efficiency Services for Industry

Agra has a large base of small and medium enterprises, from footwear and leather to foundries and handicrafts, and many of them pay more for power than they need to. The University's Institute of Engineering and Technology, the Institute of Basic Sciences and the Advanced Instrumentation Facility offer technical advice, testing and training under the University's **Consultancy Policy**. Faculty members have spoken at industry meetings on energy audits, power factor correction, efficient motors and rooftop solar, and the University's own audit experience provides a working example that local units can follow.

These links are formalised through MoUs with industry and training organisations, recorded in the University's research database. Joint meetings with industry partners during the year discussed skill development, innovation and opportunities for collaborative work, including on cleaner technologies.



Figure 15: Industry-academia interaction on skills and clean technology at the University

🔗 **Consultancy Policy:** <https://dbrau.ac.in/wp-content/uploads/2024/01/Consultancy-Policy.pdf>

🔗 **Consultancy records:** <https://dbrau.ac.in/consultancy-2/>

🔗 **MoUs of the University:** <https://dbrau.ac.in/memorandum-of-understanding-mou/>

🔗 **Advanced Instrumentation Facility:** <https://dbrau.ac.in/central-instrumentation-facility/>

7.4.4 Policy Development for Clean Energy Technology

The University contributes to clean energy policy in two ways. Internally, it has written clean energy into its own governance through the Green Clean Campus Policy, the divestment policy and the Net-Zero roadmap described earlier. Externally, its faculty take part in expert committees, seminars and consultations, and the University has signed agreements with technology companies to strengthen teaching and research in emerging areas.

The new **Centre of Excellence for Sustainability**, chaired by the Vice-Chancellor, has been set up partly for this purpose. Its mission includes translating research into policies, technologies and community-level interventions, and it lists renewable energy and clean technologies among its research areas. It brings together the School of Life Sciences, Environmental Studies, Chemistry, the Institute of Basic Sciences, Agriculture, Engineering and the Centre for Transdisciplinary Studies.



Figure 16: Exchange of documents with an industry partner for technology collaboration, reported in the press, and an associated planning meeting

Table 13: Selected University design registrations and patents

Title	Patent / Registration No.	Key inventors
Solar powered sea water desalination apparatus	390046-001	Avnish Kumar et al.
Novel instrument of reaction progress tool with heating mantle	388821-001	Dr. Ravi Shekhar
Online banking and wireless security monitoring devices	397468-001 / 395202-001	Prof. V. K. Saraswat

🔗 **Patents:** <https://dbrau.ac.in/patents/>

🔗 **List of research centres:** <https://dbrau.ac.in/wp-content/uploads/2025/10/LIST-OF-RESEARCH-CENTRES.pdf>

🔗 **Centre of Excellence for Sustainability and SDG Cell:** <https://www.dbrausdg.in/coe>

7.4.5 Assistance to Low-Carbon Innovation

The **Vivekananda Incubation Foundation (VIF)** at the Institute of Engineering and Technology, Khandari campus, is the University's main route for turning ideas into businesses. It offers workspace, mentoring, help with intellectual property and access to seed funding, and it welcomes start-ups in renewable energy, sustainable agriculture and waste-to-energy. The University's **Startup Policy** and **Seed Money Policy** provide the rules and the funds.

Some of the most useful low-carbon work is small in scale. The **Green Gas Plant** on campus turns organic waste into biogas, and students have worked on prototypes such as a solar e-cycle. Faculty mentor students on energy-efficient IoT devices, LED controls and energy-monitoring tools. The best-practice programme "Waste to Wealth" has reused scrap metal, old poles and tyres from the University and the city in large sculptures, an example of the circular-economy thinking that low-carbon innovation depends on.



