

ENERGY AUDIT REPORT

2024-2025



RAYAT SHIKSHAN SANSTHA'J ANNASAHEB AWATE COLLEGE, MANCHAR, DIST- PUNE

DT-10-10-2024 TO DT-10-10-2024

AUDITED BY

ADITI ENGINEERING SERVICES NASHIK

Inward No - 678

Date - 04/11/2024

ACKNOWLEDGEMENT

Energy Audit of system is key instrument in knowing the present level of efficiency of various components and establishing the areas of shortfall for improvement.

We are very thankful for Hon. Dr Shri-Nanasaheb Gaikwad Sir, M.Sc. Phd, Principal , **Rayat Shikshan Sanstha Annasaheb Auti College , Manchar Dist- Pune** who have opted such prudential & renovative step on the behalf of Management & have given opportunity to conduct Energy audit of college campus facility .We are also thankful for subordinate staffs who have given their valuable contribution for guiding & supporting us during college premise round for data collection , network study & measurement for accomplishing successful Energy audit. We are also very thankful for & appreciating hospitality given by Hon. Principalsir & subordinate staff.

This report made with sincere efforts gives details of the relevant data collected during energy audit study, observation, analysis & recommendations made pertaining to different systems in college premises.

Several Energy Conservation Opportunities(Measures) have been identified & proposed in course of our study & these options when implemented , are expected to bring in lasting benefits(saving) in term of energy as well as cost to the management.

We are pleased to submit this Detailed Energy Audit Report to Hon. Dr Shri-Nanasaheb Gaikwad Sir, M.Sc. PHD, Principal representing on behalf of management and wish him all the best for implementation of identified Energy Conservation Opportunity as well as recommendations.

Aditi Engineering services Nashik is willing to support management technically toward implementation of Energy Saving Measures for deriving energy conservation & cost effective benefits.

FOR ADITI ENGINEERING SERVICES, NASIK



Er.Deokar Bhausaheb

BEE Certified Energy Auditor

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Date- 29-10-2024

ENERGY AUDIT TEAM

Name	Company	Designation
Mr. Pravin Kurkute sir	Rayat Shikshan Sanstha Annasaheb Awate College , Manchar	College Representative
Er. Bhausahab Deokar	Aditi Engineering Services Nashik	Certified Energy Auditor

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1).INTRODUCTION

Rayat Shikshan Sanstha S. Annasaheb Awate college is situated at Manchar in District- Pune Maharashtra state. This college is affiliated with Savitribai Phule University Pune. This college is started on June 20, 1966 by Rayat Shikshan Sanstha Satara in memory of a veteran educationist and social activist Annasaheb Awate of this region who had devoted all his life to the development of Ambegaon tehsil in Pune district. This college has been imparting higher education up to PG level in science, commerce & Art faculty.

Various faculty departments are functioning with basic motto to impart quality, employment, entrepreneur and Agro oriented higher education to mostly rural as well as urban student. Besides this there is multistoried ladies hostel building for facilitating accommodation to many rural girl students. This college also provides gymkhana facility to student undergoing through various type of physical education. There is also beautiful library where student studying in various branches have facility to refer books.

2).SCOPE OF ENERGY AUDIT :-

The task of energy audit undertaken by Aditi Engineering Services Nashik has the objective of finding opportunities of energy conservation & saving and to recommend action plan with calculation of investment options & energy saving thereof. **The Energy audit has been conducted on 10-10-2024.**

Scope of work is defined below

1. Study & Audit of MSEDCL electricity Bill for cost saving.
2. Inventory of loads & analysis of it
3. UPS Loading study
4. Submersible pump loading study.
5. Photovoltaic solar power system measurement & benefits assessment.
6. Identification of energy saving opportunity & energy conservation measures
7. Submission of technical & financial analysis report of energy audit.

3).ENERGY AUDIT METHODOLOGY :-

The audit involves visiting physical position of load & carry out inventory of load. Due measurement of electrical loads of equipment & circuit is carried out. Energy bill received from MSEDCL is audited & studied for KWH requirement & how efficiently energy is used. Energy conservation & saving opportunities are identified during round for implementation.

4).EXECUTIVE SUMMERY

The management of college has taken many electrical service connections from MSEDCL to meet the requirement of electricity of college for various purposes. In addition to this, the management of college has also installed renewable source of electric power in which one separate on-grid photovoltaic solar power system is installed & commissioned roof top bearing 20KW capacity. The system is commissioned & connected in grid of MSEDCL through NET Metering.

