

SDG-7 Report

7 Affordable and Clean Energy

Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for all



Campus Address: Dontanapally, Shankarapalli Road,
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ICFAI Foundation for Higher Education

Report on

SDG 7 Affordable and Clean Energy

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Preamble

Sustainability encompasses a paradigm shift in thought, behaviour, and operation that strives to fulfil the requirements of the current generation while safeguarding the capacity of resources to sustain future generations. The following are some essential aspects:

Social and Environmental Responsibility: Preserving natural resources, minimizing environmental damage, and minimizing carbon footprints are the primary objectives of sustainable practices.

Social equity: It is the practice of ensuring that all communities and individuals are treated fairly and equitably, and that decision-making processes take social justice and inclusiveness into account.

Economic viability: Sustainability aims to establish long-lasting economic systems that strike a balance between profitability and the adverse social and environmental consequences.

Innovation and adaptability: The adoption of innovation and adaptability is of the utmost importance in order to discover novel resolutions to preexisting challenges and effectively respond to evolving conditions.

Holistic approach: A holistic approach to decision-making entails taking into account the interdependencies among social, environmental, and economic factors.

Education and awareness: Advocating for education and raising awareness regarding sustainability contributes to the development of a responsible society and facilitates constructive transformation.

The university believes that through the implementation of sustainable practices across multiple domains, including resource management, policy formulation, business operations, and lifestyle selection, it is possible to strive for a more harmonious and balanced world that benefits both current and future generations.

IFHE believes and implements in the adage energy saved is energy produced.

About IFHE Hyderabad

The ICFAI Foundation for Higher Education (IFHE), Hyderabad, is a deemed-to-be university established under Section 3 of the UGC Act, 1956. Spread over a 91-acre, lush green campus, IFHE is one of India's largest multidisciplinary universities, with integrated programs across management (IBS Hyderabad—AACSB and SAQS accredited), science & technology (IcfaiTech), law (FoL), architecture (SArch), and the social sciences (ISoSS). The institution is widely recognized for its student-centric, research-driven approach, robust international collaborations, and direct engagement with social responsibility and sustainability. Emphasizing "Learning for Leadership," IFHE has secured A++ NAAC accreditation and is consistently ranked among India's top private universities for management, law, and engineering. The University is granted Category I autonomy by the University Grants Commission.

The university campus is equipped with state-of-the-art infrastructure—including advanced classrooms, laboratories, digital learning hubs, residential hostels, sports facilities, and a strong network of faculty drawn from academic and industry backgrounds. With over 10,500 students and a strong alumni base of over 22,500, IFHE's teaching, research, and outreach focus on ethics, practical skills, critical thinking, problem-solving, and social impact—directly aligned with the UN SDGs, especially in water, energy, health, innovation, justice, and partnerships.



Energy Consumption Measurement and Management

The energy management system at IFHE Hyderabad is designed to ensure accuracy, transparency, and continuous improvement in consumption patterns across campus. Every major building—whether academic, residential, or service-oriented—is equipped with individual digital and smart sub-meters wired to a centralized monitoring dashboard. These meters' log electricity use in real time and feed historical data into a university-wide energy management platform, enabling both snapshot and long-term analysis.