Figure 17: Vivekananda Incubation Foundation at the Institute of Engineering and Technology, Khandari campus

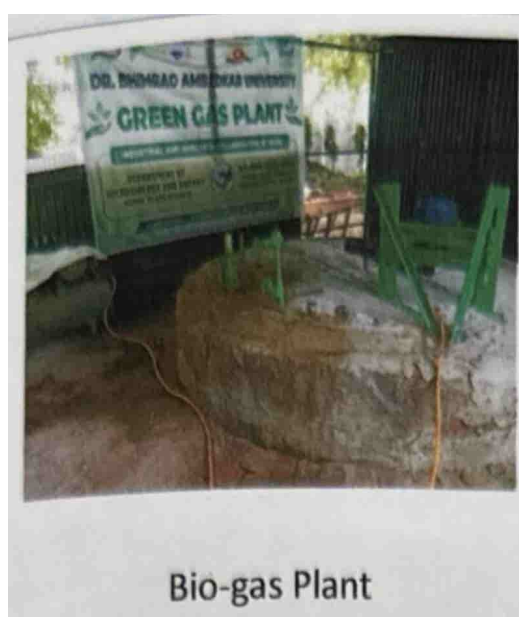


Figure 18: The Green Gas (biogas) plant on campus, photographed for the Green Audit 2025-26

- 🔗 **Vivekananda Incubation Foundation:** <https://dbrau.ac.in/vivekanand-incubation-foundation-copy/>
- 🔗 **Startup Policy:** <https://dbrau.ac.in/wp-content/uploads/2024/04/Startup-Policy.pdf>
- 🔗 **Seed Money Policy:** <https://dbrau.ac.in/wp-content/uploads/2024/08/Seed-Money-Policy.pdf>
- 🔗 **Best practice: Waste to Wealth:** <https://dbrau.ac.in/wp-content/uploads/2024/07/7.2.2.-Waste-To-Wealth-2.pdf>

7.5 Low-Carbon Energy Use

In 2025-26, **19.69% of all the energy the University used came from renewable sources**, all of it from our own rooftop solar plants. Measured against electricity alone, solar met **22.3%** of demand. In the cooler months the share rises to around a third (33% in November 2025) because demand falls while solar output stays steady.

Rooftop solar plants

Two grid-interactive solar plants are in operation, with a combined capacity of **130 kWp**. The larger one, at the Chhalesar campus, also has lithium iron phosphate battery support. The technical sheets for both plants are reproduced below.

Table 14: Solar plant specifications and benefits

Parameter	Institute of Basic Sciences, Khandari	Chhalesar Campus
Capacity	60 kW	70 kW
Type	Fixed axis, grid-interactive inverter	Fixed axis, grid-interactive inverter
Panel rating	545 Wp	545 Wp
Battery support	—	200 Ah, 240 V LiFePO ₄
Generation per month	7,200 units	8,400 units
Money saved (at ₹9 per unit)	₹64,800 / month; ₹7,77,600 / year	₹75,600 / month; ₹9,07,200 / year
Loads supplied	Tube lights, fans, EPABX, computers, printers, HVAC, pumping	Tube lights, fans, EPABX, computers, printers, HVAC, pumping
Payback (with accelerated depreciation benefit)	3 years	3 years

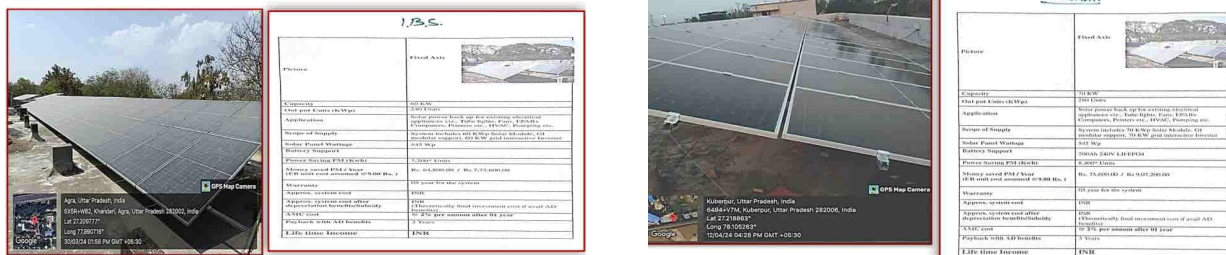
The two plants together produce 15,600 units a month, the same figure used by the Energy Audit for each month of 2025-26, and save roughly **₹16.85 lakh a year** on electricity bills at ₹9 per unit (or ₹18.72 lakh at the audit's tariff of ₹10 per unit). They also avoid about 133 tonnes of CO₂ a year.

