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Manipal University Jaipur Energy Efficiency Standards Policy

Policy Statement

Manipal University Jaipur acknowledges its responsibility in supporting a sustainable and energy-efficient future. This Energy Efficiency Standards Policy sets forth guidelines and procedures to ensure that all renovations and new construction projects at the university align with energy efficiency standards, thereby reducing energy consumption and lessening environmental impact.

I. Purpose

The objectives of this Energy Efficiency Standards Policy are to:

Encourage responsible and sustainable energy usage throughout Manipal University Jaipur.

Minimize the environmental impact associated with campus construction and renovation projects.

Provide clear guidelines for architects, contractors, and project managers to follow during design and construction.

Replace non-renewable energy as much as possible with renewable energy sources.

Ensure adherence to relevant local, state, and federal energy efficiency regulations.

II. Scope

This policy applies to all construction and renovation projects undertaken on Manipal University Jaipur's property, covering academic buildings, residence halls, administrative facilities, and other university-owned structures.

III. Definitions

1. Energy Efficiency: Utilizing technology, practices, and design approaches that minimize energy consumption while maintaining or improving performance and comfort levels.

2. LEED Certification: A globally recognized rating system, Leadership in Energy and Environmental Design assesses buildings for sustainability and energy efficiency.

3. Renewable Energy: Energy generated from sources that are replenished naturally, such as solar, wind, and geothermal power.

4. Building Envelope: The physical structure—walls, roofs, windows, and doors—that separates a building's interior from the external environment.

IV. Guidelines and Procedures

A. Project Assessment

- All construction and renovation projects must undergo an initial energy efficiency assessment to determine their potential environmental impact and identify opportunities for improvement.
- The assessment shall consider factors such as building design, materials, systems, and energy sources.

B. Design Phase

- During the design phase, architects and designers must prioritize energy-efficient building concepts and technologies, aiming for a minimum LEED Silver certification or equivalent.
- The design shall include provisions for natural lighting, ventilation, and the use of renewable energy sources.
- Building envelopes must be designed to maximize insulation and minimize heat transfer.

C. Construction Phase

- Contractors and construction managers shall adhere to the approved design plans and specifications for energy-efficient systems and materials.
- All construction personnel shall be trained in energy-efficient construction practices.
- Compliance with energy efficiency standards will be subject to regular inspections.

D. Post-Construction Assessment

- Upon project completion, an assessment will be conducted to ensure that all energy efficiency measures have been implemented as planned.
- Any discrepancies or deviations from the approved design shall be rectified.

V. Implementation and Compliance

A. Responsibility:

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- The Directorate of General Services &Administration shall be responsible for overseeing the implementation and compliance of this policy.
- All university departments, contractors, and project managers shall adhere to this policy and collaborate to ensure its success.

B. Compliance

- Failure to comply with this policy may result in project delays, cost adjustments, or other corrective actions as per university regulations.
- Manipal University Jaipur shall maintain compliance with all applicable local, state, and federal regulations regarding energy efficiency in construction.

VI. Review and Revision

This policy shall be reviewed and updated as necessary to reflect changes in technology, regulations, and best practices related to energy efficiency standards in construction.

VII. Conclusion

Manipal University Jaipur's commitment to energy efficiency in construction is a testament to its dedication to sustainable and responsible practices. By establishing clear guidelines for project assessment, design, construction, and compliance, the university aims to lead by example and reduce its carbon footprint. As similar policies are adopted by other institutions, we move toward a future where energy-efficient construction becomes the norm, supporting a more sustainable and environmentally conscious world.

Version History

Number	Year	Major Revision
Version 4.0	2023	Focus on Awareness
Version 3.0	2022	Increasing Solar Capacity
Version 2.0	2021	More focus on carbon footprint
Version 1.0	2018	Initial policy

Approval

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Energy Efficiency Strategy

Energy Audits and Evaluations

The initial phase of Manipal University Jaipur's commitment to energy efficiency involves conducting thorough energy audits throughout the campus. These evaluations examine energy usage trends in buildings, equipment, and transportation, yielding critical insights into potential areas for enhancement.

