KALASALINGAM
ACADEMY OF RESEARCH AND EDUCATION
(DEEMED TO BE UNIVERSITY)
Under sec. 3 of UGC Act 1956. Accredited by NAAC with "A++" Grade

THE - Impact Rankings 2026

SDG 7: Affordable and Clean Energy

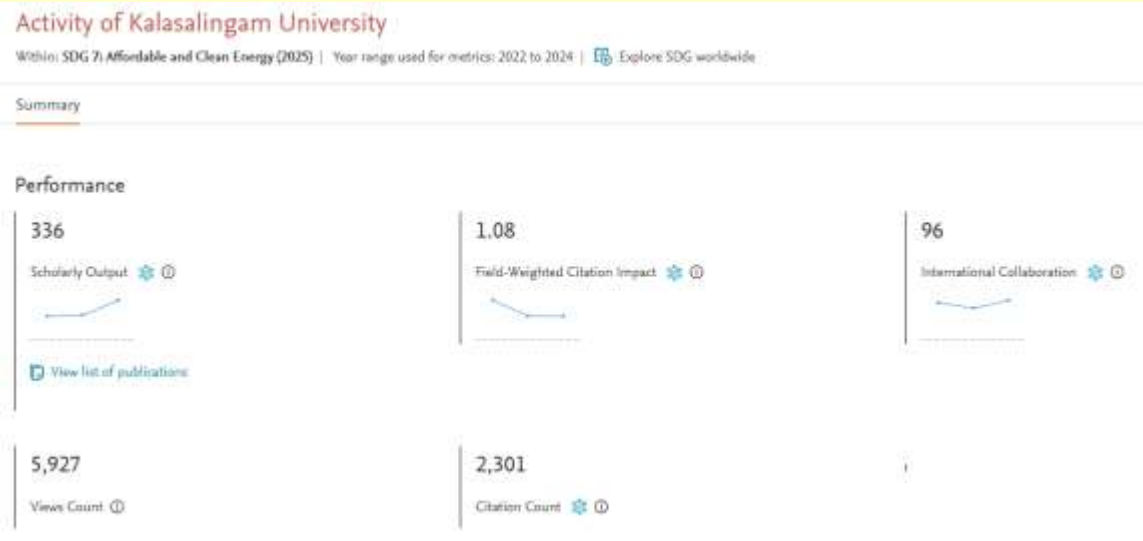
Annual Report – 2023 to 2024

SDG 7 focuses on ensuring universal access to affordable, reliable, sustainable, and modern energy. The goal emphasizes increasing the global share of renewable energy, improving energy efficiency, and strengthening international cooperation to promote clean-energy research and infrastructure. Achieving SDG 7 is essential for reducing carbon emissions, enhancing energy security, and enabling inclusive economic growth.

Affordable and clean energy is central to sustainable development because energy powers every aspect of modern life—industry, healthcare, education, mobility, and digital infrastructure. A transition to renewable sources such as solar, wind, hydro, and bioenergy reduces dependence on fossil fuels, mitigates climate change, and lowers pollution levels. Energy-efficient technologies and responsible consumption practices further support environmental protection and long-term resource sustainability.

