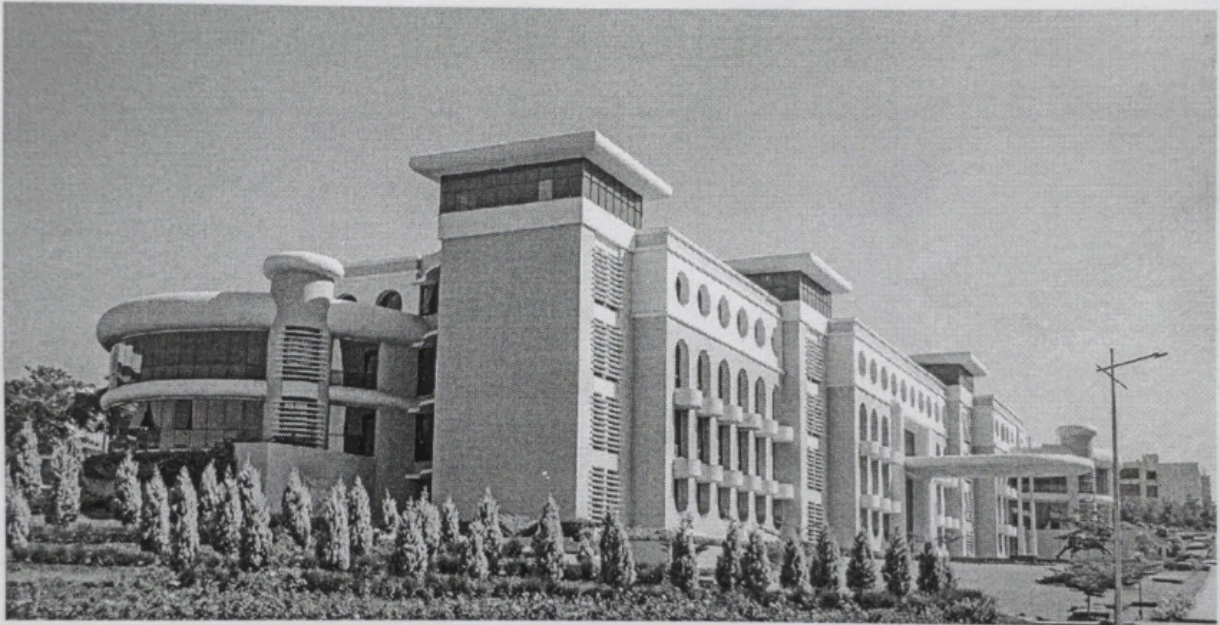


Energy Audit Report

**Sandip Foundation's
Sandip Institute of Pharmaceutical Sciences, Nashik**



Conducted & Prepared by

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Energy in following forms:

1. Electricity from MSEDCL:

Institute receives Electricity from Maharashtra State Electricity Distribution Company Limited, Nashik

2. High Speed Diesel Generator (HSDG):

HSD is used as a fuel for Diesel Generator which is run whenever power supply from MSEDCL is not available. Kirloskar Cummins 500 KVA.

Following are the major consumers of electricity in the facility

- Computers
- Lighting
- Air-Conditioning units
- Fans
- Other Lab Equipment
- Printers
- Xerox machines
- CCTV
- UPS load (Computer + Printer + Projector + CCTV + Router + Scanner)
- Flood light/ Street Light
- Pumping motor
- Electrical Machines

1. Analysis of monthly electricity bill

In a corporate electricity bill three factors contribute significantly to the total amount. They are:

- **Active energy consumption.** The total active or useful energy consumed by all loads connected to the feeders.
- **Power factor consumption.** The total reactive power energy consumed by inductive or Capacitive loads.
- **Maximum power demand.** The peak power or the cumulative power rating of all connected loads at a particular point of time.

Though traditionally energy audit targets the active energy consumption and power factor improvement, this project gives special emphasis to reduction of maximum power demand.

Walk through Audit

2) Analysis of maximum demand & Power factor & Incentives in the electricity bill. The month's wise electricity bill is analyzed to obtain table.