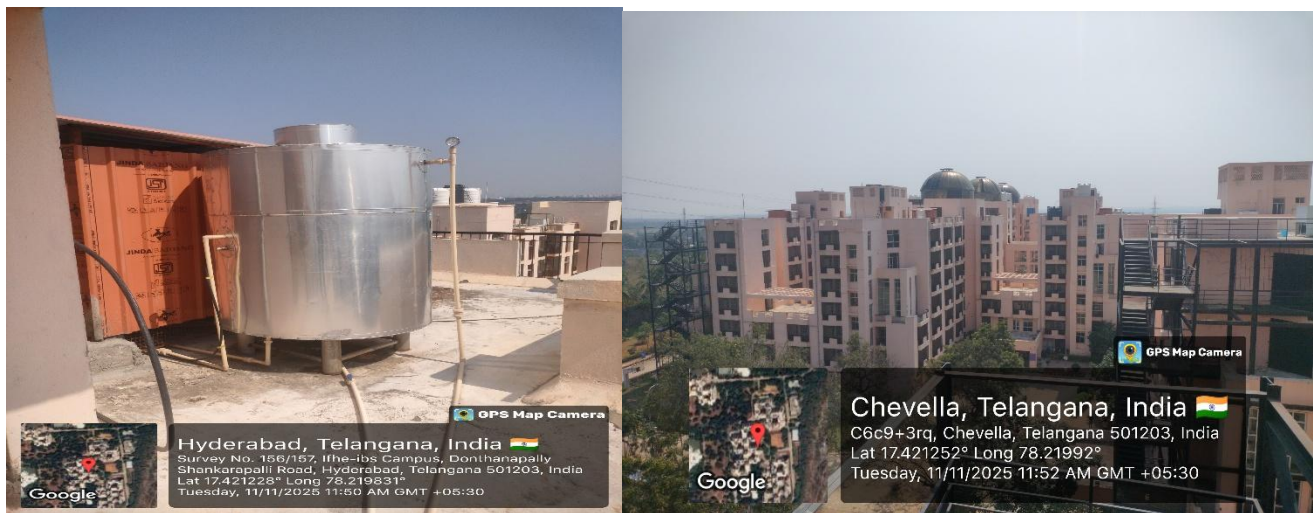


Monthly and quarterly audits are performed by a dedicated engineering team, who cross-validate readings and investigate variance trends against historical benchmarks. Consumption profiles are generated for each building and end-use category, distinguishing lighting, cooling, IT loads, and process utility. This enables the campus management to identify high-usage zones and prioritize retrofits, occupancy scheduling changes, or behavioral awareness campaigns to accelerate reductions.

Statistical analytics from this system inform annual reports submitted as part of institutional and external accreditation processes. Per capita campus energy use is benchmarked against national best practices for similar institutions, and efficiency targets are revised every year in response to performance and technology trends. Audit outcomes are presented to campus leadership, alongside recommendations for new investment in optimization, ensuring that energy management is never static but evolves with need, growth, and strategic direction.

Solar and Renewable Energy Generation

A flagship achievement for IFHE Hyderabad is its large-scale investment in on-site solar energy generation. With a combined rated capacity of 1,200 kWp, distributed solar PV arrays occupy rooftops of key buildings, from main lecture halls to hostels and administrative blocks. Energy is generated during all daylight hours and routed for direct consumption on site, with surplus power prioritized for highest usage blocks and storage, if applicable.



On an annualized basis, the solar system produces more than 1.6 million kWh of clean energy, meeting up to 40% of the campus's total electricity demand on the sunniest days. Solar generation is metered and monitored through dedicated inverters that provide live diagnostics, performance histories, and fault alerts to the facilities management team. To maximize impact, load balancing is managed to ensure renewable energy is always drawn before tapping grid supply.

This capacity allows significant reductions in the university's carbon footprint; comparative modeling shows an annual avoidance of more than 1,400 metric tons of CO₂ emissions relative to grid-only consumption. Solar power also directly reduces operational budgets, freeing funds for reinvestment in additional technology upgrades, student programming, and research.



Grid Integration and Backup Systems

IFHE's energy infrastructure is designed for seamless integration of multiple power sources, prioritizing both reliability of supply and maximization of renewables use. The primary backbone for electricity is a dedicated connection to the Telangana state grid, sized for full campus occupancy and equipped with automatic voltage regulation for sensitive equipment.