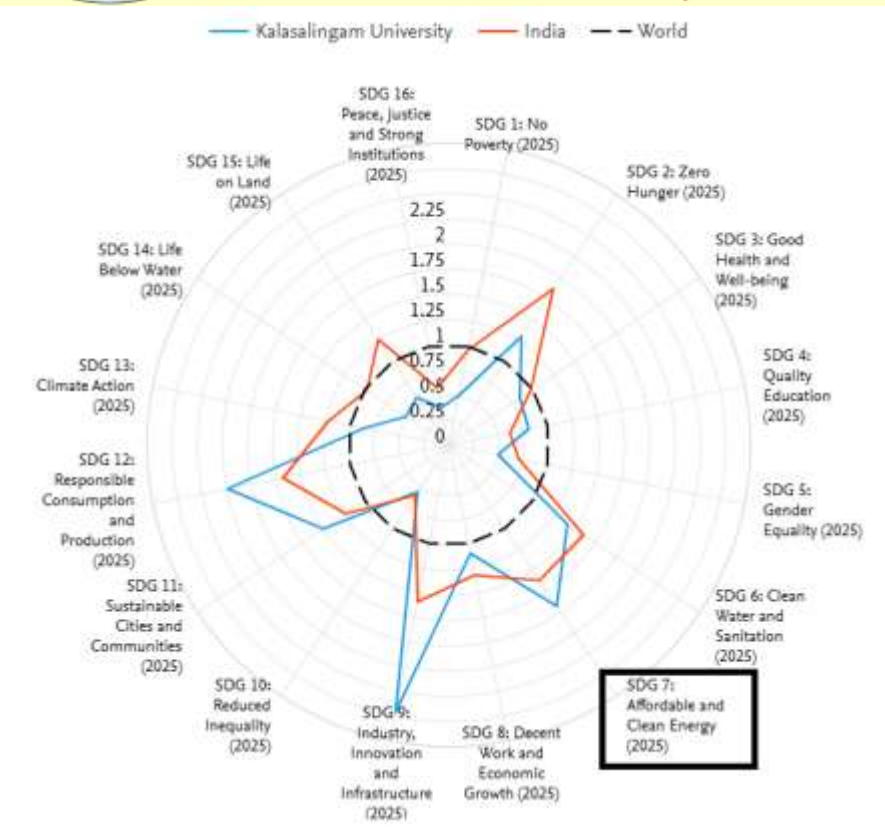
Educational institutions, industries, and governments play a pivotal role in advancing SDG 7 by adopting renewable energy systems, improving energy-efficient campus operations, promoting research in clean-energy technologies, and engaging communities in energy-awareness initiatives. By integrating innovative sustainable-energy solutions, institutions can reduce operational costs, decrease carbon footprint, and serve as models for green and resilient infrastructure.

SDG 7: Research Metrics (SciVal)



Relative Activity

The Relative Activity Index is defined as the share of an Institution's Scholarly Output in a SDG relative to the worldwide share of Scholarly Output in that same SDG.



1. Energy-Efficient Renovation and Building (SDG 7.2.1)

Kalasalingam Academy of Research and Education **(KARE) follows the National Building Code of India 2016 (NBC 2016)** for all its new constructions and renovations. The buildings are designed to use natural light and ventilation to save electricity. Open courtyards, skylights, and large windows ensure that sunlight reaches all areas, reducing the need for artificial lighting. Most buildings are **square-shaped with central courtyards** that enhance brightness and airflow. The university also orients its classrooms towards the **northeast to prevent overheating**. To further improve sustainability, KARE **uses recycled and eco-friendly materials** such as fly ash, marble dust, and sugarcane bagasse ash in construction. **Energy-efficient devices** like LED lights, BLDC fans, and solar water heaters are used across the campus. Additionally, motion sensors and daylight sensors are installed in lighting systems to avoid wastage. The institution meets nearly 45% of its total energy needs through rooftop solar panels. KARE also runs academic programs such as B.Arch, M.Arch (Habitat Design), and M.Tech in Renewable Energy Technologies to promote sustainable practices among students. Policies like the **Energy Policy, Maintenance Policy, and Sustainable Environment Policy** ensure the long-term upkeep of these green initiatives. The campus is also surrounded by green belts and plantations, maintaining a healthy and eco-friendly environment.

2. Upgrading Buildings to Higher Energy Efficiency (SDG 7.2.2)

KARE has implemented strong policies to ensure all buildings follow energy-efficient and carbon-reduction standards. Around 80% of the lighting systems on campus are LED-based and controlled by motion sensors. The university has upgraded traditional ceiling fans with energy-saving BLDC fans, reducing energy use from 75 watts to 25 watts per fan. CFL bulbs have been replaced with LED lights in classrooms, hostels, and outdoor areas to further enhance energy efficiency. Sensor-based automation is used throughout the campus—such as automatic fire alarms, daylight sensors, and movement-based lighting. Solar energy plays a vital role, with over **1,124 kWp of rooftop solar panels** generating around 45% of the university's total power. Rainwater harvesting systems are also installed to reuse water for irrigation and groundwater recharge. The use of **sustainable building materials** like fly ash and GGBS reduces carbon emissions and keeps indoor temperatures moderate. Architecturally, buildings are designed in square or rectangular shapes with open courtyards to maximize daylight and airflow. This reduces the need for artificial cooling and lighting. KARE's approach combines smart building design, renewable energy, and sustainable materials to promote a green campus. Their efforts reflect a commitment to cost savings, comfort, and long-term climate protection through reduced energy consumption and carbon footprint.