Building Renovations and Enhancements

Utilizing the findings from the energy audits, Manipal University Jaipur embarks on a series of renovations and enhancements to its buildings. This initiative encompasses the improvement of insulation, the installation of energy-efficient lighting solutions, and the modernization of HVAC systems to more energy-efficient alternatives.

Integration of Renewable Energy

In an effort to diminish its dependence on fossil fuels, Manipal University Jaipur incorporates renewable energy sources into its campus framework. The installation of solar panels facilitates the generation of clean energy, thereby lowering energy expenses and reducing carbon emissions.

Intelligent Building Technologies

Manipal University Jaipur is leading the way in the implementation of intelligent building technologies that enhance energy efficiency in real-time. Sophisticated building management systems track energy consumption and make prompt adjustments to curtail waste, thereby boosting overall efficiency.

Eco-Friendly Transportation

Acknowledging the significant role of transportation in its carbon footprint, Manipal University Jaipur emphasizes sustainable transportation solutions. The university has improved access to public transportation, established bike lanes, and encouraged carpooling among students, faculty, and staff.

Manipal University Jaipur has adopted a forward-thinking approach by establishing an extensive energy efficiency strategy designed to markedly decrease its total energy usage. Energy efficiency plays a vital role in any sustainable campus initiative. As a distinguished institution of higher learning, Manipal University Jaipur has accepted the responsibility of

minimizing its ecological footprint. The university's energy efficiency strategy exemplifies its dedication to environmental stewardship and prudent resource management.

The initiatives undertaken by Manipal University Jaipur motivate students to emerge as future leaders in environmental advocacy, while its research provides significant contributions to the domains of energy efficiency and sustainability.

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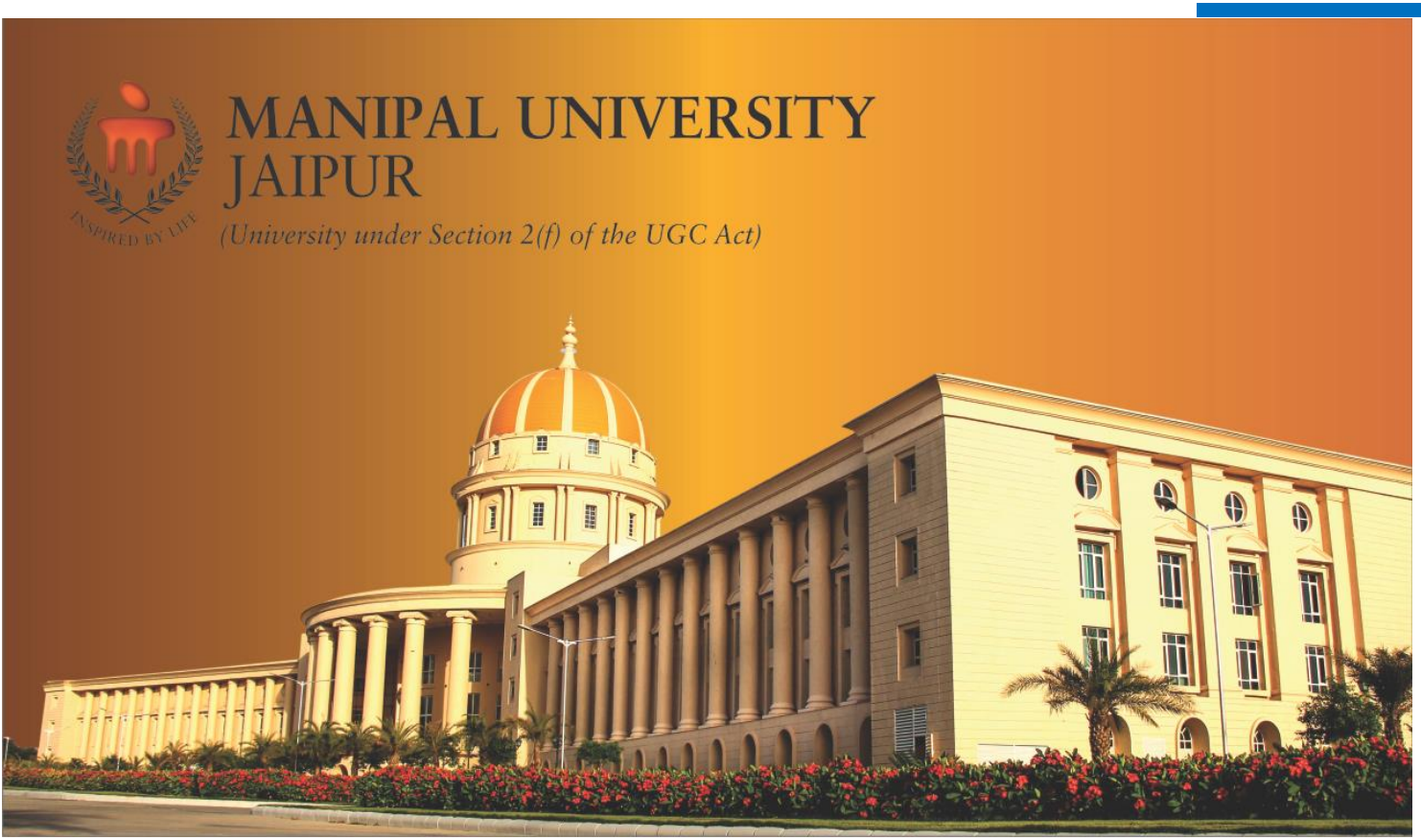

