ITM
UNIVERSITY
GWALIOR • MP • INDIA
"CELEBRATING DREAMS"

Energy policy and facilities for alternate sources of energy and energy conservation measures

Message from Vice Chancellor

Dear Students, Faculty, and Staff,

As Vice Chancellor, I am pleased to address you on the important subject of our university's energy policy. In our commitment to fostering a sustainable future, we are implementing a comprehensive energy management strategy aimed at reducing our carbon footprint and promoting environmental stewardship across our campus.

Our policy focuses on three core areas: energy efficiency, renewable energy adoption, and community engagement. We are investing in energy-efficient infrastructure, including LED lighting, smart building technologies, and optimized HVAC systems, to ensure minimal energy wastage. Additionally, we are expanding our use of renewable energy sources, with solar panels being installed on key buildings to harness the abundant sunlight in Gwalior.

Education and awareness are crucial for the success of our energy policy. Collaborative projects and research initiatives will also be encouraged to innovate and implement sustainable solutions.

By adopting these measures, ITM University not only aims to reduce operational costs but also to contribute positively to the global fight against climate change. Together, let us commit to building a greener, more sustainable campus for future generations.

Thank you for your support and participation.

Best regards,

Vice Chancellor

ITM University Gwalior

A POLICY ON ENERGY CONSERVATION

Preamble

Energy is now a vital part of everyday life. With a population of 1.44 billion and one of the world's fastest-growing major economies, India will be a bulk consumer the global energy markets. Based on current policies, India's energy demand could double by 2040, with electricity demand potentially tripling as a result of increased appliance ownership and cooling needs. (India 2020 –IEA Analysis-Energy Policy Review).As per the Environment Policy 2020 of AICTE, that sets long term goals for educational institutes to conserve natural environment, develop sustainable solutions and control energy consumption, an educational institution has to evolve programs and policies that turns the institute into a carbon-negative institute and promote in educating students and employees on environmental concerns and sustainability, be responsive to the emerging challenges in the Energy sector and Sustainable development of the State and Country. So, it is essential for the educational community to practice sustainable energy that will provide favourable effect on the eco-system.

The Energy Policy of the Institution will thus be effective in organizing structured programs to promote awareness on the proper management and conservation of energy those models resource efficient and low-carbon campuses that demonstrate practice for sustainability.

1. Energy Policy Statement

The ITMU energy policy articulates commitment of the University to the conservation of energy by defining energy management protocol for thermal and electrical energy systems of the institution, focusing on sustainable practices in reducing carbon footprint and other environmental impacts as per the norms of Energy Conservation and Management, for maintaining an eco-friendly green campus.

2. SCOPE

This policy is applicable to all ITM University buildings, facilities, and equipment.

3. Objectives

- Utilize energy resources efficiently by introducing innovative technologies
- Use of renewable energy.
- Optimize the Energy consumption and cost.
- Reduce, Reuse and Recycle.
- Carry out regular internal energy audits to identify energy conservation opportunities.
- Regular monitoring and follow up procedures managed by the University Energy Audit/Management Cell for effective implementation at department levels.
- Train faculty, non-teaching staff, students and housekeeping staff to make the Institute a role model in the area of Energy conservation.
- Encourage faculty members to obtain certification as Certified Energy Auditors and Managers.
- Establish ties with Industries and conduct a complete Energy Audit.
- Promote awareness related with Energy conservation among various sections of society.
- Review the Policy on a regular basis.

4. POLICY

Lighting

- Employees and students shall make every effort to reduce the amount of energy associated with lighting in all campus facilities by:

o Turning lights off in unoccupied spaces.

o Discontinuing the use of incandescent lighting wherever more efficient lighting is possible, such as compact fluorescent or light-emitting diode (LED) bulbs.

o Maximizing the use of natural light and turning off all non-essential lighting whenever possible.

o Utilizing task lighting in lieu of overhead lighting when appropriate.

o Turning off exterior building architectural lighting between 11:00 PM and 6:00 AM.

- All new lighting installations shall use LED bulbs to maximize energy efficiency.
- Personal safety shall not be compromised by lighting energy reduction decisions.