Open areas in the middle of the buildings to get more sunlight

Usage of Recycled materials for Construction

Usage of the renewable energy sources through solar energy panels

3. Carbon Reduction and Emission Reduction Process (SDG 7.2.3)

The institution follows several programs and initiatives to reduce its environmental impact and support sustainability, helping to reduce carbon emissions both directly and indirectly. These are some of the common programs followed by KARE:

1. Usage of the solar energy panels in the campus to produce some of the energy for the campus needed.
2. Effective implementation of Rainwater harvesting system
3. Explicit policy on Energy
4. Academic programs on Energy and Climate change
5. Banning Entry vehicles inside the campus and usage of dedicated pedestrian paths.
6. Usage of Energy Efficient appliances
7. Usage of E-Vehicles for campus shuttle services
8. Research Initiatives towards Energy and Climate Change
9. Awareness programmes on Energy and Climate change

KARE actively works toward carbon reduction through renewable energy, sustainable construction, and eco-friendly policies. The university's 1,124.22 kWp rooftop solar panels provide about 45% of total energy needs, reducing dependency on fossil fuels. Rainwater harvesting systems are established across the campus to recharge groundwater and minimize water waste. The university has multiple sustainability policies, including Energy Policy, E-Waste Policy, Maintenance Policy, Recycle Policy, and Water Conservation Policy.

To ensure the success of its energy efficiency initiative, the institute offers various programs on energy and climate change. Academic programs such as M.Tech in Renewable Energy and electives on climate change educate students about sustainability. To cut emissions, vehicle entry is restricted within the campus, and pedestrian and cycling paths are provided. Faculty and students use electric vehicles for transport. Awareness campaigns on energy saving and research initiatives on clean energy

help create a strong culture of environmental responsibility. KARE's faculty and students have published more than 150 research papers and filed 11 patents focusing on renewable energy and sustainable technology. Workshops and seminars on energy conservation and renewable systems are regularly organized. These combined measures not only reduce carbon emissions but also help KARE become a model green campus. Through education, innovation, and policy implementation, the university continues to contribute to India's clean energy transition and global sustainability goals.

Pedestrian-friendly pathways around the campus

EV Transport Service inside the campus

4. Plan to Reduce Energy Consumption (SDG 7.2.4)

KARE has created a structured plan to reduce energy consumption through renewable energy, smart systems, and eco-friendly designs.

1. The energy efficient appliances are installed whenever replacement is done in all areas like, LED lightings, Air conditioners, Energy efficient fans and Geysers.
2. Renewable energy sources like **Solar Plant and Biogas Plant** are used to meet 45% of the energy requirement.
3. The institution has also installed **152 solar street lights** throughout the campus
4. **Solar water heaters** are installed in the hostels and solar pumps are installed in the agriculture farms to tap solar energy.
5. Most new buildings are designed in a **square or rectangular shape, with open space left in the center**. This layout allows **natural sunlight** to enter the buildings, making the interiors brighter and more comfortable.
6. Movement sensed **automatic door opening-closing system** is installed in the administrative building to conserve energy.
7. **EV's and bicycles** are used for campus shuttle services.
8. The university follows the concept of Smart buildings equipped with **efficient ventilation systems** and surrounded by green belts and plantation for healthy environment around the buildings.

9. The Indoor environments of the buildings have sufficient intensity of light and well aeration to have the conducive environment for Teaching Learning purpose.
10. Smart buildings improve **the indoor air quality and lighting** in a significant wing and consumes lesser energy sources.
11. **Smart metering** improves monitoring and control of electricity usage and eliminates wastages.

The university uses solar and biogas plants to meet nearly half its energy needs. Buildings are equipped with LED lighting, efficient fans, and sensor-based systems that minimize wastage. Smart buildings are designed to allow maximum daylight, ventilation, and comfort while consuming less energy. The institution also promotes electric vehicles and bicycles for internal transportation, significantly reducing fuel usage. Smart metering systems monitor and control electricity use in real-time to prevent energy loss. KARE has adopted comprehensive policies such as the Energy Management Policy and Maintenance Policy to maintain safety, energy efficiency, and sustainability in all facilities. Preventive maintenance ensures that all systems and infrastructure perform efficiently with minimal energy waste. Together, these measures reflect KARE's dedication to climate-friendly operations and long-term sustainability. The university's smart building concept not only supports energy conservation but also provides a comfortable and eco-friendly environment for learning and research.