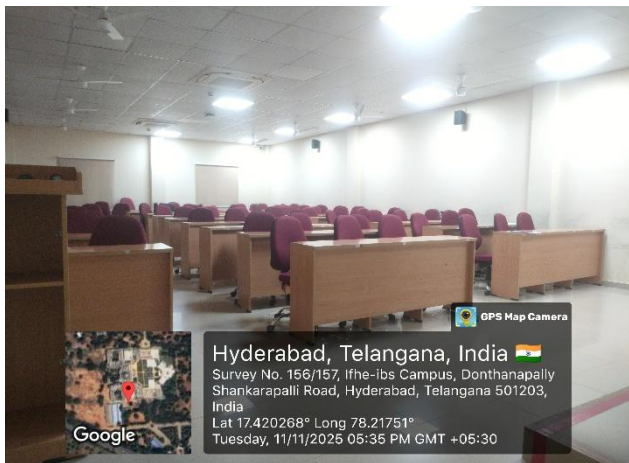
Solar PV arrays are hardwired into the grid interface using grid-tied inverters and intelligent distribution panels. This setup ensures that solar generation is utilized in real time, with automated protocols to switch seamlessly to the state grid during night or cloudy periods. In the rare case of grid failure, a series of diesel generator sets activate via automatic changeover, providing uninterrupted energy to critical facilities—including IT, laboratories, medical, and safety systems.

<https://ifheindia.org/qs/sustainable-procurement-and-purchase-policy>

This layered system is monitored in real time by a campus SCADA-like dashboard, which provides operations staff with live updates on supply status, load factor, solar output, backup runtime, and alerts for downtime events. Monthly drills and maintenance checks ensure backup systems are ready for emergency deployment and kept in optimal running order, minimizing pollution and run time through periodic load testing and “green” operational strategies.

Energy Efficiency Projects

IFHE Hyderabad has made comprehensive investments in energy efficiency at multiple levels of its infrastructure and operations. Over the past five years, the university has replaced all conventional lighting systems in academic blocks, residential halls, and public areas with energy-efficient LED fixtures. This campus-wide LED retrofit was conducted following a detailed energy audit, which analyzed the illumination requirements, existing consumption patterns, and return on investment for each zone. The result is a campus where nearly every lighting point—from classrooms to pathways and auditoriums—is optimized for minimal energy use while maintaining or improving brightness levels.



In addition to lighting, the university has upgraded HVAC (heating, ventilation, and air conditioning) systems with variable frequency drives (VFDs) and smart control modules. These upgrades allow for the fine-tuning of energy input in accordance with actual use and occupancy, leading to significant reductions in both peak and base energy loads. Similarly, all elevators and major water pumping stations are now equipped with energy-efficient motors and VFD controls, further curbing unnecessary power draw.



Energy Efficient Fans



Sensor-based Feeder for Time Control for Lights

<https://ifheindia.org/assets/pdf/QS/Green-Audit-Report.pdf>

A key area of innovation has been the integration of sensor-based automatic controls. Motion and occupancy sensors have been installed in classrooms, corridors, and washrooms, ensuring that lighting and ventilation operate only when spaces are actually in use. Timers and programmable switches govern external landscaping and street lighting, turning systems on and off based on daylight availability and programmed schedules. These controls, combined with campus-wide awareness campaigns and operational protocols, help to foster an energy-conscious culture where both staff and students are active contributors to efficiency goals.

Annual reporting quantifies the reductions achieved from these projects. Each intervention's impact is tracked by comparing pre- and post-retrofit consumption, enabling identification of best practices and further opportunities for improvement. This results-driven approach—backed by third-party green audits and national benchmarks—keeps IFHE continually moving towards higher efficiency, reduced costs, and a lower carbon footprint.

<https://ifheindia.org/times-higher-education>

Hot Water from Solar Heaters

Hot water generation at IFHE Hyderabad is a robust example of solar thermal energy deployment at institutional scale. The campus has installed over a dozen large-capacity solar water heating systems on the roofs of hostels, canteens, and kitchen blocks. These systems use flat-plate collectors and high-efficiency vacuum tubes to capture and store solar heat, providing sufficient hot water throughout the year for both residential and culinary uses.

Each hostel is equipped with a solar thermal plant with a minimum rated capacity of 1,000 liters per day, sized based on occupancy, local climate analysis, and usage modeling. System performance is monitored daily by maintenance staff, who check collector cleanliness, tank temperature, and backup integration. Backup electric or gas geysers remain on standby but are rarely needed thanks to the reliability and scale of the solar plants.