Energy Efficient Practice and Consumption Plan

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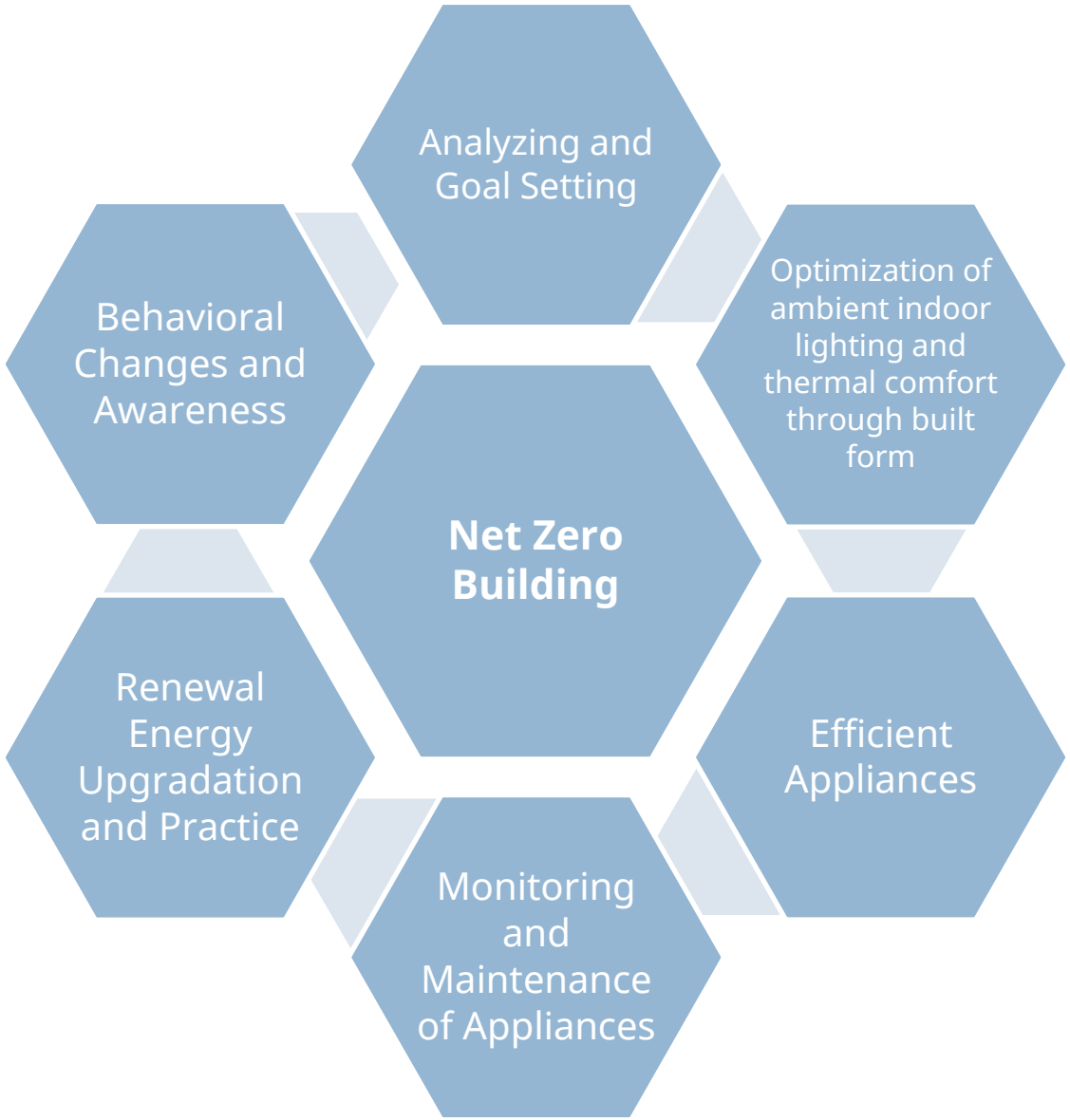
Energy Efficient Plan



