

CHAPTER-9

ENERGY AUDIT

2016-2021





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Energy is one of the primary inputs for the economic development of any country. The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect. Also, it can be said as “the strategy of adjusting and optimizing energy, using the system and procedure to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems”. The energy audit is key to a systematic approach for decision making in the area of energy management. It attempts to balance the total energy inputs with its use and identify all the energy streams in a facility.

Electricity audit:

Energy resources utilized by all the departments, support services and the administrative buildings of Dr. Harisingh Gour Vishwavidyalaya, Sagar, campus include electricity and liquid petroleum. The major use of the energy is at the office, canteen, hostel and laboratories, for lighting, transportation, cooking and workshop instruments. Dr. Harisingh Gour Vishwavidyalaya, Sagar, has installed a solar power plant having a capacity of 180 kW. Electricity is also supplied to the University campus by Madhya Pradesh State Electricity Board.

Table-28: Total energy consumption for last 5 years 2016-17, 2017-18, 2018-19, 2019-20, 2020-21.

Details	2016-17	2017-18	2018-19	2019-20	2020-21
Electrical Cosumption	2452823	2489825	2449410	2475110	2105679

Table-29: Electricity expenses for last 12 months 2020-21

Months	Mar-20	April-20	May-20	June-20	July-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-20	Feb-20
Electrical Expenses (units)	1583123	1450402	1006405	1626809	1553338	1792138	2385274	2348192	1968522	2115560	2206921	2105556

University have only one 33/11 KV substation having 6.30 MVA capacity & 11KV / 415 Volts
14 No. of Distribution substation :

- Electrical energy consumption per day for institute – 5769 Unites.



- % LED lamps of total lighting of the campus.
- Institute have policy to procure BEE approved, 5 star rating energy device / instrument / utilities.
- Total No. of ACs split Ac: 234, Cassette Ac: 48, Window AC : 16, Tower AC ; Nil VRF AC : 8.
- Annual maintenance contract is given for ACs – None
- list of major consuming equipment / device lab instrument in institute are – AC, Water Cooler, Work shop Machineries.
- Total No. of coolers used in summer – 65 no.
- No. of generator set : 13 no.
- Total running Hr. /year : 490Hrs (for 2020-2021)

Table -30: ACs in use

Sr. No.	Type	Total No.
1	Split AC	234
2	Cassette AC	48
3	Window AC	16
4	Tower AC	-
5	VRF AC	8
	Total	306

Only 6-7 ACs are 5 star rating ACs. Consumption of energy because of ACs is not estimated. No. of Electrical equipments use & electrical Energy consumed equipment wise is not estimated.

Sr. No.	Equipment	Quantity
1	Computer	
2	Printers	
3	3D Printers	
4	Xerox (Photocopy Machine)	
5	Projector	
6	Water Cooler	65
7	Air Cooler	
8	Generator	13
9	Geezers in girls & Boys Hostel	26+27=53

Energy conservation efforts:

Initiative for use of Solar Energy

- No. of Solar Panel installed: 463 no. (325 Watt peak per module)
- Amount of energy generated through solar: Rs. 3, 51,958.00 since December 2020 to till date.
- Amount of solar energy utilization against total energy requirement / Year : 2 %
- For Year: December 2020 to till date Energy Requirement :
- Solar energy use : 166694 Units since December 2020 to till date.



Fig-11: A unit of solar Panel

Preventive Measures:

- Use of LED bulbs is promoted and florescent Tube Light and CFL are getting replaced; 65.21% of the present bulbs and tubes are replaced to LED, energy-saving fans is also evident and encouraged in use.
- University has many areas where lighting is not required at all times. Installing sensor-based lighting in such areas can generate massive rewards. This is one of the easiest ways to save energy at university.

- If most computer laboratory and instrumentation laboratory systems are based on old technology, they might be consuming more power than new technology.
- Replacing old computers and instruments with ones having energy efficiency certifications is the easiest way to conserve energy at university.
- By installing more solar energy panels generate more electricity and minimize their electricity bill. In the hostels' increased use of solar water heaters is needed.
- Investment in solar lights for outdoor lighting can generate long term benefits.
- A huge amount of energy is wasted because no one really cares about switching off the fans and lights when not required. Hence, planning workshops on energy conservation to educate students, faculty, and staff can generate massive results.
- Unplug overhead projectors, computers, and smartboards when not in use. This simple way to conserve energy can help save a large amount of power and money in the long run.

Futrure plan to use sustainable energy:

- Solar panels:** University is preparing the road map for the installation of solar panels in near future so that the dependency on electricity may be reduced.
- Gobar Gas Plant:** University will also install gobar gas plant for getting extra renewable source of energy.
- Wind mills:** It is proposed to workout on the utility of wind mills.



Fig-12: Electrical Bike