By switching to solar for the bulk of hot water needs, the university has dramatically reduced both grid electricity use and LPG consumption. Monthly and annual savings are logged by comparing meter readings and supplier invoices, with results shared in campus environmental reports. The success of these installations has led to consideration of additional solar water heating expansions for new residential blocks and athletic facilities. In workshops and awareness talks, IFHE regularly showcases its solar thermal achievements as a model for other institutions in the region.

Appliance and Equipment Optimization

Energy efficiency at IFHE is not limited to building systems alone—it also extends to every significant appliance and piece of equipment across the campus. All air conditioners, computer servers, refrigerators, and laboratory devices are required to meet at least four-star Bureau of Energy Efficiency (BEE) ratings or international equivalents. The transition to efficient appliances is managed as a rolling upgrade program, where the oldest and most energy-intensive devices are retired or replaced first.



Biogas Plant on the Campus

In information technology suites, server rooms and central processing labs are fitted with advanced cooling and heat management systems. Automatic power management settings are enforced on all student-access and back-office desktops, with usage tracked via software to reduce idle time. In science and engineering labs, major equipment—such as centrifuges, ovens, and spectrometers—are maintained to rigorous protocols for energy consumption, calibration, and safety.

Procurement policies at IFHE now mandate the purchase of only energy-efficient models for all new devices. Periodic reviews (at least twice a year) involve inventory inspections, performance logging, and spot checks for compliance. Outcomes and insights from these reviews are documented in the university's sustainability progress reports and shape ongoing efforts to create a “low-energy campus” mindset among all stakeholders.

The university further strengthens this focus through regular training for staff who operate or maintain high-usage machines. By empowering all employees and users with energy-saving know-how, IFHE ensures their appliance and equipment optimization strategies are embedded at every operational level, maximizing both savings and sustainability benefits.

ICMR Case Studies (2023–2024)

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
1	2023–2024	Maria Klawe – Promoting Gender Diversity and Inclusion in STEM Education at Harvey Mudd College	Anirudhan, Anil; Dutta, Sanjib	SDG 5	Link
2	2023–2024	PepsiCo's Sustainability Strategy to Build a Positive Value Chain	Kumari, Shwetha; Nair, Jitesh	SDG 13; SDG 17	Link
3	2023–2024	SAP's Innovation Approach: Boost Startups and Intrapreneurship	Prasad, Namratha V	SDG 9	Link

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
4	2023–2024	Starling Bank’s Anne Boden – The Founder and CEO of a ‘Profitable’ Challenger Bank in the UK	Anirudhan, Anil; Dutta, Sanjib	SDG 5	Link
5	2023–2024	Hilfr’s Labor Model: A First for Gig Workers of the Platform Economy	Nair, Jitesh; Pasala, Balaswamy	SDG 8	Link
6	2023–2024	Psudo – Setting New Standards for Sneaker Manufacturing	Zafar, Faria; Perepu, Indu	SDG 12; SDG 13	Link
7	2023–2024	SHEIN: Ethical Cost of Ultra-Fast Fashion	Zafar, Faria; Perepu, Indu	SDG 12	Link
8	2023–2024	Shubham Housing Development Finance – Social Impact through Financial Inclusion	Kumar, KBS; Perepu, Indu	SDG 10	Link
9	2023–2024	Back Market and the Global E-Waste Crisis	Qumer, Syeda Maseeha	SDG 12	Link
10	2023–2024	Hemalatha Annamalai: Woman Pioneer of India’s Electric Vehicle Revolution	Koti, Vinod Babu; Prasad, Namratha V	SDG 5	Link
11	2023–2024	IKEA Builds Smaller Format Stores – Comes Closer to Customers	Anirudhan, Anil; Dutta, Sanjib	SDG 9	Link
12	2023–2024	You Mawo: Using 3D Printing Technology to Introduce a New Eyewear Concept	Koti, Vinod Babu; Prasad, Namratha V	SDG 9	Link
13	2023–2024	Climeworks – Empowering People and Companies to Fight Global Warming with DAC Technology	Anirudhan, Anil; Dutta, Sanjib	SDG 13	Link
14	2023–2024	Nepra’s “Let’s Recycle” Initiative – Tackling India’s Solid Waste Management Problem	Anirudhan, Anil; Dutta, Sanjib	SDG 12	Link
15	2023–2024	Cotopaxi: Creating Sustainable Social Impact	Kumari, Shwetha; Nair, Jitesh	SDG 10; SDG 12	Link