Table 1: Monthly analysis maximum demand and its cost. F.Y. 2020-2021

Month	Contact Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges (Rs)	Billed pf	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS)
April-2020	750	413	411	1,69,743.00	0.986	1670	-
May- 2020		413	411	1,69,743.00	0.985		-
June-2020		413	411	1,69,743.00	0.991		-
July- 2020		413	411	1,69,743.00	0.979		-
Aug- 2020		413	411	1,69,743.00	0.962		-
Sept-2020		413	411	1,69,743.00	0.974		-
Oct- 2020		413	411	1,69,743.00	0.986		-
Nov- 2020		413	411	1,69,743.00	0.968		-
Dec-2020		413	411	1,69,743.00	0.940		-
Jan- 2021		413	411	1,69,743.00	0.840		-
Feb-2021		413	411	1,69,743.00	0.798		-
Mar-2021		413	411	1,69,743.00	0.763		-
Average Bill Demand			413	411	1,69,743.00		Total Incentive to SF=

Table 2: Monthly analysis maximum demand and its cost. F. Y. 2021-22

Month	Contract Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges(Rs)	Billed PF	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS)
April-2021	750	450	432	1,94,400.00	0.764	1670	-
May- 2021		450	432	1,94,400.00	0.985		-
June-2021		450	432	1,94,400.00	0.998		-
July- 2021		450	432	1,94,400.00	0.998		-
Aug- 2021		450	432	1,94,400.00	0.998		-
Sept-2021		450	432	1,94,400.00	0.998		-
Oct- 2021		450	432	1,94,400.00	0.998		-
Nov- 2021		450	432	1,94,400.00	0.998		-
Dec-2021		450	432	1,94,400.00	0.997		-
Jan- 2022		450	432	1,94,400.00	0.997		-
Feb-2022		450	432	1,94,400.00	0.996		-
Mar-2022		450	432	1,94,400.00	0.993		-
Average Bill Demand			450	432			Total Incentive to SF=

Table 3: Monthly analysis maximum demand and its cost. F. Y . 2022-23

Month	Contact Demand (kVA)	Bill Demand (KVA)	Demand Charges /kVA	Demand Charges(Rs)	Billed pf	Sanction Load (Kw)	Penalty/ Incentive due to PF in (RS)
April-2022	750	488	454	2,21,552.00	0.976	1670	-
May- 2022		496	454	2,25,184.00	0.975		-
June-2022		488	454	2,21,552.00	0.981		-
July- 2022		488	454	2,21,552.00	0.991		-
Aug- 2022		488	454	2,21,552.00	0.990		-
Sept-2022		488	454	2,21,552.00	0.988		-
Oct- 2022		488	454	2,21,552.00	0.989		-
Nov- 2022		488	454	2,21,552.00	0.984		-
Dec-2022		488	454	2,21,552.00	0.983		-
Jan- 2023		488	454	2,21,552.00	0.981		-
Feb-2023		488	454	2,21,552.00	0.979		-
Mar-2023		488	454	2,21,552.00	0.981		-
Average Bill Demand			488	454			Total Incentive to SF=

3) Annual Electricity Consumption

Year	Average unit consumption per month (KWh)	Unit consumption per year (KWh)	Connected load
2019-20	7625	91506	133
2020-21	3867	46405	
2021-22	2555	30663	
2022-23	7461	89534	

Total Connected load of the SIPS building

Sr. no	Components	Quantity	Rating (W)	Total Watt	Usage per day hrs	Avg. per day power consumption (W)
1	Fan	147	80	11780	3	35340
2	Tubelight	68	36	2448	4	9792
3	CFL	42	18	756	4	3024
4	Machine	82	740	60716	1	60716
5	Table fan	5	60	300	3	900
6	Exhaust fan	5	180	900	5	4500
7	LED	155	20	3100	4	12400
8	AC	15	3000	45000	1.5	67500
9	UPS load	1	8000	8000	4	32000
Total Connected load of SIPS building 226172 Watt						226172

1. Maximum Demand Control

1.1 Critical load analysis

Based on the data obtained, a study for determining the most critical load at any point of the day was done. Based on this report, during peak load when the maximum demand exceeds the present value the non-critical loads at that point of time can be switched off thereby reducing the maximum demand or that load is shifted in off peak hours.

2. Final Conclusion:-

Power factor is already improved beyond 0.9 and maximum demand is already under limit.

Also the penalties due to excess maximum demand can be saved by continuous monitoring of maximum demand in Energy meter..

Conclusion:

- Variation of PF the Power Factor to reduce the utility power bill. Most utility bills are influenced by KVAR usage. A good Power Factor provides a better voltage, reducing the pressure on electrical distribution network, reducing cable heating, cable over loading and cable losses. Reducing over loadings of control gears and switch-gears etc.
- Power factor is already improved beyond 0.9 and maximum demand is already under limit.

General Observations based on Electricity Bill:

For SIPS College Campus the Contract Demand (CD) is 140 kVA and minimum billing Demand is less than 50% of the Contract Demand, Maximum Demand recorded whichever is maintained.