Dr. Bhimrao Ambedkar University, Agra A State University of Uttar Pradesh (Formerly: Agra University, Agra) www.dbrau.ac.in	
Solar Facility Benefits Installed at Institute of Basic Sciences	
Picture	Fixed Axis 
Capacity	60 KW
Out put Units (KWp)	240 Units
Application	Solar power back up for existing electrical appliances viz., Tube lights, Fans, EPABs Computers, Printers etc., HVAC, Pumping etc.
Scope of Supply	System includes 60 KWp Solar Module, GI modular support, 60 KW grid interactive Inverter
Solar Panel Wattage	545 Wp
Battery Support	
Power Saving PM (Kwh)	7,200* Units
Money saved PM / Year (EB unit cost assumed @9.00 Rs.)	Rs. 64,800.00 / Rs 7,77,600.00
Warranty	05 year for the system
Approx. system cost	INR
Approx. system cost after depreciation benefits/Subsidy	INR (Theoretically final investment cost if avail AD benefits)
AMC cost	@ 2% per annum after 01 year
Payback with AD benefits	3 Years
Life time Income	INR

Dr. Bhimrao Ambedkar University, Agra A State University of Uttar Pradesh (Formerly: Agra University, Agra) www.dbrau.ac.in	
Solar Facility Benefits Installed at Chhalesar Campus	
Picture	Fixed Axis 
Capacity	70 KW
Out put Units (KWp)	280 Units
Application	Solar power back up for existing electrical appliances viz., Tube lights, Fans, EPABs Computers, Printers etc., HVAC, Pumping etc.
Scope of Supply	System includes 70 KWp Solar Module, GI modular support, 70 KW grid interactive Inverter
Solar Panel Wattage	545 Wp
Battery Support	200Ah 240V LIFEPO4
Power Saving PM (Kwh)	8,400* Units
Money saved PM / Year (EB unit cost assumed @9.00 Rs.)	Rs. 75,600.00 / Rs 9,07,200.00
Warranty	05 year for the system
Approx. system cost	INR
Approx. system cost after depreciation benefits/Subsidy	INR (Theoretically final investment cost if avail AD benefits)
AMC cost	@ 2% per annum after 01 year
Payback with AD benefits	3 Years

60 kW plant, Institute of Basic Sciences

70 kW plant, Chhalesar Campus

Figure 19: Proof: technical and benefit sheets of the two solar plants

Khandari Campus – 60 kW

Chhalesar Campus – 70 kW

Figure 20: Solar power systems with their installation documents

Geo-tagged photograph taken during the audit, 18 July 2026



Rooftop array photographed for the Energy Audit

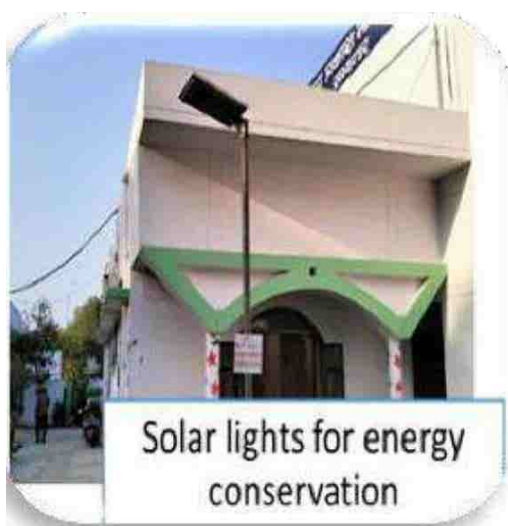
Figure 21: Solar arrays as verified by the auditors in July 2026



Figure 22: Rows of solar modules on a University rooftop

Solar lighting in open areas

Street lighting across the campus is powered by integrated solar lights, as the Green Audit 2025-26 records. These lights need no cabling from the grid, switch on and off by themselves and are one of the most visible parts of the energy programme.



Solar lights for energy conservation

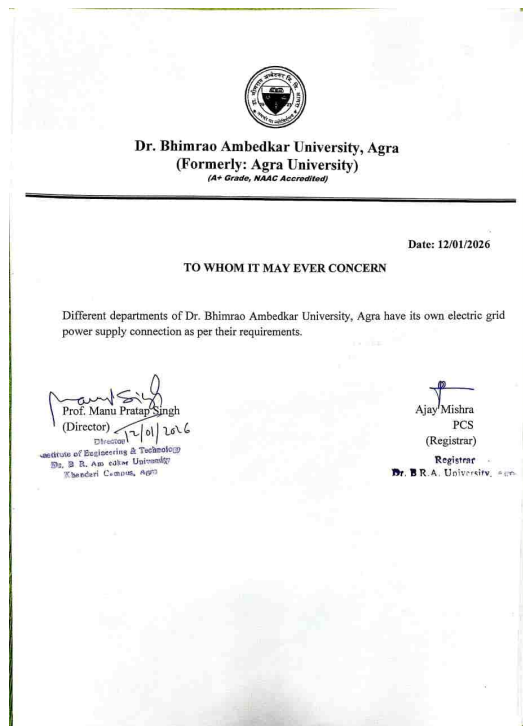


Solar street light (Environment Audit 2025-26)