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
16	2023–2024	Ecokaari: Up-Cycling Waste Plastics into Fabrics	Kumari, Shwetha; Nair, Jitesh	SDG 9; SDG 12	Link
17	2023–2024	Marut Drones – Using Technology to Solve Social Issues	Zafar, Faria; Perepu, Indu	SDG 9	Link
18	2023–2024	Nestlé’s Diversification through Palforzia: The Setback and Lessons	Koti, Vinod Babu; Prasad, Namratha V	SDG 3	Link
19	2023–2024	Science Based Targets Initiative (SBTi) – A Scientific Approach to Define and Achieve the Carbon Emissions Reduction Targets	Vijaya, Lakshmi S; Nagendra Kumar, MV	SDG 13	Link
20	2023–2024	Unilever’s Sustainable Sourcing	Samantarai, Munmun; Dutta, Sanjib	SDG 12; SDG 13	Link
21	2023–2024	VAAST Bikes: Building a Niche Brand through Sustainable Products and Processes	Nair, Jitesh; Pasala, Balaswamy	SDG 9; SDG 12; SDG 13	Link
22	2023–2024	Adidas: Sustainability Bond	Nagendra Kumar, MV; Perepu, Indu	SDG 9	Link
23	2023–2024	Enbridge: A Diversity, Equity & Inclusion (DEI) Leader in the Energy Industry	Nair, Jitesh; Pasala, Balaswamy	SDG 8; SDG 10	Link
24	2023–2024	Etsy’s Growth Strategy in India: Empowering Artisans	Koti, Vinod Babu; Prasad, Namratha V	SDG 8	Link
25	2023–2024	H&M – Can the Fast Fashion Giant Transition into a Green Future?	Kumar, KBS; Perepu, Indu	SDG 12; SDG 13	Link
26	2023–2024	LEAD’s Integrated EdTech Solution: Combining Technology, Curriculum and Pedagogy to Transform Traditional Education	Nair, Jitesh; Pasala, Balaswamy	SDG 4; SDG 9; SDG 10	Link

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
27	2023–2024	Pesky Fish’s ‘Port to Plate’ Technology Platform: Reinventing the Seafood Supply Chain	Kumar, KBS; Perepu, Indu	SDG 8	Link
28	2023–2024	Blueland: An Innovation-Led Solution Addressing Global Climate Challenges	Kumar, KBS; Perepu, Indu	SDG 13	Link
29	2023–2024	PhysicsWallah – A Disrupter in the Indian EdTech Industry	Zafar, Faria; Perepu, Indu	SDG 4	Link
30	2023–2024	Pure Harvest Smart Farms – A Technology-Enabled Agribusiness Startup Addressing the Food Security Challenges in the Middle East	Zafar, Faria; Perepu, Indu	SDG 2; SDG 9	Link
31	2023–2024	Zipline: Navigating the Rwanda Skies to Make Medical Supplies Accessible to Millions on Land	Samantarai, Munmun; Dutta, Sanjib	SDG 3	Link
32	2023–2024	Danone: Realigning Sustainability for Profitability?	Kumari, Shwetha; Nair, Jitesh	SDG 12	Link
33	2023–2024	India’s Moon Mission Chandrayaan-3: From Failure to Success	Harish, R; Dutta, Sanjib	SDG 9	Link

Publications Supporting SDG 7 (2024)

Article – Open Access: Do Green Innovation and Governance Limit CO₂ Emissions: Evidence from Twelve Polluting Countries with Panel Data Decision Tree Model

Authors: Dash, A.K.; Panda, S.P.; Sahu, P.K.; Jóźwik, B.

