CAPPADOCIA UNIVERSITY
Logic - Wisdom - Equality - Tradition

SUSTAINABLE DEVELOPMENT GOALS • ANNUAL REPORT

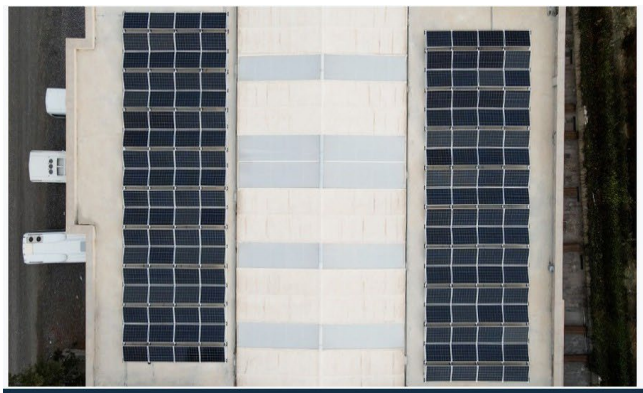
Powering a lower-carbon future.

SDG 7 / AFFORDABLE AND CLEAN ENERGY

7 AFFORDABLE AND CLEAN ENERGY

Energy stewardship, renewable infrastructure and research for sustainable transition.

Reporting Period: 2025



SOLAR ELECTRICITY / OKTAY SINANOĞLU



SOLAR THERMAL / MUSTAFA PAŞA

On-campus solar electricity and solar water-heating systems documented at our University.

2025 • CAPPADOCIA UNIVERSITY • ENGLISH EDITION

THE 2025 STORY

Energy as a responsibility shared across the University

The transition to cleaner energy depends on what we generate, what we use, how our buildings operate, and the knowledge we contribute to society.

Cappadocia University approaches energy as a cross-cutting dimension of environmental responsibility. Our on-campus solar systems, conservation measures, technical monitoring and educational activities connect the daily operation of a multi-campus university with the wider transition towards affordable, reliable and cleaner energy. The Cappadocia Fire (KÜN Ateş) programme brings these priorities into a practical framework spanning building design, heating and cooling, efficient lighting, renewable energy and engagement with University members.

During 2025, our natural-resource monitoring register documented electricity, natural gas, petrol, diesel and coal separately. The institution's source-based energy calculation totals 73,638 GJ, incorporating actual 2025 consumption quantities and 502 GJ of documented annual solar-system technical energy values. Technical documentation also identifies separate solar photovoltaic and solar water-heating installations in Mustafapaşa. The year also provided opportunities for public and academic discussion: energy efficiency in sustainable gastronomy, energy security, solar power-plant planning and low-carbon technology were represented through scholarly and educational activities.

73,638
GJ INSTITUTIONAL ENERGY ACCOUNT
Source-based 2025 calculation

1,119,371
KWH RECORDED ELECTRICITY
January–December 2025

502
GJ SOLAR TECHNICAL ENERGY
PV electricity + solar heat

What this report examines

Institutional governance and energy management; measured energy use; on-site solar electricity and solar-derived heating; resource-efficient building practices; academic research and energy dialogue; and the contribution of these measures to sustainable energy systems. Where institutional records describe technical annual system values, these are presented separately from recorded 2025 consumption.

INSTITUTIONAL PERSPECTIVE

Energy efficiency and clean energy are not isolated technical initiatives. Our ambition is to make resource use visible, use existing infrastructure thoughtfully and connect research and community learning to our own operational experience.

OUR UNIVERSITY

A university rooted in place, looking to the future

Founded as Cappadocia Vocational College in 2005 and established as Cappadocia University in 2017, our institution combines professional education, interdisciplinary research and community contribution across its campuses in Nevşehir and İstanbul. Our educational philosophy is grounded in applied learning, disciplinary expertise and the SOBE approach, which prioritises the latest knowledge and encourages students to interpret contemporary problems through their scientific, social and historical contexts.

The Cappadocia region offers a distinctive context for sustainability. Historic settlements, seasonal tourism, cultural heritage, specialised aviation services and diverse building stock create practical questions about energy demand, thermal comfort and the protection of valued landscapes. Our response integrates renewable-energy infrastructure into existing campus buildings while recognising the needs of historic properties and their occupants.