5. Energy Wastage Identification (SDG 7.2.5)

KARE conducts regular energy audits to identify areas of energy wastage and improve efficiency. These audits are carried out by accredited third-party agencies that analyze energy usage and recommend methods to save power without affecting quality or comfort. The audits help in pinpointing inefficiencies in lighting, cooling, and equipment usage. Based on audit findings, the university implements corrective actions such as upgrading to energy-efficient appliances, improving maintenance schedules, and installing smart monitoring systems. ISO audits further ensure compliance with national standards for energy and environmental management. The energy audit reports available on the university website show transparency and accountability in sustainability practices. This proactive approach helps KARE continuously improve energy efficiency and move closer to its goal of a carbon-neutral campus. Overall, energy auditing is a key part of KARE's sustainability framework. It ensures that every watt of electricity is used responsibly and that the university remains a leader in promoting green and efficient energy use.

6. Disinvestment Policy (SDG 7.2.6)

Kalasalingam Academy of Research and Education (KARE) has adopted a Disinvestment Policy (DP 2023) to promote sustainable energy independence and reduce dependency on non-renewable sources. The main goal of this policy is to move towards self-reliance in power generation through renewable sources like solar, wind, and biomass energy. Under this plan, the university aims to install a 2 MW solar power system by 2030 and increase its solar capacity by 50% each year. The policy also focuses on developing a campus waste-based biomass power generation system by 2028 to **achieve zero solid waste disposal**. Additionally, KARE plans to establish a small wind power plant by 2026 and double

its wind generation capacity every three years. Another important target is to ensure that all vehicles operating inside the campus—such as buses, cars, and bikes—will be battery electric or fuel-cell-powered by 2030. The implementation of this structured framework demonstrates **KARE's proactive approach to sustainable energy management**. It reflects the university's vision of becoming a model institution for clean energy adoption in higher education. By **promoting renewable energy and green transportation**, the Disinvestment Policy helps the university significantly reduce its carbon footprint while contributing to India's broader environmental and energy goals.

SDG 7.3.1. Energy usage per sqm (July 2023- June 2024)

Total energy consumption (kWh) = 8646382

Total energy consumption (Gigajoules) = 31126.97

Building area of university Floor space(sqm) = 313053

Energy consumption per sqm = (31126.97 / 313053)

= 0.099 GJ

7. Local Community Outreach for Energy Efficiency (SDG 7.4.1)

KARE actively engages with the **local community through awareness programmes** and training events that emphasize the importance of energy efficiency and clean energy. The Department of Electrical and Electronics Engineering (EEE) celebrated **"Energy Conservation Week"** in December 2023, organizing seminars, workshops, and competitions to promote sustainable energy use among students and residents. Various schools within KARE, including the School of Electronics, Electrical, and Biomedical Technology and the School of Advanced Sciences, have conducted national-level workshops. Notable among them are the "Digital Control of Power Electronic Converters for Renewable Energy Systems" (2024) and "Energy Resources for Environmental Remediation" (2023).

These workshops focused on skill development, research innovation, and spreading awareness about renewable energy technologies. Faculty members and experts from reputed institutions like NIT Tiruchirapalli and Anna University were invited to share their expertise with participants. The sessions helped students, researchers, and local participants understand how energy-efficient systems and clean technologies can improve daily life while reducing pollution. Through such initiatives, KARE extends its educational mission beyond the campus by fostering community learning on sustainability and energy conservation. The institution's efforts not only support SDG 7 (Affordable and Clean Energy) but also encourage the community to adopt cleaner, greener lifestyles.

8. 100% Renewable Energy Pledge (SDG 7.4.2)

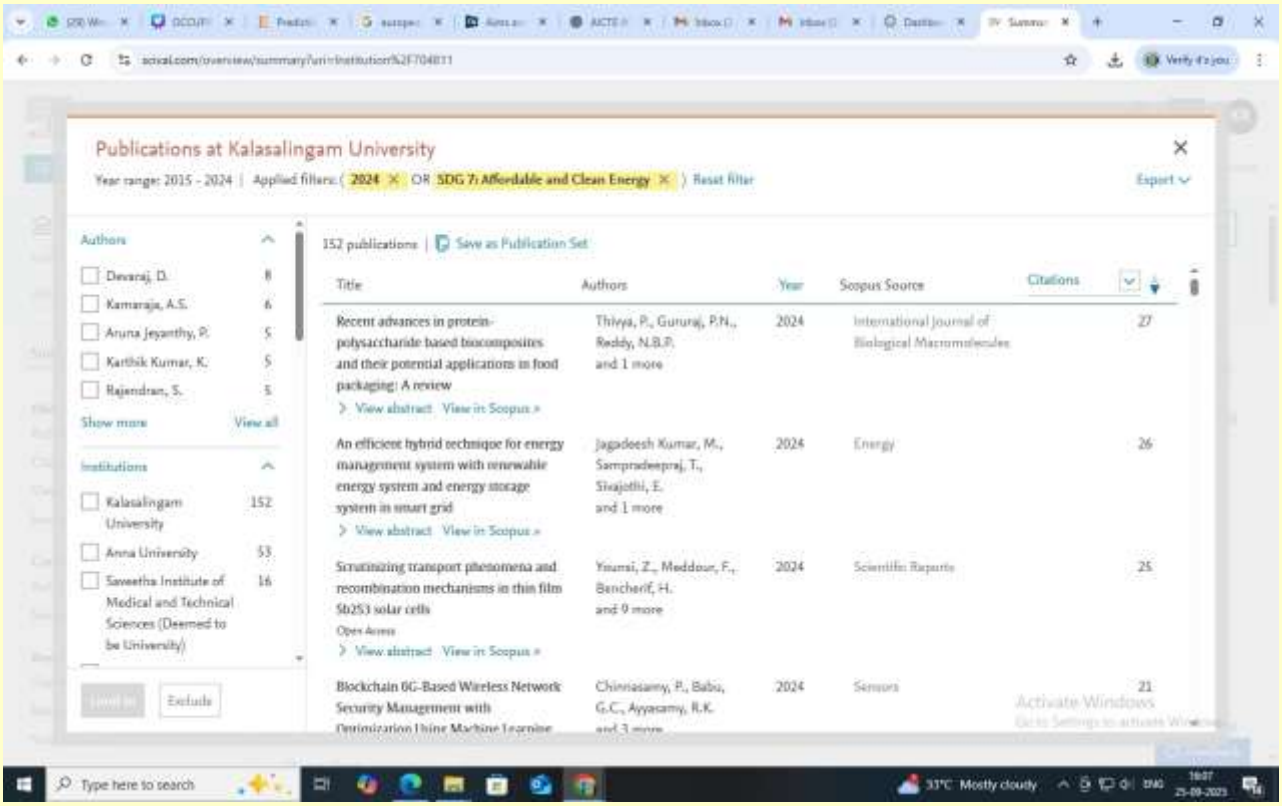
To ensure a 100% renewable energy commitment, the university has implemented the following measures:

1. Powered the campus buildings **with renewable energy sources**.
2. Invested in on-campus renewable energy projects, like solar panels and wind turbines, to **reduce fossil fuel use** and greenhouse gas emissions.
3. Developed a plan to reach **carbon neutrality** by a target year, focusing on energy efficiency, renewable energy, and carbon offsetting.
4. Followed green building standards, all new buildings and renovations **are constructed under NBC 2016 (National Building Code of India - 2016) guidelines**.
5. Integrated sustainability and **climate change topics into various courses**, encouraging students to address environmental challenges.
6. Funded research on climate change, renewable energy, and sustainability to foster innovation.
7. Established waste reduction and **recycling programs to minimize landfill waste** and maximize recycling.
8. Prioritized local and **sustainable purchases**, supporting eco-friendly products and fair trade.
9. Collaborated with the local community on sustainability projects and knowledge-sharing.
10. Provided resources and grants for student-led sustainability projects, empowering students to apply their knowledge in practical ways.

KARE has pledged to achieve 100% renewable energy use and is already generating over 45% of its total electricity from solar power. In 2023–24 alone, the university produced 3.91 million kWh of renewable energy out of a total consumption of 8.64 million kWh. This progress reflects a strong commitment toward carbon neutrality. To reach the 100% renewable goal, KARE has powered its campus through on-site solar installations and initiated plans for wind and biomass energy projects. The institution also adheres to green building standards under the National Building Code (NBC 2016), ensuring energy-efficient construction and renovations. Sustainability and climate change topics are embedded across various academic programs to educate students on environmental responsibility. The university funds research on renewable energy, climate change, and waste recycling to encourage innovation. Waste reduction, recycling programs, and the promotion of local eco-friendly products are part of the broader sustainability plan. KARE collaborates with the local community on clean energy projects and supports student-led initiatives through grants and mentorship. These combined actions highlight the university's comprehensive approach to sustainability—blending education, innovation, policy, and practical projects to create a model of renewable energy transformation in higher education.

9. Energy Efficiency Services for Industry (SDG 7.4.3)

KARE supports industries through expert guidance, research collaboration, and technology transfer in energy efficiency and renewable energy. University professors and students engage in applied research projects that directly benefit the industrial sector. Through platforms provided by the Ministry of Higher Education, KARE shares its research outcomes with companies to help them adopt energy-saving technologies. Faculty and students have developed innovative energy-efficient technologies, resulting in several patents, such as the Portable Climate Controller for Mushroom Cultivation, Pyrolysis-Based Plastic Waste to Energy System, and Automated Dosa Preparation Machine. These inventions demonstrate practical solutions for reducing energy consumption and promoting sustainability in industries. KARE's research also extends to hybrid renewable systems, solar energy conversion, and advanced energy storage technologies. Numerous research papers published in reputed journals strengthen the university's contribution to clean energy innovation. By integrating research, education, and community engagement, KARE acts as a bridge between academia and industry. The institution's initiatives help industries adopt cost-effective and sustainable energy practices, aligning with the global transition toward green growth and low-carbon technologies. Through its energy efficiency services, KARE not only supports industrial development but also contributes significantly to India's climate action goals.



10. Policy Development for Clean Energy Technology (SDG 7.4.4)

KARE plays a vital role in supporting government initiatives for clean and energy-efficient technologies through policy development, research, and advocacy. The university has established comprehensive sustainability policies, including Energy Policy, Sustainable Environment Policy, E-Waste Policy, Recycle Policy, Maintenance Policy, and Water Conservation Policy. These policies guide all campus operations to ensure efficiency, safety, and environmental responsibility. KARE's faculty members contribute to national discussions by publishing research articles that propose innovative solutions for energy conservation and renewable energy adoption. Studies such as "Hybrid Multi-Objective Optimization for Renewable Energy Sources" and "Smart Energy Management for University Campuses" highlight the university's leadership in sustainability research. Through active participation in conferences and publications, KARE experts share insights with policymakers, helping shape regional and national clean energy frameworks. The university also encourages multidisciplinary collaboration across departments to develop technologies that can be scaled for public and industrial use. By aligning its research and academic activities with government priorities, KARE strengthens its role as a knowledge hub for sustainable energy development. These contributions help promote the wider adoption of renewable energy technologies and support India's transition to a low-carbon economy.

11. Assistance to Low-Carbon Innovation (SDG 7.4.5)

KARE supports low-carbon innovation through its Kalasalingam Technology Business Incubator (KTBI), established in 2015 with funding from the Department of Science and Technology (DST). KTBI nurtures start-ups and student innovators in areas related to renewable energy and green technologies. It has supported enterprises like Optimum Energy Solar Systems and SRP Clean Energy Pvt. Ltd., which work on solar and sustainable energy solutions. The incubator offers mentoring, funding, and technical support to help innovators transform ideas into viable products. Recently, KTBI was recognized by the Ministry of Micro, Small, and Medium Enterprises (MSME) for its efforts to promote entrepreneurship. KARE's faculty and students also contribute to low-carbon innovation through patents and funded projects. Notable patents include a Plastic Waste-to-Energy Conversion System and Energy-Efficient Heating Systems. Additionally, projects funded by TNSCST focus on solar-based composters and electric earth augers powered by renewable energy. By combining education, research, and incubation, KARE creates a **complete ecosystem that promotes sustainability-focused entrepreneurship**. This initiative empowers students, supports green start-ups, and helps the local economy transition towards low-carbon development. KARE's consistent efforts demonstrate its vision to make clean energy innovation accessible, practical, and impactful.