PRACTISE AT MUJ

1. Conduct an Energy Audit.

2. Conscious built form

3. Application of efficient appliances

4. Regular maintenance of appliance.

5. Monthly monitoring of process and systems.

6. Annually analyze energy generation, consumption and future production

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RENEWABLE ENERGY UTLIZATION

Renewable energy Utilization is a key part of the design and development at Manipal University Jaipur. Hence, on site energy generation was given precedence to offset at least 50% of the total energy demand to achieve this solar p.v arrays are installed on the rooftops across all the major buildings in the University.

Key Performance Indicators:

The approach of MUJ to race towards self sufficiency in Energy is by reducing overall energy demand of MUJ (Admin & Academic-1) wherever possible. Design optimization was the key aspect which is driving MUJ to achieve energy use reduction. The reduced energy will be met by on site generated solar energy

- Climate responsive design of the building is the key element in the reduced energy demands.
- Appropriately sized systems with energy efficient technology & controls further reduced the energy demands
- Design has considered the orientation of building to construct the service structures on roof to reduce the amount of self shading & shadow patches on roof to maximum energy harvest with the solar pv's.
- Constant increase in capacity of solar PV system to steady offset of conventional energy demands

PRACTISE AT MUJ:

Available roof area is utilized for solar panels for high energy production to target NET Zero campus.

Parking shades are utilized for solar energy generation, efficiently utilizing space and getting benefitted for campus geographical location.

ENERGY AUDIT

PRACTISE AT MUJ:

INVENTUM POWER

Document ID: IPPL/EA/ND/19-20/01

ENERGY SAVING SUMMARY

S.No	Energy Conservation Projects	Annual Water Saving (KL)	Annual Energy Saving (KVAh)	Annual Monetary Saving in Lakhs	Investment (in lakhs) Rs.	Payback Period in Months	Co2 Emission Reduction in Ton	Page No
1	Avoiding use of transformer-1 during non-peak months		21,818	2.05	1.5	9	17.9	54
2	Maintaining 410-415 V instead of 430 V at Transformer-1		1,40,695	13.23	Nil	Immediate	115.4	55
3	Energy saving achieved by Chiller set point optimisation		13,745	1.29	Nil	Immediate	11.3	57
4	Energy saving by chiller plant optimisation		43,636	4.10	Nil	Immediate	35.8	59
5	Installation of Automation in Unitary AC		7,987.2	0.75	1.2	19	6.5	63
6	Replacement of Old AC by Inverter AC		3,840	0.36	1.2	40	3.1	63
7	Increase Re-use of Grey-Waste Water from laundry	4000		9.76	15.0	18	-	68
8	Energy saving by using fine bubble diffuser		44,460.6	4.26	5.0	14.2	36.5	71
9	Aggregation and optimisation of compressed air usage in STP		3,625.3	0.34	0.5	17.8	3.0	74
10	Installation of Energy efficient fans		2,40,000	22.56	90.0	48	196.8	79
11	Replacement of Inefficient Heat Pumps (Either by new heat pump or through staform hot water system)		49,332.8	5.1	7.8	18.5	40.5	81
12	Cleaning and Maintenance of Heat pumps to improve COP		39,926.3	3.8	6.0	19.2	32.7	83
13	Installation of Solar street light at peripheral roads		24,741.8	2.3	9.5	48.8	20.3	85
Total		**4000**	**6,33,809**	**70**	**138**	**24**	**520**	