A strategic commitment made operational

The University's 2023–2028 Strategic Plan places sustainability among its institutional priorities. Our Environmental and Sustainability Policy, revised in November 2023, establishes an Energy Management Programme; our Climate Action Policy, issued in October 2024, connects energy efficiency, lower fossil-fuel dependence and renewable energy to climate action and institutional performance monitoring. The Sustainability Office and Sustainability Commission coordinate reporting and engagement within this policy framework.

POLICY IN ACTION

A connected approach to energy stewardship

Governance links written commitments to facilities, measurement and the capacity to improve performance.

Institutional framework	Energy-relevant function	Documented basis
Environmental and Sustainability Policy	Energy Management Programme; resource-efficient practice; environmental impact monitoring	KÜN.PB.010 / revised November 2023
Climate Action Policy	Energy-efficient infrastructure, renewable energy, carbon footprint reduction and campus adaptation	KÜN.PB.014 / October 2024
KÜN Ateş programme	Natural ventilation, heating management, efficient lighting and renewable energy initiatives	Public University sustainability programme
Environmental management system	Procedures for monitoring, measurement, evaluation and review of environmental performance	ISO 14001 institutional framework

How decisions translate into practice

Energy management is embedded in the way buildings are used and maintained. The Cappadocia Fire programme describes measures to minimise unnecessary lighting, use efficient appliances, install photocells in intermittently occupied areas, avoid heating unused rooms and take advantage of natural heating and cooling. These measures are particularly relevant to a University operating in a region where energy performance must be considered alongside cultural heritage and building conservation.

Technical oversight includes collecting energy consumption data from utility records, retaining monitoring results, reviewing environmental aspects and assessing performance through management-system processes. Our solar-generation monitoring uses dated photovoltaic readings; energy use records are maintained separately for purchased electricity and other fuels.

ENERGY MANAGEMENT CYCLE

Policy and planning → building and equipment operation → resource monitoring → review and improvement. This sequence supports continuous energy management rather than treating energy-saving actions as single isolated events.

THE ENERGY LEDGER

Electricity demand, measured month by month

The 2025 monitoring register provides an auditable picture of recorded electricity use across the institution.

1.119
kWh ELECTRICITY
Calendar-year total, 2025

134,761
kWh HIGHEST MONTH
December 2025

65,724
kWh LOWEST MONTH
June 2025

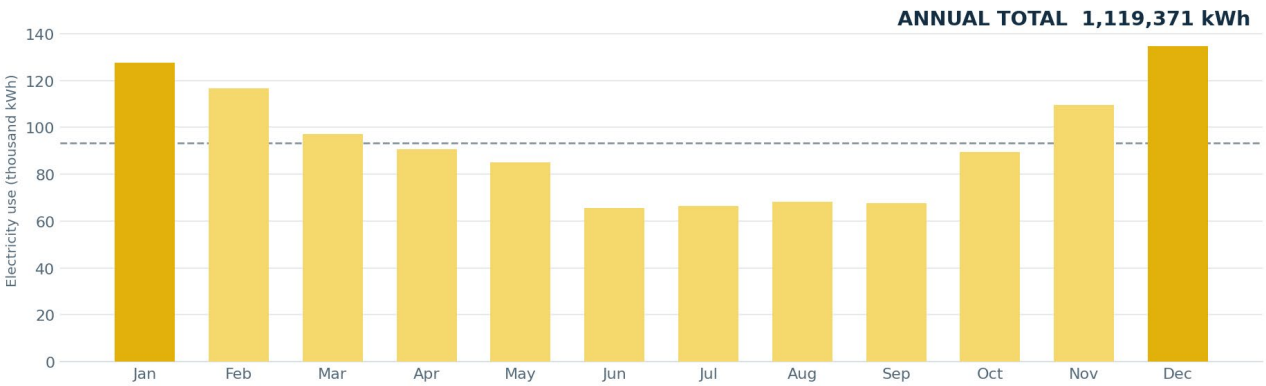


Figure 1. Monthly recorded electricity use, January–December 2025. Source: University Natural Resource Use Tracking Register (Mİ.LS.005).

The twelve-monthly entries sum to 1,119,371 kWh for January–December 2025. Recorded use varied across the year, with the highest monthly figure in December and the lowest in June. The chart describes consumption; without additional load, occupancy, weather and tariff information, seasonal differences are not presented as proof of a specific efficiency intervention.

An academic-year account kept distinct

An additional electricity account for September 2024–August 2025, assembled from utility invoices for six campuses, records 1,180,132 kWh. This academic-year series is a separate twelve-month period from the January–December 2025 monitoring total; it is retained as an institutional source for academic-year activity and is not used as the preceding calendar-year benchmark.