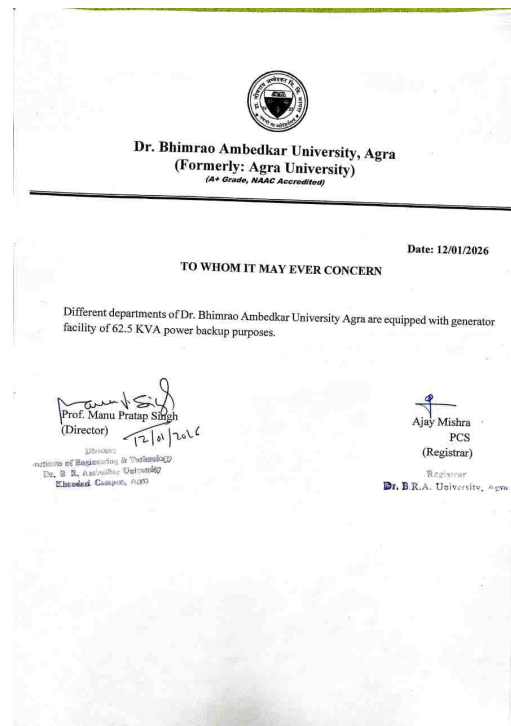
Figure 23: Solar street lighting on campus

Reliable supply with minimal diesel

Reliability matters as much as cleanliness. All departments of the University have their own grid connections, and backup is provided by two diesel generator sets of 62.5 kVA (Kirloskar, 2014) and 5 kVA. Because the grid supply is dependable and solar covers part of the daytime load, the generators ran only briefly: 535 litres of diesel in the whole year, which is 0.62% of the University's energy and 1.43 tonnes of CO₂. The Energy Audit recommends replacing both sets, which are old, with efficient models. As the battery storage in the solar roadmap comes in, the need for diesel backup will shrink further.



Certificate: grid supply connection for all departments



Certificate: 62.5 kVA generator backup

Figure 24: Proof: certificates issued by the Registrar on reliable power supply (dated 12 January 2026)

Low-carbon mobility

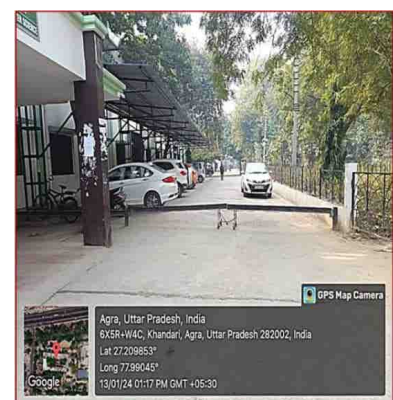
Transport adds little to the University's footprint (0.86 tonnes of CO₂ from its six vehicles), and the policy is to keep it that way. Students are not allowed to bring personal vehicles onto campus grounds; parking is provided at the entrance of each institute; paved and shaded pathways make walking pleasant; bicycles are encouraged and can be kept on campus; and battery-operated vehicles carry differently-abled students, luggage and guests. Carpooling is encouraged under the Green Clean Campus Policy.



