SDG-7
AFFORDABLE AND CLEAN ENERGY

Goal 7 emphasizes the importance of affordable, reliable, sustainable, and modern energy for all, especially for children. Access to sustainable energy significantly enhances the quality of life, enabling essential services that are crucial for children's survival, development, and well-being.

In homes, reliable modern lighting allows children to complete their homework and perform daily tasks after dark, while adequate heating and cooling create a comfortable living environment. For health centres and schools, energy is vital for lighting, operating medical equipment, cooking, and maintaining digital connectivity. Poor electricity access is linked to lower educational performance, decreased school attendance, and challenges in attracting and retaining qualified teachers.

Moreover, sustainable energy solutions can significantly reduce indoor air pollution, which is a major health risk for children. The burning of solid fuels in homes contributes to severe health issues, resulting in over half a million deaths among children under five each year, along with long-term damage to their developing brains and lungs. By addressing energy needs sustainably, we can improve health outcomes and educational opportunities for children, fostering a brighter future.

At CUI's campuses, all buildings are designed and constructed with a strong emphasis on energy efficiency, adhering to standards set by the Capital Development Authority (CDA) and the government of Pakistan. Energy-efficient buildings play a crucial role in reducing energy consumption and minimizing environmental impact. They also create a more comfortable and sustainable environment for occupants, promoting overall well-being. By prioritizing energy efficiency, CUI contributes to a more sustainable future while enhancing the quality of life for its community.

CUI is moving towards renewable energy production like Solar Power Plants:

a) 100 KW Solar Power Plant Operational

b) 850 KW Solar Power plant at Islamabad Campus has been planned and recommended by the Campus Works Committee is under execution

c) 300 KW Solar Generation Facility at CUI, Sahiwal Campus has been implemented

d) 400 KW system at CUI Wah Campus is at contract signing stage

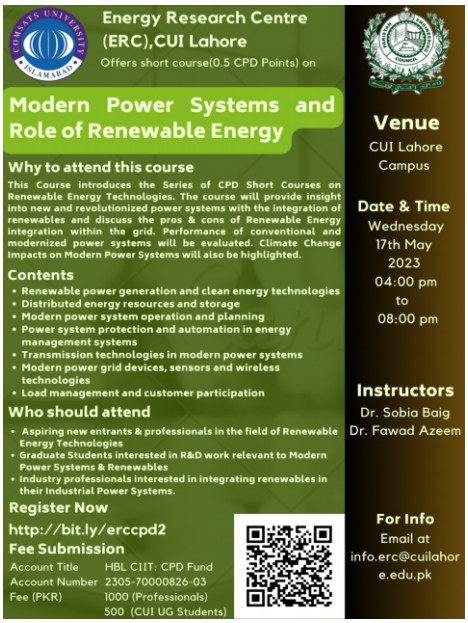
At CUI the Building Management System (BMS) is installed to control and monitor HVAC. The aim of BMS is to maintain occupant comfort and ensure occupant safety, whilst delivering energy efficiency and lower operating costs. Separate management systems for CCTV and firefighting are also in place and operated by the concerned departments.

Energy Research Centre, COMSATS University Islamabad, situated at its beautiful Lahore campus, has taken the year 2022 as an opportunity to grow in terms of capacity building within and outside the Centre, enhance industrial and organizational networking and relations, provide consultancy and continue the tradition of research and development in the form of funded projects, lab development and peer-reviewed impact factor journal publications. ERC continues to contribute in various sectors and intends to play its part in R&D as well as policy formulation in the context of energy and environment for Pakistan. The of Central Asia Regional Economic Cooperation (CAREC) region's energy demand is expected to grow to 30 % by 2030, including electricity as the major resources of consumption. At present Pakistan, which is a member country of CAREC, is faced with challenges of Climate Change and its impact, witnessed through devastating floods in 2022, and high-cost fuels for industrial, transport and residential applications. With the present critical economic situation of our country, the need for the inclusion of renewables was never as critical, as it is today, since these offer a clean, affordable and alternative solution to energy, especially electricity generation and efficient energy utilization in all sectors. Therefore, ERC continues to generate knowledge through R&D solutions for the research community, in the form of graduate research thesis, IF publications, and testing lab development. Moreover, ERC continues to provide consultative advice to the local industry and HEIs. ERC has contributed to develop national SDG 7 policy to translate the universal SDGs into national goals and targets for effective domestic implementation. ERC has developed a Comprehensive Campus Energy Plan to 100% clean and green energy, which focuses on renewable energy production, conservation measures, and cost savings, followed by promoting sustainability and climate change mitigation through projects that would reduce or curb greenhouse gas. On the same lines, as in previous years, in 2022, ERC signed MoU's with industries such as, EPTeck from Faisalabad, on the national scale, and on the international front, ERC played a pivotal role in an international CUI MoU with UJFJ, Brazil, to collaborate with National Institute of Science and Technology in Electric Energy – INERGE. INERGE is a research institute formed by researchers from UFJF, UNIFEI, UFRJ, UFF, UFSJ and UFABC, in Brazil. The institute operates in the area of Electric Energy through the development of scientific and technological research with international quality standards. ERC strives to play its role in the enhancement of academic activities related to energy and has contributed in preparing feasibility reports, and proposals for various academic programs, including BS & MS Energy Systems Engineering, Postgraduate Diplomas, workshops, short courses and trainings. With the global challenge of Climate Change, reducing Carbon footprint and pledge to limit global warming to 1.5° C by nations in COP27, the role of research Centres such ERC has become significant, and ERC aims to strive towards such goals in coming years through R&D