2025 ENERGY PERFORMANCE

The complete institutional energy account

Energy management starts with a common view of electricity, heating fuels, transport fuels and low-carbon solar energy.

73,638	502	0.68%
GJ TOTAL ENERGY ACCOUNT	GJ SOLAR ENERGY VALUES	SOLAR SHARE IN THE ACCOUNT
2025 source-based calculation	Documented annual technical basis	Calculated from documented inputs

Our University's 2025 Natural Resource Consumption Tracking List records electricity, natural gas, petrol, diesel and coal in their respective physical units. A supporting calculation workbook applies documented conversion factors to express those quantities in gigajoules (GJ). It also records the annual technical energy values of our two on-site solar installations as distinct electricity and heat categories. The resulting 2025 energy account totals 73,638.18 GJ (73,638 GJ rounded).

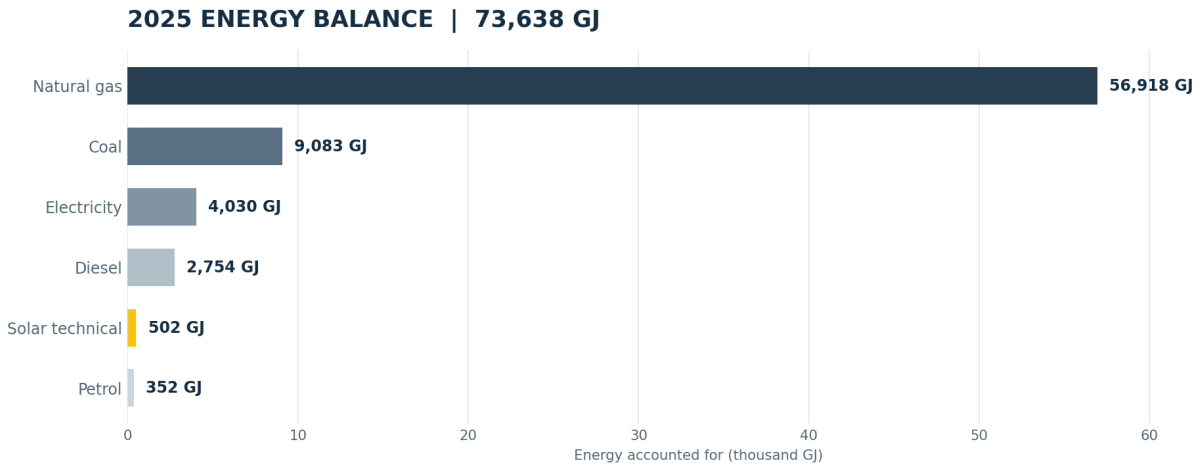


Figure 2 . Source-based institutional energy account for 2025. Fossil fuels and purchased electricity originate from actual calendar-year consumption records; the solar component combines the systems' documented annual technical values.

Energy source	2025 source quantity	Energy (GJ)	Record basis
Electricity	1,119,371 kWh	4,029.74	Recorded consumption
Natural gas	1,485,948.585 m^3	56,917.77	Recorded consumption
Petrol	10,644.62 litres	351.59	Recorded consumption
Diesel	75,241.29 litres	2,753.83	Recorded consumption
Coal	510.8 tonnes	9,083.05	Recorded consumption
Solar photovoltaic	74,400 kWh	267.84	Annual technical value
Solar thermal heat	65,100 kWh	234.36	Annual technical value

What the energy composition tells us

Natural gas represents the largest category in the 2025 energy account, followed by coal and electricity. Identifying these sources separately makes heating and building operations central to our energy efficiency priorities. The documented solar energy component totals 502.20 GJ, corresponding to 0.68% of the combined calculation. The 0.68% describes the composition of the energy-account workbook, using annual technical values for solar electricity and solar heat.

MEASUREMENT AND ACCOUNTING

How we account for energy

The energy balance brings together quantities recorded in different physical units within a transparent calculation structure.