The average electricity cost per unit (kWh) is Rs.7.59 considering the last twelve months average units and bill excluding charges.

Average monthly Power Factor is maintained that is P.F. 0.9

Power factor is maintained during 2019 to 2023 is 0.9 and above.

Merits/Existing Features of Energy Saving

- 1) Screen savers facility implemented for every computer.
- 2) AC's used are of three STARS.
- 3) Incandescent Bulbs are now here also CFL lamps are used here in corridor, they are replaced by LED lamps.
- 4) Maximum use of natural light during working hours.
- 5) Cross Ventilation is provided in laboratory & class rooms, which reduced number of fans.
- 6) Most of the practical's are scheduled in noon time where Billing Rate is normal.
- 7) Walls are painted with off white color to have sufficient brightness.
- 8) Solar powered street lamp is used.
- 9) LED light is used in Seminar hall.

ENERGY CONSERVATION PROPOSALS

Providing Energy Saver Circuit to the Air Conditioners The energy saver circuits for the air conditioners intelligently reduces the operating hours of the compressors either by timing or temperature difference logic without affecting the human comfort. This can save around 15% to 30% of the electricity depending on the weather conditions and temperature settings.

It is Recommended that the old air conditioners are being replaced with new energy efficient BEE STAR labeled (3 Star and above) air conditioners in a phased manner.

1.1 Replacing Fluorescent Tube Lights (FTL) with LED Tube Lights

The CFLS and FTLs can be replaced with the LED tube lights 18 W. These changes can be made at the places where the life is higher. Usually minimum of 3 years warranty is given and approximate burning hours is 40000. (15 years considering hours per day running).

1.2 General Recommendations

- All Class Rooms and labs to have Display Messages regarding optimum use of electrical appliances in the room like lights, fans, computers and projectors. Save electricity. Display the stickers of save electricity, save nature everywhere in the campus. So that all stakeholders encouraged to save the electricity.
- Most of the time, all the tube lights in a class room are kept ON, even though, there is sufficient light level near the window opening. In such cases, the light row near the window may be kept OFF.
- Trying to get the benefit of 01.50 rate in addition to actual rate for per unit consumption of electric motor pumping during 22:00 to 06:00 Hrs. during off peak load
- All projectors to be kept OFF when it is not in use.
- All computers to have power saving settings to turn off monitors and hard discs, say after 10 minutes/30 minutes.
- The comfort/Default air conditioning temperature to be set between 24 °C to 26 °C.
- Lights in toilet area may be kept OFF during daytime.
- Use AUTOMATIC POWER FACTOR CORRECTION (APFC) Panel FOR PF improvement
- Need to use power saver circuits for AC.
- Need to replace FTL by smart LED Tube.
- Need to replace ordinary bulb by LED bulb. Need to replace ordinary.
- Out of total electricity bill paid, 53 percentages are actual energy utilized charges remaining expense belongs to additional taxes on energy consumption. Recently govt. has declared the exemption on electricity duty charges for school and colleges trying to get the benefit of the same as soon as possible.

Executive Recommendations:

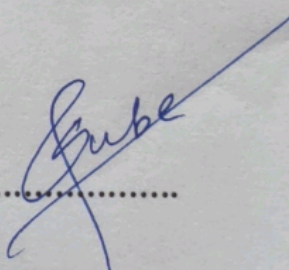
1. Need roof top solar power plant to carry maximum lighting and machine load in working hours.
2. There has to be Institute level student community that keeps track of the energy consumption. Parameters of the various departments, class rooms, halls, areas, meters, etc
3. Energy auditing inside the campus has to be done on a regular basis and report should be made to generate awareness among the staff and stakeholders.
4. Need to create energy efficiency/ renewable energy awareness among the college campus and stakeholders i.e. solar, wind, Biogas energy.
5. College should take initiative to arrange seminars, lectures for staff members and stakeholders.

Prepared by

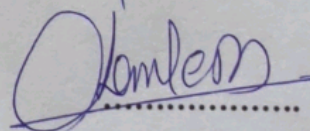


Signature

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SANDIP FOUNDATION'S
Sandip Institute of Pharmaceutical Sciences, Nashik

Energy Audit Report

Energy Audit Team has prepared this report for Sandip Institute of Pharmaceutical Sciences (SIPS), Nashik based on actual energy consumption data collected by team members and available electricity bill provided by the representatives of College, complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

Audit Team Members

1. **Dr. A. S. Dube**

HOD-ME-SIEM

Certified Energy Auditor



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