Battery-operated vehicle



Students cycling on campus



Restricted entry of vehicles

Restricted entry of vehicles

Figure 25: Low-carbon mobility on campus



Figure 26: Pedestrian-friendly pathways at different locations of the University

Summary of low-carbon energy use

Table 15: Low-carbon energy use: where we are and where we are going

Area	Status in 2025-26	Target
Solar capacity	130 kWp in operation (60 kW Khandari, 70 kW Chhalesar)	Additional 500 kWp
Renewable share	19.69% of total energy; 22.3% of electricity	Rising each year with new capacity
LED lighting	2,644 LED fixtures (~86%); 402 tube lights remaining	100% LED
Emissions	511.01 t gross, 437.90 t net; ~133 t avoided by solar	Net-Zero campus (Phase 3)
Diesel backup	535 litres in the year	Replace old DG sets; battery storage
Mobility	Vehicle restrictions, bicycles, battery vehicles	Solar charging for e-cycles and EVs
Biogas	Green Gas Plant in operation	Expand waste-to-energy

8. Looking Ahead

This year's audits give us something we did not have before: a complete, independently checked picture of how energy moves through the University, month by month and account by account. Some of it is encouraging. More than a fifth of our electricity now comes from our own roofs, diesel use is almost negligible, and LEDs have replaced most of the old lighting. Some of it is a reminder of work still to do: 402 tube lights, hundreds of heavy fans, ACs that need maintenance before every summer, and a single electricity account that uses as much as the next three combined.

Over the coming year the University intends to:

- replace the remaining tube lights and begin the fan replacement programme recommended by the audit;
- begin work on the additional 500 kWp of solar capacity, with battery storage at the Library as the first pilot;
- install sub-meters on the three largest accounts and publish monthly figures on the SDG portal;
- replace the two old DG sets and keep a fuel and running-hours logbook;
- recalculate energy use density on the verified built-up floor area; and
- continue pledges, rallies and outreach so that the habits formed on campus travel home with our students.

Nearly a hundred years after its founding, the University is still, in a quite literal sense, trying to move from darkness to light, and to do it with energy that is clean, affordable and dependable.

Annexure A: Audit Certificates and Proof Pages

The pages below are scanned from the printed 2025-26 audit reports prepared by EHS Alliance LLP, Gurugram. They are reproduced as evidence for the figures used in this report.



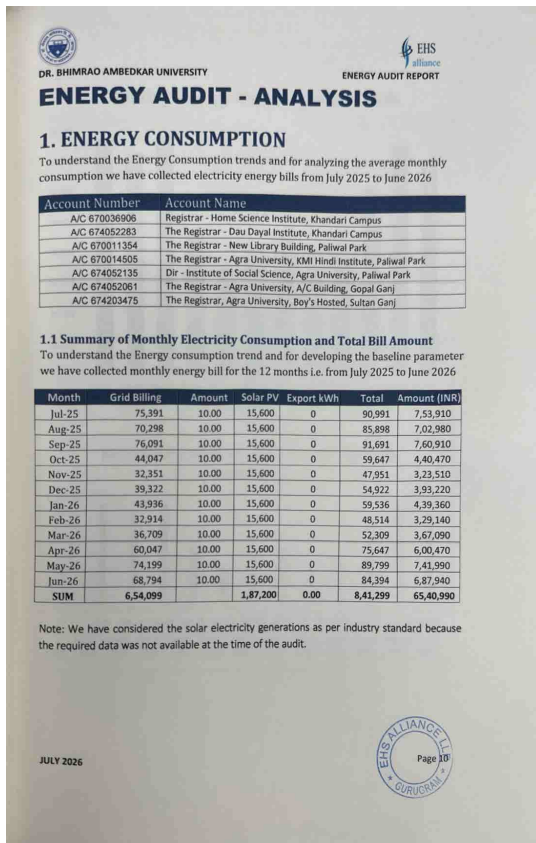
Figure 27: *Energy Audit Report 2025-26: cover and certificate (date of audit 18.07.2026)*



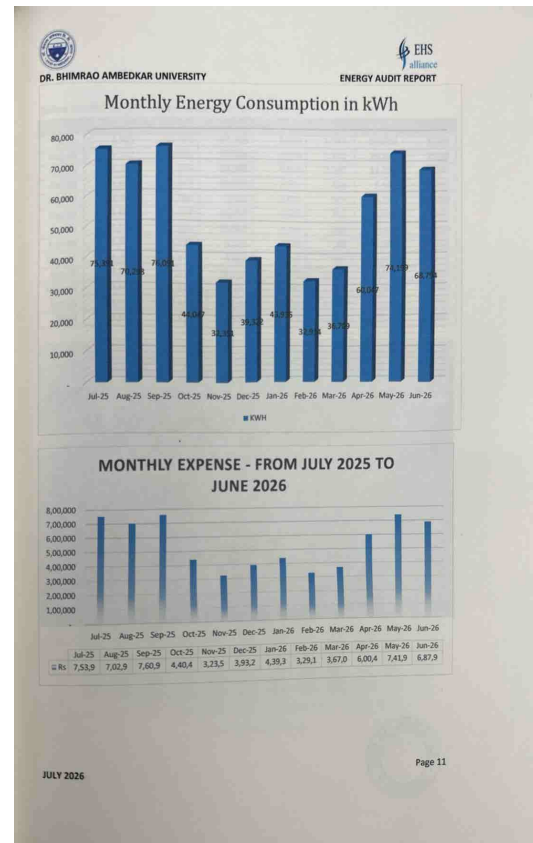
Figure 28: Environment Audit Report 2025-26: cover and certificate