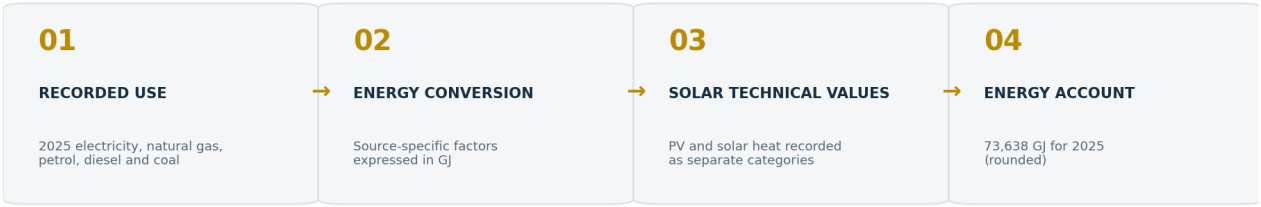


Figure 3. The documented stages of Cappadocia University's 2025 source-based energy account.

Documented factors and physical quantities

Energy category	Factor applied	Calculation basis
Electricity and solar	0.0036 GJ/kWh	Electrical or thermal kWh → GJ
Natural gas	0.038304 GJ/m³	10.64 kWh/m³ reference heating value
Petrol	0.03303 GJ/litre	33.03 MJ per litre
Diesel	0.03660 GJ/litre	36.60 MJ per litre
Coal	17.782 GJ/tonne	Reference coal energy factor

The energy quantities are sourced from the 2025 monthly register. The natural-gas calculation uses a published reference heating value; the coal calculation uses a reference energy factor because the source register identifies quantity, not a tested coal grade. These reference assumptions are documented in the calculation workbook so that the accounting method can be reproduced and reviewed.

The University's records also include an electricity-only account of 1,180,132 kWh for the September 2024–August 2025 academic year. That figure has a different twelve-month boundary from the 2025 calendar-year total of 1,119,371 kWh. Similarly, changes in the coverage of different fuel categories mean that differently defined historical energy totals cannot be interpreted as direct measures of changes in demand.

ENERGY-MANAGEMENT PERSPECTIVE

Separating consumption records, conversion factors and solar technical values allows us to see where energy is used, identify resource-intensive categories and maintain a consistent basis for future performance review.

RENEWABLE INFRASTRUCTURE

Sunlight as an on-campus energy resource

Two complementary solar systems serve different purposes: renewable electricity and solar-derived hot water.

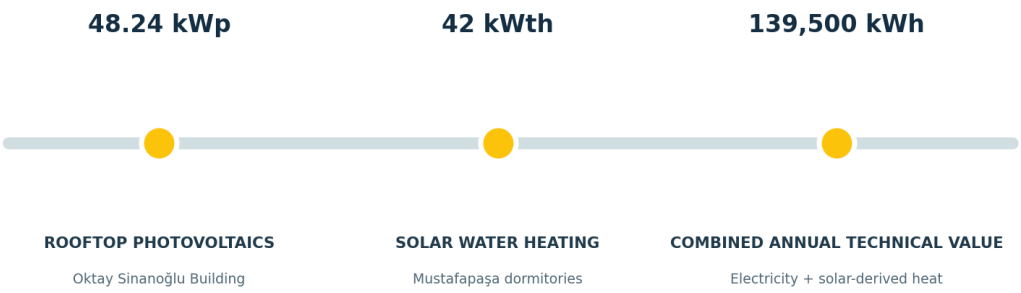


Figure 4. The two solar technologies, their installed capacities and documented annual technical energy values. The electricity and thermal components are distinguished.