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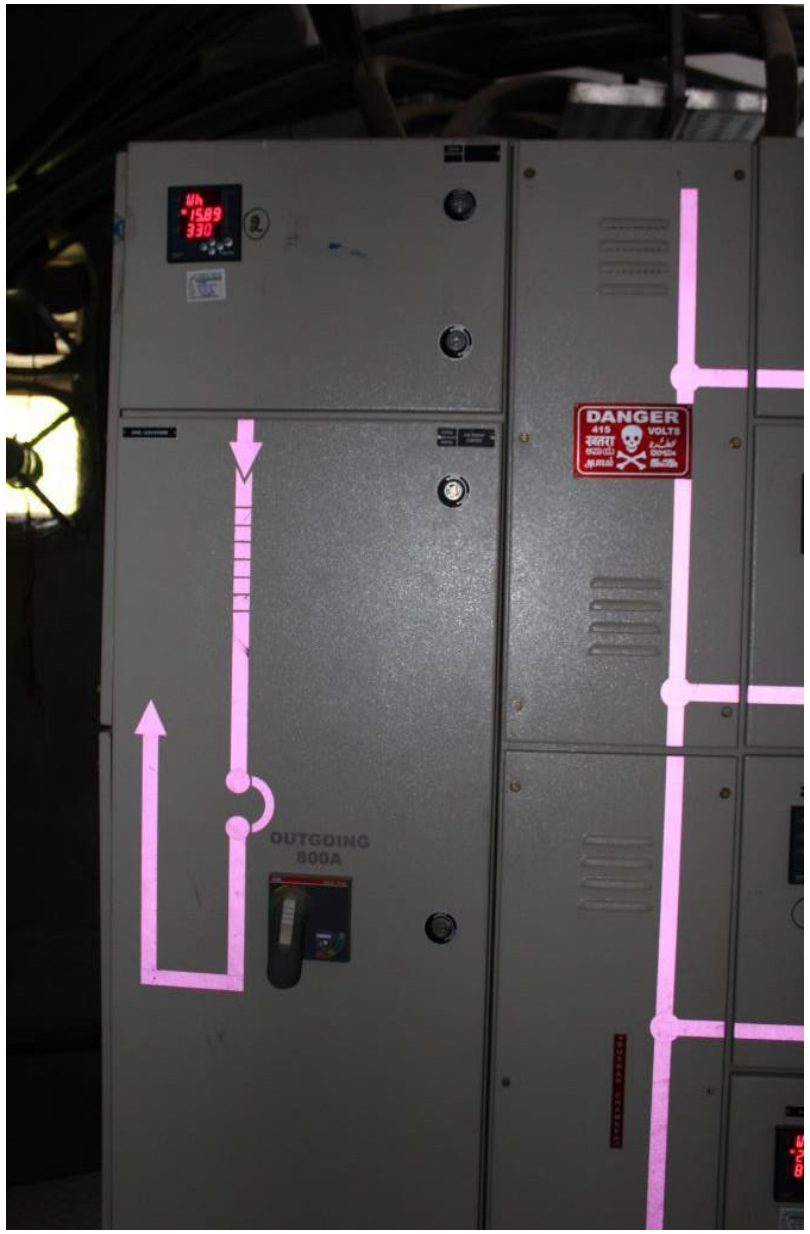
RESOURCE CONSUMPTION MONITORING



PRACTISE AT MUJ

•Resource consumption monitoring is a critical process that enables organizations to track, analyze, and manage the use of key resources like water, energy, and materials. The goal is to reduce waste, optimize efficiency, and promote sustainable practices.