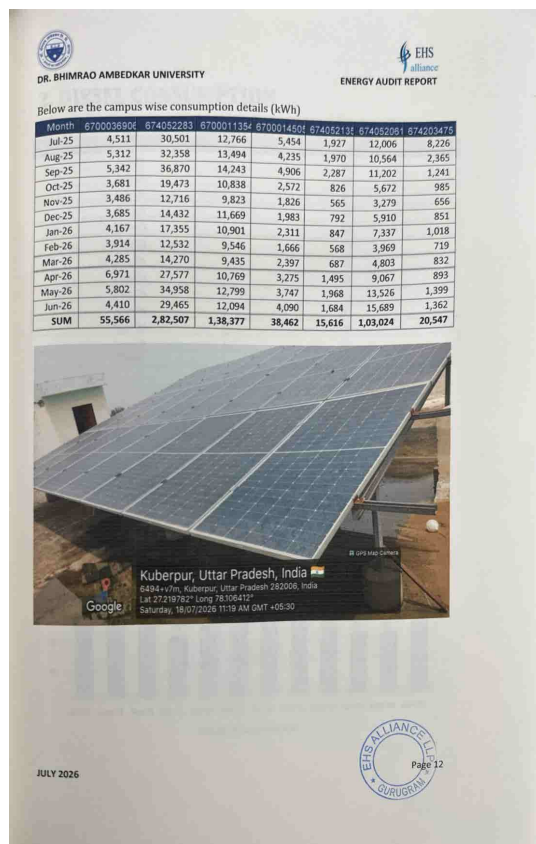
Figure 29: Green Audit Report 2025-26: cover and certificate