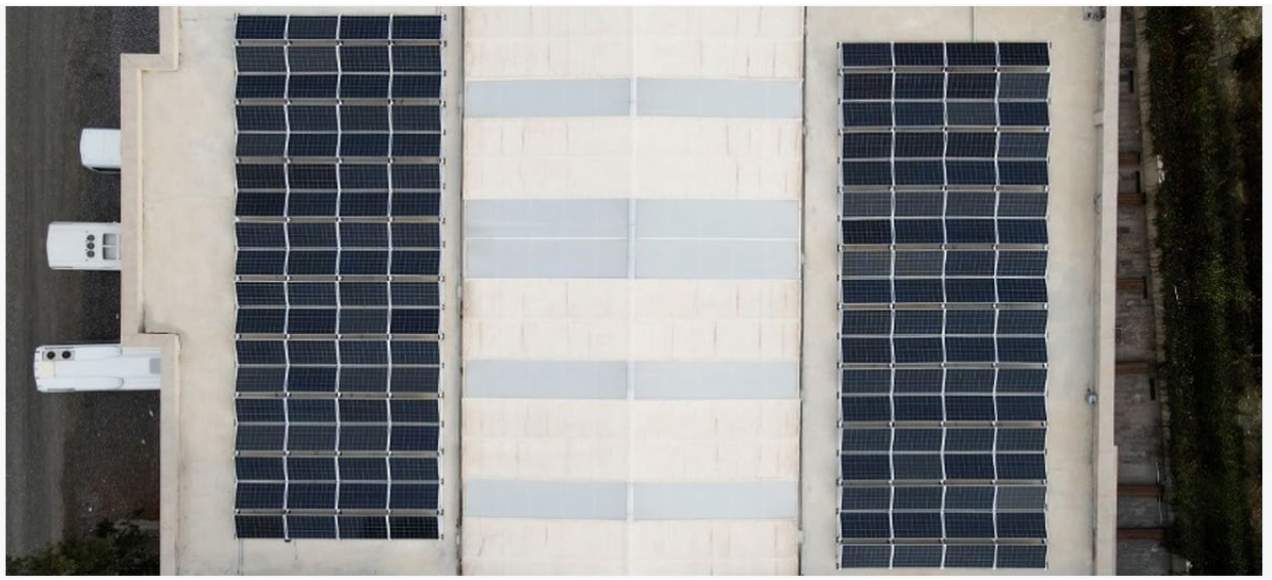


Figure 5. Solar photovoltaic panels on the rooftop of the Oktay Sinanoğlu Building at our Mustafapaşa Campus.

Electricity from the Oktay Sinanoğlu Building

The rooftop photovoltaic installation comprises 144 monocrystalline panels and has an installed capacity of approximately 48.24 kWp. The system began operating in December 2020 and remains a concrete example of integrating renewable electricity generation into the University's built environment. Institutional technical records describe an annual photovoltaic electricity value of 74,400 kWh (267.84 GJ).

Our technical monitoring infrastructure uses Huawei SUN2000 to record dated photovoltaic electricity generation and time-based production profiles. The availability of dated readings allows system performance to be reviewed rather than assessed from panel count alone.

SOURCE University renewable-energy infrastructure records and 2020 commissioning notice. · Open institutional source

Dated photovoltaic production monitoring

The Huawei SUN2000 interface provides day-specific production readings and hourly generation profiles for the Oktay Sinanoğlu solar installation. An archived reading for 3 October 2024, within the 2024–2025 academic year, records 208.45 kWh generated during that day. This is a concrete example of the monitoring system used to follow photovoltaic performance over time.

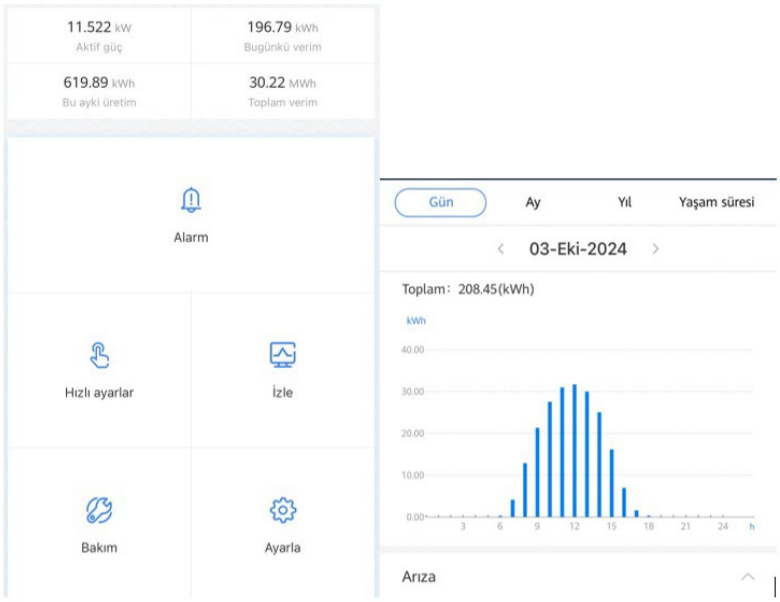


Figure 6. Huawei SUN2000 dated production interface: 208.45 kWh generated on 3 October 2024, shown together with the daily generation profile.

RENEWABLE THERMAL ENERGY

Solar heat for student accommodation



Figure 7. Roof-mounted solar water-heating collectors at the University dormitories in Mustafapaşa.