The total demand of electricity of college is met through MSEDCL Grid power only at present as photovoltaic Solar power system has been defective since December 2023. The college requires electricity for lighting load, air conditioner load, motor pump set & laboratory equipment loads majorly. MSEDCL supplies electricity to college & college uses it. Monthly electricity bill is served by MSEDCL to college against cost of electricity unit (KWH) used subject to Meter logged data & college pays it regularly.

The electricity bills for preceding 12 months of all category of connections are referred for KWH consumption & billed amount by MSEDCL to work out Average cost of power.

Details of same are given below.

1) AVERAGE COST OF POWER-

There are number of various type of electricity connection being power supplied by MSEDCL. Monthly electricity bill is served by MSEDCL against electricity used & is paid by college. Average cost of power is worked out by summing up total KWH of all connections & their amount over the year 2023-24. By dividing total amount by total KWH works out **average cost of power per KWH.**

Location of meter	Main Building	Varda	Aniket	Ladies Hostel	Library-A
Consumer No :	172030013331	172031413180	172032323036	172032514435	172031413155
Bill Month	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024
Tariff-	LT VII (B) i	LT II (A)	LT VII (B) i	LT Res 1-phase	LT II Com Less than 20 KW
Consumption	3471	659	3312	4634	6444
Number of Months	13.3	12.18	12.34	12.31	12.31

Fixed Charges	5749.34	5934.69	5327.34	1467.24	5934.69
Energy Charges	21002.22	5482.68	20032.8	45049.38	54114.63
Wheeling Charges	4061.07	771.03	3875.04	5421.78	7539.48
FCA	1350.35	304.95	1283	2783.3	4052.75
Electricity Duty	6754.2	2623.6	6408.8	8755.48	15044.7
Tax on Sale	277.68	52.72	264.96	0	1224.36
Tax on Sale Solar	36.11	6.87	34.43	0	
Locked Credit Amount	-2250.36	0	0	0	0
Gross Total Amount in Rs	36980.65	15176.54	37226.41	63477.18	87910.6
Average Units cost in Rs/KWH	10.65	23.03	11.24	13.7	13.64

Location of meter	Library-B	Bore well	Boys Hostel A	Boys Hostel B	Gross Total
Consumer No :	172031413163	172032338718	172031413228	172031413261	
Bill Month	Nov 2023 to Oct 2024	Nov23 to Oct 24	Nov23 to Oct 24	Nov23 to Oct 24	
Tariff-	LT II Com Less than 20 KW	LT VII (B) i	LT II Com Less than 20 KW	LT II Com Less than 20 KW	
Consumption	2307	8557	5834	2459	37677
Number of Months	12	12	12.31	12.31	
Fixed Charges	5935	5327	5934.69	5934.69	
Energy Charges	19376	51962	48839.93	20756.18	
Wheeling Charges	2699	10012	6825.78	2877.03	
FCA	1846	4706	4667.2	1967.2	
Electricity Duty	6270	15024	13916.196	6622.371	
Tax on Sale	438	1626	1108.46	467.21	
Tax on Sale Solar		0			
Locked Credit Amount	0	0	0	0	
Gross Total Amount in Rs	36563	88658	81292.256	38624.681	485909.4
Average Units cost in Rs/KWH	16	10.36	13.93	15.71	12.90

Average cost of power per KWH Rs - . 12.90

2) ENERGY & COST SAVING OPPORTUNITIES IDENTIFIED—

Sr No	Details Of Study	Cost Saving Opportunity Identified	Saving Potential	
			Kwh	Amount In Rs
1	Administrative Main College Building- Contract Demand Study of Connection No- 172032561441	Contract Demand reduction from 31 KVA to 25 KVA to avoid Exceeding Demand Charges recovered by MSEDCL	0	19984
2	incorrect billing tariff category applied by MSEDCL	change existing tariff Category other than LT VII (B) (i) from MSEDCL to LT VII (B) (i) to save cost	0	59185
3	College Building-Defective Photovoltaic Solar Power System rectification	Reduction In Costly Power Procurement From MSEDCL	0	275365
4	Replacement Of Existing FTL With Energy Efficient LED Tube Light	Energy Conservation & Saving	6000	77400
	Total		6000	431934

5).MSEDCL VARIOUS ELECTRICITY CONNECTION

BILLING STUDY

There are number of various type of electricity connection being power supplied by MSEDCL. Monthly electricity bill is served by MSEDCL against electricity used & is paid by college. Average cost of power is worked out by summing up total KWH of all connections & their amount over the year 2023-24. By dividing total amount by total KWH works out **average cost of power per KWH**. Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL.