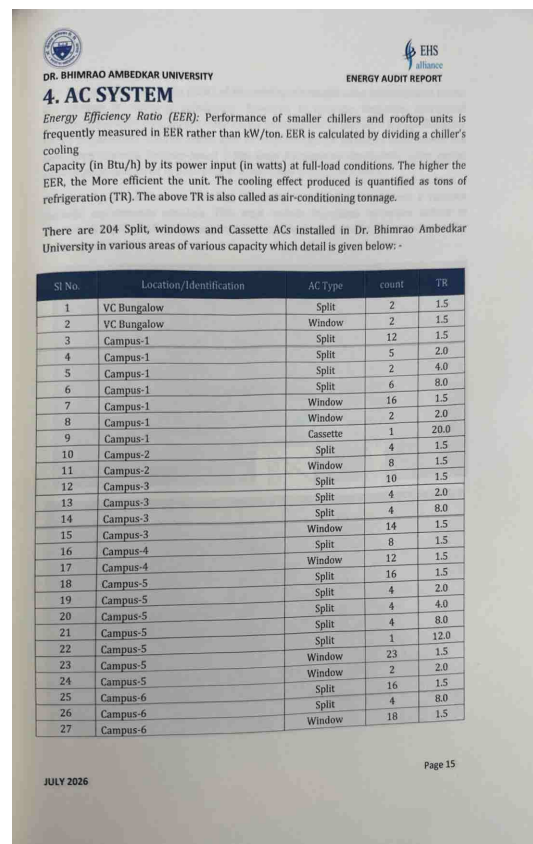
Monthly consumption and bills

Figure 30: Energy Audit 2025-26: electricity consumption, July 2025 – June 2026

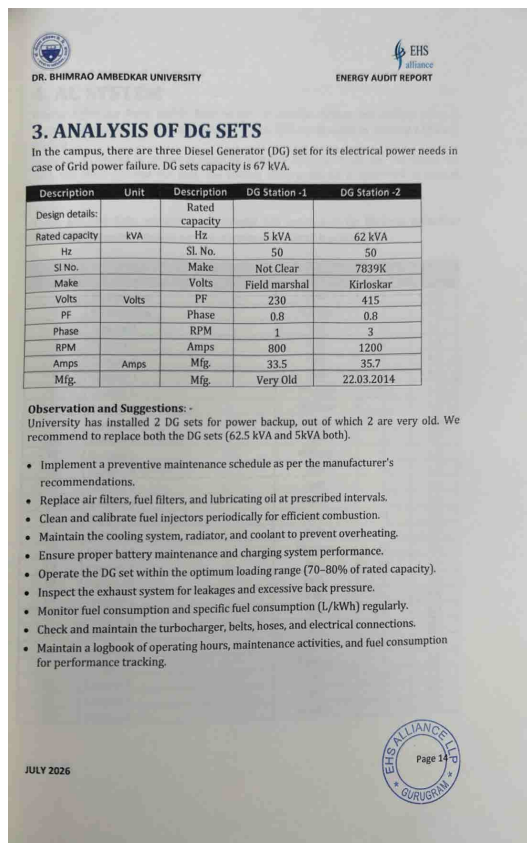
Monthly consumption and expense charts



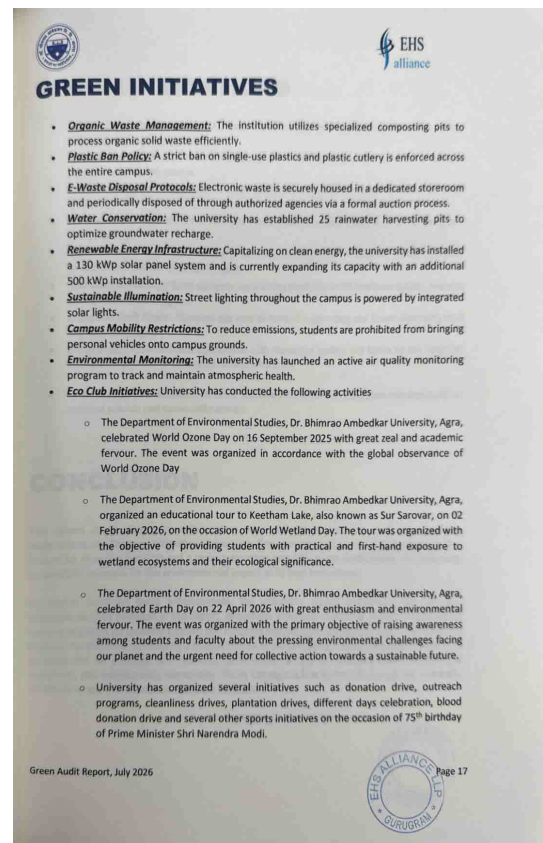
Campus-wise consumption

Figure 31: Energy Audit 2025-26: account-wise consumption and air-conditioning inventory

AC inventory (204 units)



DG set analysis



Green initiatives, incl. 130 kWp solar and 500 kWp expansion

Figure 32: Energy Audit 2025-26 (DG sets) and Green Audit 2025-26 (green initiatives)