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RENEWABLE ENERGY ANALYSIS

Months	Grid - MUJ Academic		Solar (Only MUJ)		Grid + Solar (Only MUJ)		Cost Per Unit
	1	2	3	4	5 = (1 + 3)	6 = (2 + 4)	
	Total MUJ kWh	Grid Amount	Total kWh	Solar Amount	Total kWh	Total Amount	
Apr-22	3,97,078	39,47,857	2,02,188	11,44,512	5,99,266	50,92,369	8.50
May-22	3,79,562	36,95,533	1,99,357	11,36,036	5,78,919	48,31,569	8.35
Jun-22	3,84,395	37,69,540	1,71,227	9,87,165	5,55,622	47,56,705	8.56
Jul-22	3,98,368	38,78,313	1,51,776	8,50,543	5,50,144	47,28,856	8.60
Aug-22	2,59,937	26,35,241	1,14,253	6,63,070	3,74,190	32,98,311	8.81
Sep-22	4,43,900	42,67,386	91,560	3,76,623	5,35,460	46,44,009	8.67
Oct-22	2,45,303	24,65,876	1,32,260	8,21,264	3,77,563	32,87,140	8.71
Nov-22	1,69,602	17,29,170	52,145	2,13,794	2,21,747	19,42,964	8.8
Dec-22	2,20,490	23,52,140	49,463	2,02,798	2,69,953	25,54,938	9.5
Jan-23	1,80,914	18,42,970	35,830	1,46,904	2,16,744	19,89,874	9.2
Feb-23	133236	1374783	46321	189919	179557	1564702	8.71
Mar-23	135208	1402323	145107	8,58,610.00	280315	2260933	8.1
Total	30,79,549	3,05,84,026	13,45,166	74,01,319	42,79,608	3,71,26,735	8.85
Avg Per Month	3,42,172	33,98,225	1,49,463	8,22,369	4,75,512	41,25,193	

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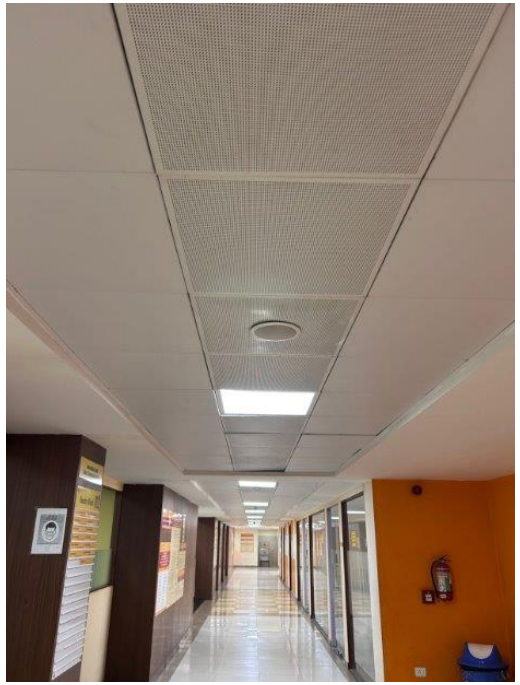
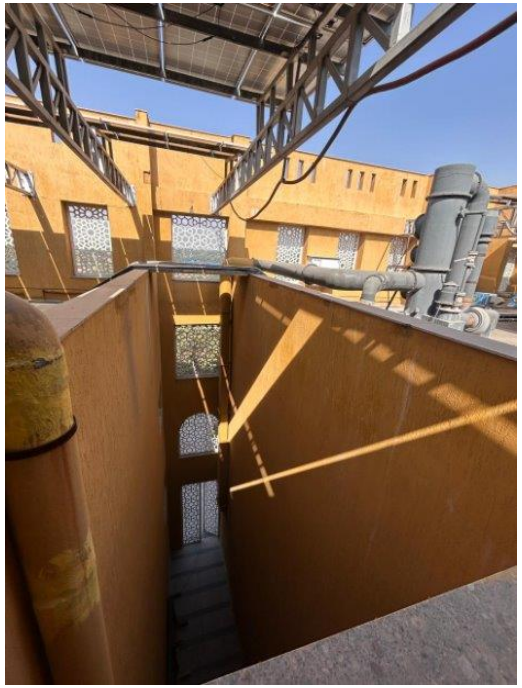
RENEWABLE ENERGY GENERATION

PRACTISE AT MUJ:





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RENEWABLE ENERGY SYSTEM MAINTENANCE

PRACTISE AT MUJ: