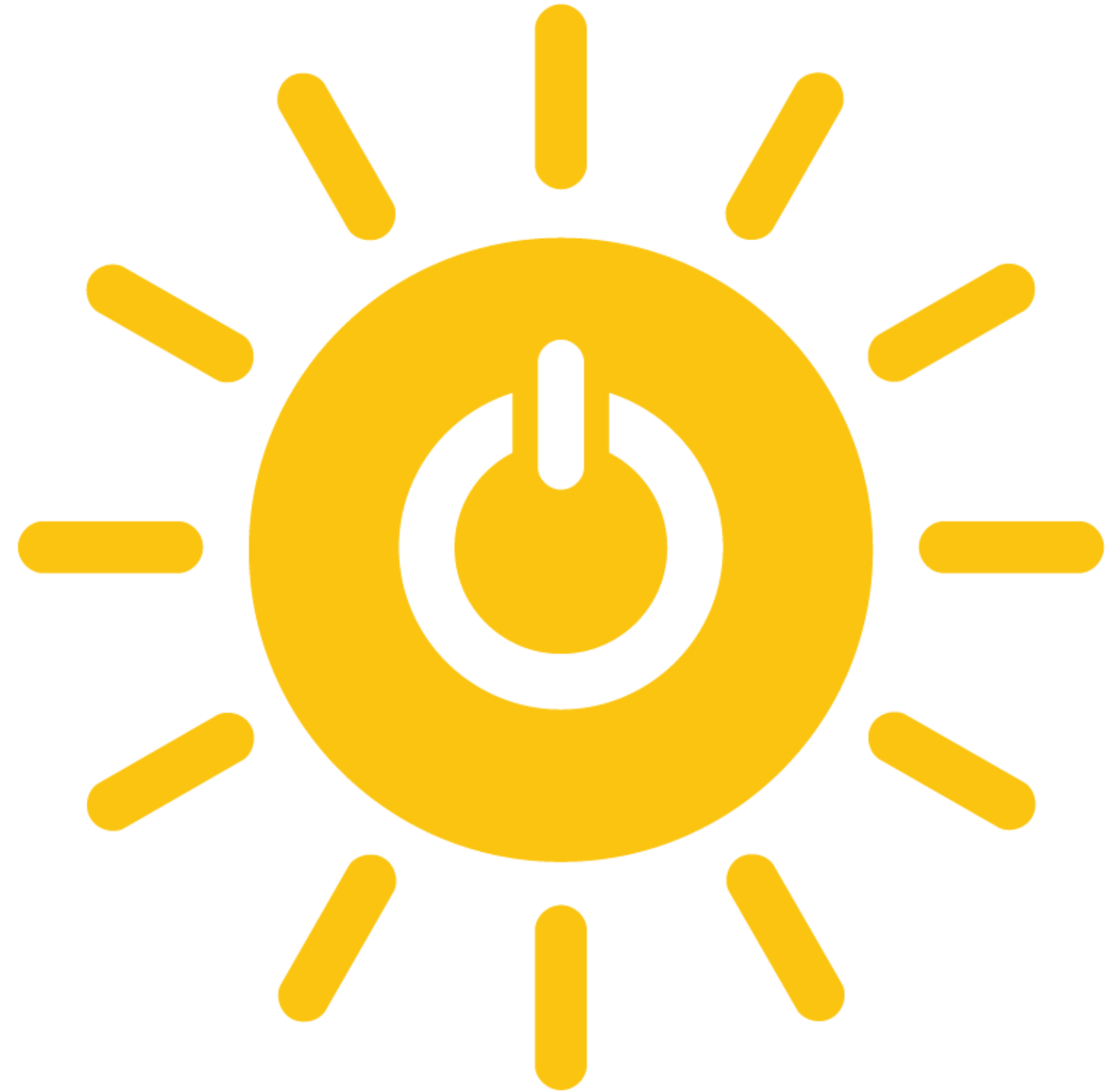


7 AFFORDABLE AND CLEAN ENERGY



Sustainable energy is central to tackling climate change and ensuring economic growth. Özyeğin University applies international energy standards on campus, integrates renewable energy projects into its operations, and contributes research to advance energy efficiency and green technologies.

96

Scholarly Publications
(2020-2024)

0.92

Citation Impact
(FWCI)

4

Funded
Projects

5

Student-Led
Activities



Transdisciplinary Energy Transition Course

Özyeğin University integrates clean energy and sustainability principles into its academic ecosystem through experiential learning and sectoral education. A cornerstone of this approach is SEC 373: "Transdisciplinary Approach – Energy Transition under the Threat of Climate Crisis," a course designed to cultivate holistic understanding and action on the global shift toward renewable energy. Drawing together students from engineering, economics, environmental science, and policy, the course encourages critical reflection on the technological, economic, and social dimensions of energy transition. Students engage in interactive workshops and collaborative projects that simulate real-world energy scenarios—analyzing renewable integration, policy design, and the social justice implications of the transition. Student teams develop applied solution proposals, from renewable energy deployment models and energy-efficiency strategies to frameworks that support clean energy adoption both on campus and in surrounding communities. Complementary faculty-led projects under Dr. Hamza Makhamreh, faculty at

Electrical and Electronics Engineering at ÖzÜ, deepen the technical dimension through research on lithium-ion battery health modeling, LLC converters using GaN devices, and single-stage PFC circuit design. These integrated experiences nurture systems thinking, innovation, and practical engineering skills—preparing students to actively shape the clean-energy transformation.

ISO 50001 Energy Management System Standard

Özyeğin University integrates the ISO 50001 Energy Management System Standard with the ISO 14001 Environmental Management System Standard, systematically addressing energy management to achieve more efficient, sustainable, and effective energy use.

ISO 50001 is an international standard aimed at systematically addressing energy management. Developed by the International Organization for Standardization (ISO), this standard assists businesses in managing energy more efficiently, sustainably, and effectively. ISO 50001 supports organizations in achieving the following goals: Energy efficiency, Savings, Environmental sustainability, and Cost control.

In line with its environmentally conscious approach within the scope of ISO 14001 Environmental and ISO 50001 Energy Management Systems, Özyeğin University has issued its Corporate Carbon Footprint Report, which was prepared in accordance with the ISO 14064 Standard, to analyze its institutional carbon footprint and support environmental sustainability. These reports can be accessible via Özyeğin University web site.

As Özyeğin University, we have taken a significant step towards our net zero emissions goal by offsetting the carbon emissions generated throughout 2024 through Carbon Offset Projects.

Additionally, we hold an IREC Certificate (International Renewable Energy Certificate) for our 2923 MWh electricity consumption in 2024. This certificate documents that 100% of our Scope 2 electricity consumption from the grid was sourced from renewable energy. By officially certifying that all electricity used throughout 2024 was supplied from renewable sources, our university has taken a significant step toward reducing its carbon footprint.

Campus as a Living Laboratory

Özyeğin University's campus serves as a living laboratory where clean energy technologies and energy management strategies are implemented and tested in real-world conditions. The university has invested in comprehensive building energy management systems that continuously monitor energy consumption patterns, indoor environmental conditions, and equipment performance across campus facilities. This data infrastructure enables both operational optimization—automatically adjusting heating, cooling, and lighting based on occupancy and weather conditions—and research activities where students and faculty analyze energy data to identify efficiency opportunities.

The campus includes installations of renewable energy technologies including solar photovoltaic panels that generate clean electricity, solar thermal collectors that provide hot water, and ground-source heat pump systems that efficiently provide heating and cooling by utilizing stable underground temperatures. These installations serve dual purposes: reducing the university's carbon footprint and energy costs while providing educational resources where students can observe and analyze the performance of clean energy technologies. Researchers use campus buildings as test sites for piloting emerging technologies including advanced lighting controls, occupancy-based HVAC optimization, and thermal energy storage systems. The university has also implemented LED lighting retrofits across campus, significantly reducing electricity consumption while improving lighting quality, alongside building envelope improvements including enhanced insulation and high-performance windows.



Academic–Industry Collaboration and Policy Engagement

Özyeğin University advances Türkiye’s clean energy transition by fostering collaboration between academia, industry, and policymakers through its Center for Energy, Environment and Economy (EÇEM). Established in 2009, EÇEM serves as a multidisciplinary research and engagement hub that integrates engineering, architecture, and economics to address challenges related to energy efficiency, climate change, and sustainable development. The center focuses on technology transfer, energy-efficient buildings, and human–building interaction, translating academic research into practical solutions for society and industry.

Through EÇEM, the university coordinates major national initiatives and platforms for dialogue. The TÜSİAD–EÇEM Workshop Series, conducted under Türkiye’s Industrial Energy Efficiency Vision Project, enables direct knowledge exchange between researchers and industry leaders. The 2024 workshop convened representatives from twelve major companies to discuss process optimization, waste heat recovery, and renewable integration. The Chapter Zero Türkiye–TÜSİAD–EÇEM Climate Action Event, held in December 2024, brought together corporate executives to address climate

governance, carbon pricing, and regulatory developments, highlighting how energy efficiency can drive innovation and competitiveness. The university further contributes to national energy policy discussions through EÇEM experts’ participation in the Energy Week organized by the Ministry of Energy and Natural Resources, where academic research informs evidence-based policymaking.

Academic Leadership

In 2024, Asst. Prof. Göktürk Poyrazoğlu, Head of the Grid Operations and Planning Laboratory, strengthened Özyeğin University’s leadership in clean energy through research and national engagement. He contributed to high-level discussions on renewable integration and infrastructure security at the Turkish Atlantic Security Conference, and his paper on the Spatio-Temporal Impact of EV Charging Load on Locational Marginal Prices received the Best Paper Award at the 9th International Youth Conference on Energy (IYCE’24).

Energy Positive Homes

The Center for Energy, Environment and Economy (EÇEM) serves as a project partner in LEGOFIT, an international initiative coordinated by Demir Enerji and composed of 19 partners from 10 countries. The project focuses on developing adaptable technological solutions and early design strategies for the construction and renovation of Energy Positive Homes (EPH). Through an innovative platform based on Building Information Modelling (BIM), LEGOFIT integrates active and passive energy systems with smart management technologies to optimize building performance and minimize environmental impact throughout the life cycle. The project's integrated approach will be demonstrated across multiple pilot sites representing diverse climatic, cultural, and construction contexts.

Sustainable Logistics Systems

The Online Robust Green Vehicle Routing Project, led by Dr. Mesut Sayın, addresses systemic vulnerabilities in logistics operations exposed by global disruptions. The project develops an online and

resilient routing framework that dynamically manages uncertainties in demand, travel time, and cost. By combining blockchain technology with sustainable routing algorithms, it aims to enhance operational efficiency, reduce environmental impact, and build more adaptive and future-ready logistics systems.