Source: Discover Sustainability, 2024.

Article – Open Access: Efficient Routing in MANETs by Optimizing Packet Loss

Authors: Nizamuddin, M.K.; Mohammad, A.A.K.; Hashmi, S.S.; HariKrishna, D.; Marouthu, A.

Source: Ingenierie Des Systemes D Information, 2024.

Book Chapter: Future of Energy Transition Relies on Prosumer-Based Smart Grid-Integrated Renewable Distributed Generation System

Authors: Kumar, M.; Singh Patel, B.; Samuel, C.

Source: Advanced Geospatial Practices in Natural Environment Resource Management, 2024.

Article: The Clean Energy–Ecology Interrelatedness: Evidence from the S&P Dow Jones Indices

Authors: Swamy, V.; Tiwari, A.K.

Source: Journal of Energy and Development, 2024.

Article: Panacea for Exorbitant Trends of Air Pollutants: Creative Destruction Model of Electric Vehicles

Authors: Sri, P.P.; Prasuna, V.N.P.; Nilugal, S.M.; Murugesan, R.; Prasad, K.P.

Source: Indian Journal of Environmental Protection, 2024.

Book Chapter: Design and Implementation of IoT-Based Advanced Energy Management System for Smart Factory

Authors: Jayanthi, S.; Kumar, N.S.; Zafar Ali Khan, N.Z.A.; R., S.; Pachipala, Y.

Source: Cyber Physical Energy Systems, 2024.

Conference Paper: Forecasting Day-Ahead Spot Electricity Prices

Author: Girish, G.P.

Source: Lecture Notes in Networks and Systems, 2024.

Conference Paper: Leveraging AI on Images Captured Through Drones for Solar Panel Fault Identification

Authors: Kundu, A.; Rohit, K.; Girish, G.P.; Kundu, S.G.

Source: Lecture Notes in Networks and Systems, 2024.

Conference Paper: Designing an Energy-Efficient Flip-Flop with MTCMOS Using Muller C-Element Technique

Authors: Ramesh, N.V.; Vidya, K.S.; Chandana, S.; Jogi, S.; Seetharamulu, B.

Source: 2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT 2024).

Conference Paper: Hard Fusion Techniques for Energy-Efficient CSS Over Fading Channels in Cognitive Wireless Sensor Network

Authors: Sharma, G.S.; Nayyar, A.; Vyas, S.; Kumari, R.

Source: Lecture Notes in Electrical Engineering, 2024.

Article: The Linkage Between FDI and Energy Use in the Case of Emerging Market Economies

Authors: Rath, B.N.; Dash, A.K.; Mishra, A.K.

Source: Environment Development and Sustainability, 2024.

Book Chapter: Financing the Transformation to Net Zero Goals: IREDA Investment for Sustainable Initiatives

Authors: Nayak, D.V.; Arun Kumar, A.; Suryadevara, R.; Khan, S.

Source: Approaches to Global Sustainability Markets and Governance, 2024.

Conference Paper: AI Applications of Clean Energy Innovations

Authors: Sri, P.P.; Prasuna, V.N.P.

Source: Proceedings of CONECCT 2024 – 10th IEEE International Conference on Electronics Computing and Communication Technologies, 2024.

Conference Paper: Low Power Approximate Ternary Multiplier Architecture for Image Processing Applications

Authors: Reddy, C.R.K.; Induluru, G.; Shreya, K.; Rani, K.N.; Kumar, U.A.

Source: 2024 5th International Conference for Emerging Technology (INCET 2024).

Conference Paper: Energy-Efficient Ternary Multiplier

Authors: Agrawal, R.; Abhijith, N.S.; Anil Kumar, U.; Veeramachaneni, S.; Ahmed, S.E.

Source: 2024 IEEE 6th International Conference on AI Circuits and Systems (AICAS 2024).

Conference Paper: Deep Learning for Energy Demand Forecasting in Electric Vehicle Charging Stations

Authors: Hanumanthakari, S.; Anita, S.; Christiana, B.V.; Kannan, S.; Nandha Kumar, S.K.