Interior Environment

- Every effort will be made to maintain the occupied temperature in all campus facilities at 22 to 24 degrees Celsius, excluding special environmental needs such as server rooms and computer laboratories.
- Classrooms with 20 or fewer students will be set at 22 degrees Celsius.
- Only authorized personnel and security guards are allowed to operate the centralized control system of the air conditioning units.
- Efforts will be made to improve the utilization of our buildings by consolidating activities from lower-utilized buildings into higher-utilized buildings. This will allow building ventilation and air conditioning system runtime to be reduced, resulting in energy savings.

Computers

- Computer power management software should minimize the operation and consumption of electricity when computers are not in use, excluding computers performing unique computational functions.
- All computers purchased must have energy-saving features enabled whenever in use.
- Peripheral equipment should be turned off whenever possible.
- Students are encouraged to turn off and unplug gaming consoles when not in use (some brands use almost as much power when turned off as when turned on).

Office Equipment

- All powered office equipment should be turned off or placed on standby when not in use unless it is detrimental to the operation of the equipment. Items such as copiers, printers, calculators, shredders, etc., should be turned off at the end of the workday.
- Office equipment quantities should be reduced through consolidation to central locations for shared use whenever possible.

Appliances

- **Employees**

o Non-school-provided appliances (such as printers, coffee makers, refrigerators, freezers, microwaves, toasters, lamps, televisions, and scanners) may only be used if approved by the President/EVP/VPAA.

o The quantities of purchased appliances, facilities, and equipment shall be reduced through consolidation to central locations for shared use whenever possible.

o All new or replacement computer monitors and televisions shall be LCD unless there is a justifiable need for a tube-based display.

o All appliances shall be turned off when not in use unless it is detrimental to do so (e.g., a refrigerator or freezer).

- **Students**

o All appliances shall be turned off when not in use unless it is detrimental to do so (e.g., a refrigerator or freezer).

- Lighting facilities and air conditioning units inside the classrooms must be turned off before leaving the room.
- Ensure all computers/gadgets are unplugged when leaving the classrooms and laboratories.

Renewable Energy and Power Efficiency

- **Solar Energy**
  - The university will actively pursue the installation and use of solar panels on campus buildings to harness solar energy and reduce dependence on non-renewable energy sources.
  - Solar-based energy conservation measures will be integrated into campus facilities, prioritizing solar-powered lighting and heating systems.
  - The university will implement wheeling to grid practices to feed excess solar energy back into the power grid, supporting overall energy sustainability.
- **Biogas**
  - The university will explore and implement biogas generation projects, utilizing organic waste from campus kitchens and gardens to produce biogas for heating and cooking purposes.
- **Power Efficient Equipment**
  - All new equipment and appliances purchased must be energy efficient, adhering to the latest energy-saving standards.
  - Existing equipment and appliances will be evaluated for energy efficiency, and non-efficient items will be replaced as budgets allow.

5. Action Plan

Energy Optimization Plan

1. Restructuring the Energy Management Cell with representatives from both campus, for effective implementation of Energy management program.
2. Regular Monitoring and benchmarking resource use and waste generation.
3. Monitor and evaluate the energy performance levels
4. Setting short term and long term targets and conservation strategies, to achieve and surpass goals for zero-carbon Campus.
5. Use of energy efficient, star labeled equipment.
6. Periodic maintenance and replacement of other lights/lighting fixtures to LED.
7. Maintaining a sustainable approach by use of existing equipment efficiently till its life cycle ends, and replacing with more efficient equipment when necessary.
8. Reduce e-waste to maximum with proper maintenance, before moving on to Replace & Recycle stage.

9. Maximum use of Daylight for Indoor illumination and natural ventilation.
10. Use of occupancy sensors for classrooms, halls, administrative offices, restrooms and sensor-based switches for streetlights, corridor lighting to optimize energy use.
11. Fine tuning of optimum temperature setting of Air Conditioners and Water coolers.
12. Maximize use of Renewable Energy – Grid Interactive Solar PV System installed in the Campus.
13. Maximum demand optimization by adequate reactive power management
14. Encourage students to undertake UG and PG projects on Energy Management, Energy optimization techniques, Renewable Energy Harvesting thereby promoting a sense of awareness towards Energy use and its cost.
15. Provide training for faculty and students about Energy Management, Energy Auditing.
16. Include Project learning strategies for Energy Conservation and Energy management courses in the curriculum in tie up with Industries.

6. Mechanism of Action Plan

The Energy Management Cell should lay down well-defined procedures as mentioned below, that follows the indicated stages.

i. Create Energy Baseline Assessment
ii. Define the Energy Agenda of the Academic year
iii. Create Implementation guidelines
iv. Review: Monitoring and follow-up

A worksheet or checklist to be maintained for the Energy Management Action Plan so as to meet the short term and long-term goals.

Item No	Action	Measured outcome	Accountability	Recourses Needed	Start Date	End Date

7. Review

An Energy Conservation Policy Advisory Committee shall be created and will be tasked with evaluating and recommending policy revisions when appropriate. Membership on this committee shall be appointed by the Vice President for Administration and consist of a broad cross-section of the ITM University community.

8. Responsibilities

Employees and Students

- Recognizing that energy conservation is important to the university's fiscal health and environmental goals.
- Complying with the policy.
- Taking actions to conserve energy and reduce energy waste.
- Reporting ideas on energy conservation or energy waste to the Office of the Vice President for Administration or their respective Department Heads.

Registrar

- Communicating this policy to everyone within their jurisdiction.
- Including energy conservation procedures in orientation programs.

B ALTERNATE SOURCES OF ENERGY AND MEASURES TAKEN FOR ENERGY CONSERVATION

The list of facilities at the University are as below:

- Solar Energy
- Biogas Plant
- Wheeling to the Grid
- Sensor-base Energy Conservation
- Use of LED bulbs/Power Efficient Equipement
- Wind will or any other clean green energy

Features:

1. MPSEB fed 33 KV Substation.
2. Grid connected Solar Plant
3. PF Improvement Equipment
4. 100% Power Backup –Generators and Solar Plant
5. LED Light fixtures.
6. Sensor controlled Washroom lights and exhaust fan.
7. Effective peak load management
8. Repair, Re-use and frequent maintenance of equipment to ensure sustainable longevity.
9. Effective maintenances through annual maintenance.

1. SOLAR ENERGY

The solar PV Power generation system installed at ITM University is a highly efficient, modular, extendable and cost-effective power generation solution. The system operates in grid tied condition with net metering system. The system is designed as per the International Standards to ensure that the years of trouble-free operations. As a result of proven technology, the system is highly efficient and maintenance free. The on-grid roof-top PV plant is divided into two fields, one with capacity of 225 kWp and other with 270 kWp, and has a total capacity of 495 kWp. The plant employs 540Wp monocrystalline PV panels with HG10R SERIES-530-540W 540W manufactured by TATA Power. The PV panels are supported by both elevated and block structures. The system employs five 80 kW grid tie inverters and one 50 kW grid tie inverter from the Goodwe company for conversion from DC output of PV panel to AC. The electricity generated by the solar plant is consumed by the campus and the excess units are exported to the grid through net metering system.

. Impact of the solar plant on the Environment

We are contributing to solve Earth's biggest problem: global warming

Equivalent acres of forest	11090.45 acres/year
Coal Burn avoided	5198.63 Metric Tons
Carbon dioxide offset	10482.36 Metric Tons
Petrol consumption avoided	4398140 litres
Equivalent kilometres driven	40547155 kms
Equivalent no. of trees planted	173471 trees

Photos of Solar panels on the roofs of JC Bose Block building

Photos of Solar Energy with Tata Solar and its contribution to climate change

Solar water heating panels on hostel and residential complex

2. BIOGAS PLANT NEAR ANNAPURNA MESS

Bio gas, the naturally formed biofuel is generated from Organic matter through Anaerobic Digestion. In a way to contribute towards the nation's energy-saving plans, the Institution has constructed its own Bio-Gas plant on the campus. The fuel is generated using the Night soil collected from the Hostel and the vegetable waste from the canteen and energy equivalent to 81 Kgs of LPG is saved every month which adds up to 972 kg of LPG gas per year. The gas generated is used for cooking purposes in Hostel and it also helps to recycle the waste to control methane pollution.