The solar water-heating system at the Mustafapaşa student dormitories is documented with an installed thermal capacity of 42 kWh. Its technical annual solar-derived heat value is recorded as 65,100 kWh, equivalent to 234.36 GJ. Unlike the photovoltaic system, these collectors support heat provision for water heating rather than electricity generation.

Accounting for two distinct energy streams

Solar technology	Installed capacity	Annual technical energy	Energy form
Oktay Sinanoğlu photovoltaic array	48.24 kWp	74,400 kWh	Electricity
Mustafapaşa solar water-heating collectors	42 kW thermal	65,100 kWh	Heat
Combined technical annual values	Two systems	139,500 kWh	Electricity + heat

Together, the two documented annual technical values amount to 139,500 kWh (502.20 GJ). Their combined capacity provides a useful description of our installed renewable-energy infrastructure. Photovoltaic electricity and solar-derived thermal energy remain separate in the account; the figures are not treated as a measured January–December 2025 renewable-energy total.

CAMPUS OPERATIONS

Efficiency begins with the buildings we already use

Energy efficiency measures prioritise lighting, thermal comfort, equipment and building use.

Reducing unnecessary demand

The Cappadocia Fire programme describes a pragmatic set of interventions: minimising avoidable lighting, preferring energy-efficient appliances, using photocells where rooms are infrequently occupied, limiting cooling demands and excluding unused rooms from unnecessary heating. Our Environmental and Sustainability Policy reinforces this approach by placing energy management within wider resource conservation and environmental improvement responsibilities.

Working with the local built environment

Building energy strategy in Cappadocia must respond to distinct campus uses and architectural conditions. The programme promotes new building design that considers natural heating and cooling potential, as well as sympathetic interventions in existing and historic buildings. Efficiency is therefore addressed through both technical equipment and operating behaviour, rather than through a single technological solution.

Monitoring as a basis for improvement

Monthly electricity consumption records and environmental management reviews create a mechanism for identifying changes in demand and assessing where more targeted building-level work would be most useful. This links electricity conservation to low-carbon operations and supports future prioritisation of investments based on measured requirements.

ENERGY-EFFICIENCY PRIORITIES

Efficient lighting • demand-led heating and cooling • natural ventilation • renewable integration • building-level consumption review

EDUCATION AND PUBLIC ENGAGEMENT

Energy knowledge shared beyond the campus

University research, professional dialogue and publicly announced events complement on-campus energy management.

Date	Event	Contribution to knowledge exchange
5–7 Sep 2024	International Energy, Environment and Energy Storage Conference	Hosted at Mustafapaşa; presentations and discussion addressed hydrogen, solar technologies, energy storage and environmental effects.
23 May 2025	Gastronomy, Tourism and Sustainability	An announced talk at Uçhisar included energy efficiency in sustainable gastronomy and ISO 50001 among its subjects.
12 Nov 2025	Energy Security: Nuclear Energy	Online academic discussion through Political Science and International Relations, addressing energy security and the nuclear-energy debate.

The May 2025 gastronomy and sustainability programme demonstrates how energy-efficiency concepts can be brought into a sector that is central to Cappadocia's local economy. A talk on energy efficiency and ISO 50001 provided an occasion to connect technical energy management terminology with tourism and food-service practice. The November event approached energy from the perspective of energy security and national policy discussion. These formats broaden the conversation beyond engineering and campus facility management.

PUBLIC ENGAGEMENT

Taking energy literacy into public dialogue

Accessible knowledge can connect the technical decisions made on campus with the choices of professionals and community members.

Public information on efficient and renewable energy

Our Cappadocia Fire programme is presented publicly as one of five themed sustainability programmes. It communicates practical principles of efficient electricity use, conservation of heat, renewable energy generation and reduced energy-related environmental impacts. During 2025, the Sustainability Office's wider programme of QR-linked badges and informational materials offered an additional route to these institutional resources, enabling students and community participants to explore related content after public interactions.

Energy and carbon literacy in professional education

The Gastronomy, Tourism and Sustainability Conversation held at the Uçhisar Campus on 23 May 2025 explicitly addressed energy efficiency in sustainable gastronomy, the ISO 50001 framework and digital carbon-management applications in tourism. This educational meeting connected resource efficiency with practical decisions in regional economic sectors.

Climate information available beyond the campus

The University's Climate Crisis Awareness Database remained publicly available in 2025 and provided Turkish-language scientific infographics on environmental risks, climate change and mitigation. Its 2025-dated content and the University's public sustainability communication channels complement more specialised energy information. The platform extends opportunities for independent environmental learning, while its broader climate themes are distinguished from specific energy-efficiency training.

COMMUNITY CONTRIBUTION

Publicly available energy guidance, professional learning on efficient resource use and accessible scientific climate information make the University's sustainability practice relevant beyond its own facilities.

SCHOLARSHIP AND INQUIRY

Research perspectives on the energy transition

The University's wider scholarly ecosystem connects energy technologies with spatial planning, environmental decision-making and social policy. Alongside our campus initiatives, the academic work indexed by the University and research published through its journals provides perspectives relevant to renewable-energy planning and the governance of energy systems.

Solar photovoltaic planning and spatial decision-making

A 2025 study by Ömer Öztaş and Bilal Ervural, indexed in the University's academic information system, combined geographic information systems with the fuzzy best–worst method to assess the suitability of prospective solar photovoltaic power-plant sites in Konya, Türkiye. The peer-reviewed article presents a replicable approach to siting decisions, using factors such as solar irradiation and proximity to infrastructure. It exemplifies the kind of evidence-based spatial planning relevant to renewable-energy development. The author affiliations recorded in the published article remain distinct from the University's current staff database.

Öztaş, Ö., & Ervural, B. (2025). "Integrating GIS and Fuzzy BWM for Solar PV Power Plant Site Selection: A Case Study of Konya, Turkey." *Celal Bayar University Journal of Science*, 21(1), 75–89. DOI: 10.18466/cbayarfbe.1589809.

Energy governance in area studies

The *Cappadocia Journal of Area Studies* published a peer-reviewed study of Russian energy policy in June 2025, analysing energy governance in relation to disagreement and conflict processes. Although concerned with geopolitics rather than campus technology, this contribution broadens the discussion of affordable and reliable energy to include governance, security and international relations.

Cilasun, S. S. (2025). "Russian Energy Policy in the Putin Era: Reflections on Disagreement and Conflict Processes." *Cappadocia Journal of Area Studies*, 7(1), 17–42. DOI: 10.38154/CJAS.2025.88.

RESULTS AND INTERPRETATION

What our 2025 evidence demonstrates

The year is characterised by documented infrastructure, measured resource use, standing energy policies and identifiable public and scholarly activity.

Contribution	2025 or standing evidence	Why it matters
Energy accounting	73,638 GJ source-based 2025 account; 1,119,371 kWh electricity	Measured consumption and transparent energy balance
Solar systems	144-panel PV (48.24 kWp); 42 kW thermal; 502 GJ annual technical energy	On-site low-carbon electricity and heat
Monitoring	Huawei SUN2000 daily generation readings; 2025 source-wise ledger	Documented monitoring of generation and use
Operational efficiency	KÜN Ateş energy management programme	Measures for lighting, heating, cooling and efficient building use
Public learning	May 2025 efficiency and ISO 50001 session; KÜN Ateş public resources	Energy literacy beyond formal campus operations
Research and knowledge	2025 research and journal scholarship on solar PV siting and energy policy	Methods and debate supporting informed energy decisions

These results represent different categories: recorded annual energy consumption, installed infrastructure, institutional policy and dated knowledge-sharing activities. They should not be collapsed into a single percentage or a single beneficiary count. Taken together, they show how renewable energy, efficient operations and scholarly exchange form the basis for a university-wide approach to clean energy.

SDG CONNECTIONS

Connecting clean energy to wider sustainability

The University's contribution is anchored in SDG 7 through renewable-energy infrastructure, energy efficiency, energy-management processes and relevant academic knowledge. It also supports SDG 13 (Climate Action) by encouraging low-carbon energy use and emissions-aware operations; SDG 11 (Sustainable Cities and Communities) through building conservation and climate-sensitive campus infrastructure; SDG 9 (Industry, Innovation and Infrastructure) through technical infrastructure and applied research; SDG 12 (Responsible Consumption and Production) through efficient use of resources; and SDG 17 (Partnerships for the Goals) through professional and academic cooperation.

Priorities for continued improvement

Maintaining high-quality 2025 baseline records allows our University to strengthen the next stage of energy management. The practical priorities are consistent measurement boundaries across campus facilities; continued monitoring of photovoltaic generation and solar heating; targeted review of avoidable building-energy demand; and public reporting that connects technical evidence with operational decisions. These priorities are an agenda for ongoing work, not a substitute for documented completed activities.