Source: Proceedings of the 2024 5th International Conference on Mobile Computing and Sustainable Informatics (ICMCSI 2024).

Institutional Practices Complementing Research

In addition to scholarly research, IFHE implements on-campus sustainability initiatives that reinforce SDG 7 principles:

- Solar installations and biogas plants reduce grid dependency and fossil fuel use.
- LED lighting systems, sensor controls, and energy audits enhance operational efficiency.
- Student-led projects on smart energy monitoring and renewable applications support innovation.
- Workshops and seminars raise awareness about energy conservation among faculty, students, and local communities.

These verifiable actions ensure that IFHE’s institutional practices mirror its academic and research commitments under SDG 7.

Integration into Teaching and Learning

The 2024 clean energy research findings are incorporated into teaching modules across engineering, management, and economics programs.

Students study energy economics, IoT-enabled smart grid design, and renewable finance using real case examples such as Financing the Transformation to Net Zero Goals and IoT-Based Energy Management Systems. Project-based learning encourages practical applications of renewable technologies and policy frameworks, ensuring student engagement in sustainability-driven innovation.

Alignment with SDG 7 Targets (2024)

UN Target	IFHE’s 2024 Activities / Publications
7.2 – Increase share of renewable energy	Future of Energy Transition Relies on Smart Grids; campus solar and biogas projects.
7.3 – Improve energy efficiency	Smart factory systems, AI-driven forecasting, and energy-efficient circuit designs.

7.A – Enhance cooperation for clean energy research	Do Green Innovation and Governance Limit CO ₂ Emissions and related open-access studies.
7.B – Expand clean energy infrastructure and technology	Financing the Transformation to Net Zero Goals (IREDA investment study).

Publications:

1. Assessment of solar thermal monitoring of heat pump by using zeolite, silica gel, and alumina nanofluid

Authors: Jayaseelan, G. Antony Casmir; Surenderpaul, A.; Selvam, T. Thandial; Anderson, A.; Senthilkumar, A.; Malladi, Avinash; Venkatesh, R.; Aneesh, V. N.; Saravanan, R.

Source: Clean Technologies and Environmental Policy, 2023, Vol 25(9), pp. 3075–3083.

DOI: 10.1007/s10098-023-02558-4

Abstract: Modern industries utilize solar thermal energy in heat pump applications due to its enhanced performance and improved plant efficiency. The investigation presents the effective utilization of solar thermal energy in heat pump applications using different fluid pairs like zeolite/water, silica gel/water, and alumina nanofluid/water. The effect of fluid pairs on heat transfer rate, thermal adsorption and mass loss of heat pump is monitored by STA Netzsch 409 differential thermogravimetric apparatus with a temperature range of 15–200°C. The heat transformation of a heat pump is estimated by various water absorbed amounts. The result revealed that the alumina nanofluid-operated heat pump found higher thermal adsorption behaviour. The heat transfer rate of the alumina/water fluid pair was notably higher. Different adsorption temperature points predict the saturation point of alumina at 0–200 min.

2. Adoption of ICT-based education system to protect environment and improve present education system

Authors: Agrawal, Shiv Ratan

Source: International Journal of Environment And Waste Management, 2020, Vol 26(2), pp. 168–189.

DOI: 10.1504/IJEWM.2020.108813

Abstract: This study focuses on waste characterisation by the present education system and its effects on the general environment as well as the education system itself. To address the issue, the study explores the concept of information and communication technology (ICT)-based education systems for environmental protection and improving the current education system from students' perspective. Data from 356 students in engineering, management, and computer applications was analysed using AMOS and SmartPLS for measurement validation and structural modelling. The study identified significant relationships and found that ICT-based education systems contribute positively to environmental protection and educational improvement, offering insights for policymakers and academicians.

3. Power supply to electric vehicle charging stations in India: Justification of a framework for a dynamic and adaptive electricity tariff policy

Authors: Jayapalan, C.; Hariharan, Thangatur Sukumar; Ganesh, L. S.