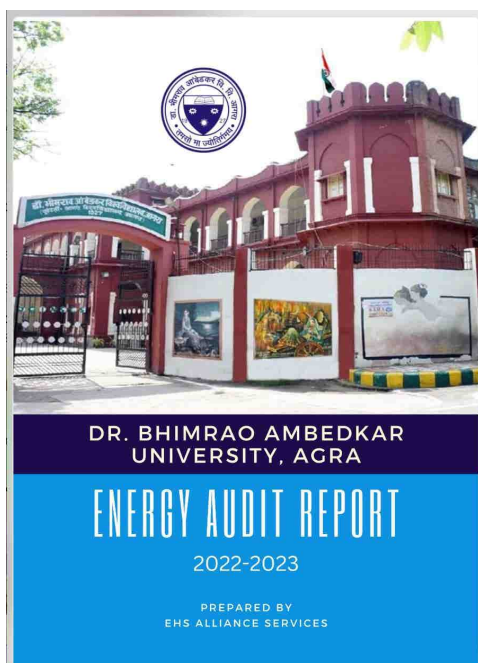


Energy-related annexure photographs

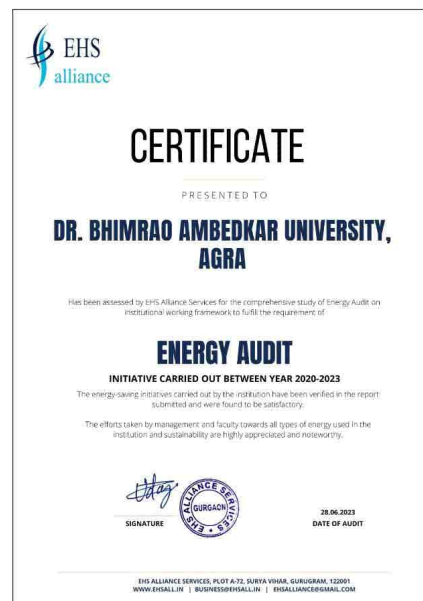


Biogas plant and bicycle rally

Figure 33: Annexure photographs from the Environment and Green Audit Reports 2025-26



Energy Audit Report 2022-23

CERTIFICATE

Energy Audit certificate 2022-23

Figure 34: Previous audit cycle (2022-23), used as the comparison baseline

🔗 **Energy Audit Report 2022-23:** <https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Energy-Audit-Report-2022-23.pdf>

🔗 **Environment Audit Report 2022-23:** <https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Environment-Audit-Report-2022-23.pdf>

🔗 **Green Audit Report 2022-23:** <https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Green-Audit-Report-2022-23.pdf>

Annexure B: Policies, Reports and Web Links

Table 16: Web links referred to in this report

Document / page	Link
SDG portal of the University	https://www.dbrausdg.in/
SDG 7 page on the SDG portal	https://www.dbrausdg.in/goals/7
SDG-aligned policies	https://www.dbrausdg.in/policies
Centre of Excellence for Sustainability and SDG Cell	https://www.dbrausdg.in/coe
Awards and recognition	https://www.dbrausdg.in/awards
University website	https://dbrau.ac.in/
University policies (all)	https://dbrau.ac.in/university-policies/
Policy on Green Clean Campus	https://dbrau.ac.in/wp-content/uploads/2024/01/Policy-on-Green-Clean-Campus.pdf
Infrastructure Maintenance Policy	https://dbrau.ac.in/wp-content/uploads/2024/04/Infra-Maint-policy.pdf
Startup Policy	https://dbrau.ac.in/wp-content/uploads/2024/04/Startup-Policy.pdf
Seed Money Policy	https://dbrau.ac.in/wp-content/uploads/2024/08/Seed-Money-Policy.pdf
Consultancy Policy	https://dbrau.ac.in/wp-content/uploads/2024/01/Consultancy-Policy.pdf
University Outreach Programme Policy	https://dbrau.ac.in/wp-content/uploads/2024/01/University-Outreach-Programme-Policy.pdf
Research Policy	https://dbrau.ac.in/wp-content/uploads/2024/01/DBRAU-Research-Policy-1.pdf
IQAC	https://dbrau.ac.in/research-main-page2/
Institutional Perspective Plan	https://dbrau.ac.in/wp-content/uploads/2024/07/INSTITUTIONAL-PERSPECTIVE-PLAN-1.pdf
Institutional best practices	https://dbrau.ac.in/institutional-best-practices/
Research publications	https://dbrau.ac.in/research-papers-publications/
Patents	https://dbrau.ac.in/patents/
Vivekananda Incubation Foundation	https://dbrau.ac.in/vivekanand-incubation-foundation-copy/
University notices	https://dbrau.ac.in/category/university-notice/
Online e-counselling (paperless admissions)	https://dbrau.ac.in/e-counseling/
K. M. Munshi Virtual Heritage Museum (digital access)	https://kmimuseum-wcrnq69.gamma.site/
Energy Audit Report 2022-23	https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Energy-Audit-Report-2022-23.pdf
Environment Audit Report 2022-23	https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Environment-Audit-Report-2022-23.pdf
Green Audit Report 2022-23	https://dbrau.ac.in/wp-content/uploads/2024/04/Agra-UST-Green-Audit-Report-2022-23.pdf

The 2025-26 Energy, Environment and Green Audit Reports were submitted to the University in July 2026. Their scanned pages appear in Annexure A.