Specification of Bio Gas Plant (Feed Material-Kitchen Waste)

Place: Annapurna Mess

S.No.	Parameters	Description
1	Material of Digester	Brick wall
2	Type of Digester	Floating Drum (KVIC- Khadi & Village Industries commission)
3	Diameter of Digester	02 meters 75 cms
4	Height of Digester	02 meters 80 cms
5	Gas Holder Height	02 meters 20 cms
6	Gas Holder Diameter	02 meters 67 cms
7	Material Floating Gas Holder	Mild Steel
8	Total Volume of Digester	16.62 m3
9	Effective volume of Gas Holder	12.31 m3
10	Primary Filling	6 Tons Cow dung and 6-ton Water
11	Required Cow dung per day	300 kg (12*25) and 300 kg water (Ratio 1:1)
12	Required Kitchen Waste per day	150 kg and 450 kg water (Ratio 1:3)
13	Per Day Gas Generation (CH4)	12 m3
14	Per Day Energy Generation (kilo calories)	12X4700 =56400 Kilo calories
15	Equivalent LPG Generation	12X3.6 = 43.2 m3
16	Required Gas for Cooking	0.25m3/person/day = 48 persons per day (Approx)
17	Food Waste Disposer insinkerator (Pulverizer) power consumption	460 watts (0.55 HP)

Photos of Bio Gas Plant

3. WHEELING TO GRID

The energy output of the solar panels is utilized for the power requirements for the University and the power output of the solar panels is also connected to the power grid of the MPEB. The excess power produced by the solar panels is supplied to the grid and the exported units are adjusted in the total bill.

UNITS EXPORTED TO THE GRID

Month	Plant 1	Plant 2
November 2023	2184	0
December 2023	1410	0
January 2024	2284	0
February 2024	3114	60
March 2024	5972	568

Photos of solar plant & net metering photographs

4. SENSOR-BASED ENERGY CONSERVATION

Sensor-based lights utilize motion or light sensors to automatically turn on or off based on detected movement or ambient light levels. These smart lighting systems offer energy efficiency and convenience by only activating when needed, reducing unnecessary electricity consumption. Commonly used in outdoor security lighting, indoor occupancy sensors contribute to energy savings and enhanced safety. Sensor-based lights provide an automated solution for optimizing lighting control in various environments.

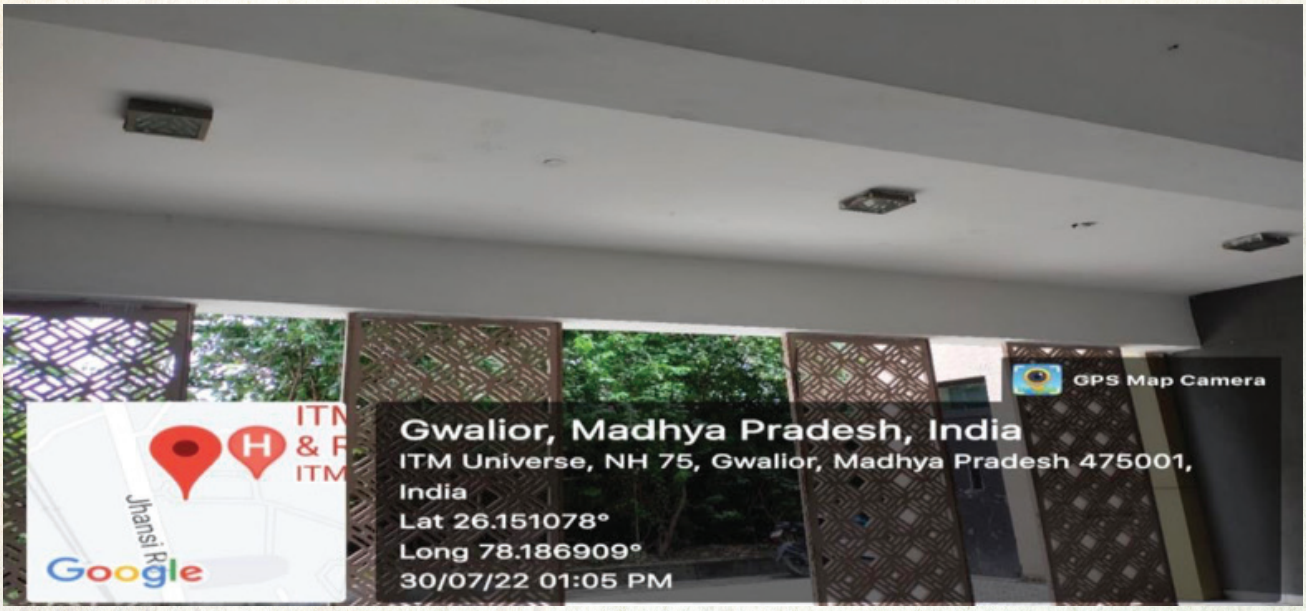
A sensor-based street light system designed for a university campus integrates Passive Infra-Red (PIR) sensors, actuators, relays, and other hardware with software platforms for networking and communication. This system aims to monitor and control street lighting automatically, ensuring lights are only on when needed, thus achieving significant energy savings. PIR Sensor HC-SR501: Detect motion in their range 5-12 meters (adjustable) operates at voltage of 5Volts. Actuators control the switching mechanism for the street lights. Relay functions electrically operated switches used to control the lighting circuits. Power supply provides stable power to the sensors, microcontroller, and relays. When a moving object (e.g., a person or vehicle) enters the detection range of a PIR sensor, it triggers the sensor. The PIR sensor sends a signal to the microcontroller. The microcontroller processes the signal and activates the corresponding relays. The relays switch on the street lights for a pre-programmed duration. After the set duration, the microcontroller turns off the relays, thereby switching off the lights. The system continuously monitors for new movement to reactivate the lights as necessary. By ensuring street lights are only on when needed, the system can achieve up to 60-70% energy savings compared to conventional always-on street lighting systems.