Source: Electricity Journal, 2022, Vol 35(10), Article 107219.

DOI: 10.1016/j.tej.2022.107219

Abstract: Owing to the steady growth in electric vehicles in India and the need to develop charging stations at diverse locations, this paper formulates a framework for a dynamic and adaptive Electricity Tariff Policy for Electric Vehicle Charging Stations. The framework consists of three foundations: theoretical (Justice Risk and Energy Trilemma concepts), operational/functional (techno-economic and social criteria), and transactional (target sets of end-users). This comprehensive framework will benefit policymakers, particularly in India, and can be adapted for use in other countries with modifications for their basic structures.

4. Investigation of the role of Sm, Na in ferroelectric, piezoelectric and conduction behaviour of Strontium Bismuth Titanate ceramics

Authors: Ravikiran, U.; Sarah, P.; James, A. R.; Zacharias, Elizabeth

Source: Solid State Communications, 2021, Vol 332, Article 114309.

DOI: 10.1016/j.ssc.2021.114309

Abstract: The study systematically investigates the ferroelectric, piezoelectric and conduction behaviour of Sm, Na substituted Strontium Bismuth Titanate ceramics ($\text{Sr}_{1-2x}\text{Sm}_x\text{Na}_x\text{Bi}_4\text{Ti}_4\text{O}_{15}$). Structural analysis confirms single-phase formation and orthorhombic sheet-like grain structure. The ceramics showed improved remnant polarization, piezoelectric charge coefficient, and electromechanical coupling factor, suitable for sensors, actuators, and transducer applications. Activation energy analysis indicates conduction through short-range oxygen vacancies hopping.

5. A Comparative Study of Multiple Regression and Artificial Neural Network models for a domestic refrigeration system with a hydrocarbon refrigerant mixtures

Authors: Reddy, D. V. Raghunatha; Bhramara, P.; Govindarajulu, K.

Source: Materials Today-Proceedings, 2020, Vol 22(4), pp. 1545–1553.

Abstract: The paper discusses development and comparison of Multiple Regression Analysis (MRA) and Artificial Neural Network (ANN) models for performance prediction (power consumption, refrigeration effect, and COP) of domestic refrigeration systems using hydrocarbon refrigerant mixtures. Results indicate ANN provided more reliable and accurate predictions compared to MRA, establishing ANN as a better technique for such performance forecasting.

Conclusion:

In conclusion, IFHE Hyderabad's commitment to SDG 7—Affordable and Clean Energy—is demonstrated through a robust, transparent, and science-driven portfolio of actions and results across every aspect of campus energy use and management. The university's continual investment in digital measurement, real-time monitoring, and rigorous auditing establishes a foundation for evidence-based decision-making and ongoing improvements in operational efficiency.

The rapid scaling of renewable energy capacity, notably through a 1,200 kWp solar PV network, has made IFHE a leader in green electricity generation, with solar now supplying a substantial proportion of daily demand and directly reducing both carbon emissions and financial outlays. Integration of this system with reliable grid and

backup solutions ensures 24x7 power to all campus functions, while remaining resilient to disruption and minimizing environmental impact.

Ongoing projects—ranging from full-campus LED retrofitting to smart HVAC controls, appliance optimization, and solar water heating—show a proactive approach to every detail of energy demand. Data-driven procurement, frequent technology upgrades, and mandatory energy-rating standards reinforce a “low-energy campus” mission supported by engaged staff and student training.

Crucially, these institutional measures are underscored by active student, staff, and community involvement through campus clubs, outreach, sustainability fairs, hands-on demonstrations, and technical education. The result is not only a campus with measurable energy savings but also a vibrant knowledge environment where new research, technology pilots, and cross-sector partnerships continuously advance the sustainability agenda.

Through these integrated strategies and transparent reporting practices, IFHE Hyderabad emerges as a benchmark institution for clean energy and energy efficiency in Indian higher education, aligning its everyday practices and long-term vision with both national and global SDG 7 objectives.