The centre will serve as a catalyst for innovation in integrated energy technologies through collaborative and interdisciplinary research. Its objective is to provide research oriented, efficient and eco-friendly solutions and professional services, related to energy issues, for socio-economic growth in the national as well as global perspective. ERC's mission is to enable capacity building of future scientific leaders, managers and engineers in the energy sector through continuing professional development activities.

CUI Lahore is making valuable contributions to the field of clean energy through education and training. By organizing technical courses, webinars, and seminars, they can help bridge the knowledge gap and foster a greater understanding of renewable energy technologies. This approach not only empowers current students but also engages working professionals, promoting a culture of continuous learning and innovation in the energy sector.

Such initiatives can significantly raise awareness about clean energy solutions, encourage sustainable practices, and potentially inspire new projects and collaborations in the community. ERC also conducted a short course. The detailed is given below: -



PUBLICATIONS

Publications Title	First Author	Publisher	Impact Factor	Weblink
Robust Data Driven Analysis for Electricity Theft Attack-Resilient Power Grid	Inam Ullah Khan Nadeem Javaid C. James Taylor	IEEE Transactions on Power Systems	10	https://ieeexplore.ieee.org/document/9743316
Optimal retrofitting of MCH-Toluene dehydrogenation system: Energy and technoeconomic analysis	Muhammad Haris Hamayun, Faisal Ahmed, Murid Hussain	Energy Conversion and Management	10.4	https://www.sciencedirect.com/science/article/abs/pii/S0196890423003953
Dual-Atomic-Site-Integrated photocatalysts for green energy synthesis	Palagiri Bhavani D. Praveen Kumar Jong Suk Yoo	Elsevier	15.1	https://www.sciencedirect.com/science/article/pii/S1385894723021605
Advances in synthesis of TiO2 nanoparticles and their application to biodiesel production: A review	Obaid Ali Qamar Farrukh Jamil Murid Hussain	Elsevier	15.1	https://www.sciencedirect.com/science/article/pii/S1385894723004655
Feasibility-to-applications of value-added products from biomass: Current trends, challenges, and prospects	Obaid Ali Qamar Farrukh Jamil Murid Hussain	Elsevier	15.1	https://www.sciencedirect.com/science/article/pii/S1385894722057205
Recent advances in wide solar spectrum active W18O49-based photocatalysts for energy and environmental applications	Palagiri Bhavani D. Praveen Kumar Murid Hussain	Taylor & Francis Online	10.9	https://www.tandfonline.com/doi/full/10.1080/01614940.2022.2038472
Cellulose-based adsorbent materials for water remediation: Harnessing their potential in heavy metals and dyes removal	Awais Ali Aslam Sadaf Ul Hassan, Muhammad Haris Saeed	Elsevier	11.1	https://www.sciencedirect.com/science/article/pii/S0959652623027130
A Physically Based Air Proportioning Methodology for Optimized Combustion in Gas-Fired Boilers Considering Both Heat Release and NOx Emissions	Guolin Xiao Xiaori Gao Wei Lu	Elsevier	11.2	https://doi.org/10.1016/j.apenergy.2023.121800

Total Publications: 62 Only High impact Factor publications are highlighted here

In 2023 there were many research projects initiated and completed in SDG 7 two of them are worth mentioning here, **“Design and Analysis of Dual Stator Generator for wind energy Conversion System”** and **“Design and fabrication of Generator for counter rotating wind turbine application”,** having the worth of **4.58 million PKR**