Photo of sensor-based street lights on the campus

Save Energy Message at Various Blocks

5. USE OF LED BULBS/POWER EFFICIENT EQUIPMENTS

LED bulbs and other power-efficient equipment offer numerous benefits, revolutionizing energy consumption in various applications. LED bulbs, for instance, consume significantly less energy than traditional incandescent bulbs, reducing electricity bills and carbon emissions. They also have a longer lifespan, decreasing maintenance costs and waste. Moreover, power- efficient equipment like energy-efficient appliances and HVAC systems contribute to sustainability by conserving resources and reducing environmental impact. Overall, the adoption of LED bulbs and power-efficient equipment plays a vital role in promoting energy efficiency, cost savings, and environmental conservation in both residential and commercial settings.



Installed LED BULBS at various Blocks

6. Other clean energy

Clean green energy, such as solar, wind, and hydroelectric power, offers sustainable alternatives to fossil fuels, mitigating environmental impact and reducing carbon emissions. These renewable energy sources harness natural resources without depleting them, contributing to a cleaner, greener future for generations to come. ITM University uses energy-efficient equipment where the equipment's utilizes less energy and less emission, University also emphasizes on the use of equipment as and when required only so that carbon emissions are reduced and also regularly maintains the equipment.

ITM UNIVERSITY
"CELEBRATING DREAMS"

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April 21, 2023

ORDER

With a view to be sensitive about environment and control of carbon emissions and also be economical; following decision has been taken & implemented with immediate effect:

1. All Faculty/Technical/Admin Staff Members are now responsible for the appropriate use of fans & light fixtures in the classrooms, labs & offices only when required. It is seen that irrational use of electricity is ignored by teachers & laboratory staff while it is their duty to sensitise the students about the correct & appropriate use. All peons will be responsible for the same if the fans & light are found in 'Switched on' mode without any occupants in the room and beyond the time table of the institute.
2. A mechanism of reporting is being implemented and all defaulters will be penalized Rs. 200/- every time the report is received. All staff including faculty members must cooperate.
3. All AC systems shall be operational between only 24th April to 30th September each year. If AC systems are found switched on after 30th September 2023 the faculty and staff members responsible will be penalized for the full day use of concerned power load of ACs. Computer labs, Seminar halls & Conference room shall remain out of the purview of this order, when in authorized & proper use.

REGISTRAR
& DEAN (ADMIN)

Copy to :

1. Hon'ble Chancellor
2. Hon'ble Pro-Chancellor
3. Hon'ble Vice-Chancellor
4. Hon'ble Pro-Vice-Chancellor
5. Director – ITM
6. All Dean's
7. All HoD's – ITM University & ITM
8. CF&AO
9. Deputy Registrar Office

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