1) MAIN BUILDING

Tariff Category in bill - LT VII (B) (I) - 1-Phase up to 20 KW

Connection No- 172030013331

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT VII (B) (i) which is correct.

Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172030013331												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-	LT-VII B I												
Consumption	201	200	343	321	244	207	318	229	673	190	229	316	3471
Number of Months	1	1.03	1.07	0.97	1.1	1	1	0.93	2.13	1	0.97	1.1	13.3
Fixed Charges	464	464	464	464	464	464	433.34	422	844	422	422	422	5749.34
Energy Charges	1242.18	1236	2119.74	1983.78	1507.92	1279.26	1909.56	1360.26	3997.62	1128.6	1360.26	1877.04	21002.22
Wheeling Charges	235.17	234	401.31	375.57	285.48	242.19	372.06	267.93	787.41	222.3	267.93	369.72	4061.07
FCA	110.55	110	188.65	176.55	122	103.5	95.4	68.7	201.9	57	68.7	47.4	1350.35
Electricity Duty	430.9	429.24	666.48	629.98	499.67	438.68	590.18	444.97	1224.5	384.28	444.97	570.39	6754.24
Tax on Sale	16.08	16	27.44	25.68	19.52	16.56	25.44	18.32	53.84	15.2	18.32	25.28	277.68
Tax on Sale Solar	2.09	2.08	3.57	3.34	2.54	2.15	3.31	2.38	7	1.98	2.38	3.29	36.11
Locked Credit Amount	0	0	0	0	0	0	0	0	2250.36	0	0	0	-2250.36
Gross Total Amount in Rs	2500.97	2491.32	3871.19	3658.9	2901.13	2546.34	3429.29	2584.56	4865.91	2231.36	2584.56	3315.12	36980.65
Average Units cost in Rs/KWH	12.44	12.46	11.29	11.40	11.89	12.30	10.78	11.29	7.23	11.74	11.29	10.49	10.65
Rate in Rs/KWH	6.18	6.18	6.18	6.18	6.18	6.18	6.00	5.94	5.94	5.94	5.94	5.94	

2) VARDA

Tariff Category in bill - LT II Com - 1-Phase up to 20 KW

Connection No-172031413180

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDC. The Billing Tariff Category applied by MSEDC in monthly energy bill is LT II Com is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDC for correct billing at correct tariff rate. Average cost of power purchased from MSEDC has been worked out as below-

Consumer No :	172031413180												Total
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	
Tariff-	LT II Com												
Consumption	51	17	15	12	16	15	17	16	135	101	101	163	659
Number of Months	1	1	1.07	0.97	1.1	1	1	0.93	1.07	1.07	0.97	1	12.18
Fixed Charges	517	517	517	517	517	517	482.69	470	470	470	470	470	5934.69
Energy Charges	434.52	144.84	127.8	102.24	136.32	127.8	141.84	132.32	1116.45	835.27	835.27	1348.01	5482.68
Wheeling Charges	59.67	19.89	17.55	14.04	18.72	17.55	19.89	18.72	157.95	118.17	118.17	190.71	771.03
FCA	40.8	13.6	12	9.6	11.2	10.5	7.65	7.2	60.75	45.45	45.45	40.75	304.95
Electricity Duty	220.92	146.02	141.61	135	143.48	141.3	136.93	131.93	379.08	308.47	308.47	430.39	2623.6
Tax on Sale	4.08	1.36	1.2	0.96	1.28	1.2	1.36	1.28	10.8	8.08	8.08	13.04	52.72
Tax on Sale Solar	0.53	0.18	0.16	0.12	0.17	0.16	0.18	0.17	1.4	1.05	1.05	1.7	6.87
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount in Rs	1277.52	842.89	817.32	778.96	828.17	815.51	790.54	761.62	2196.43	1786.49	1786.49	2494.6	15178.54
Average Units cost in Rs/KWH	25.05	49.58	54.49	64.91	51.76	54.37	46.50	47.60	16.27	17.69	17.69	15.30	23.03
Rate in Rs/ KWH	8.52	8.52	8.52	8.52	8.52	8.52	8.34	8.27	8.27	8.27	8.27	8.27	

3) LADIES HOSTEL

Tariff Category in bill - LT Res - 1-Phase up to 20 KW

Connection No-172032514435

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT I Res is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDCL for correct billing at correct tariff rate. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172032514435												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-	LT Res												
Consumption	684	617	307	227	222	397	414	331	367	403	275	390	4634
Number of Months	1.03	1	1.07	0.97	1.1	1	1	0.93	1.07	1.07	0.97	1.1	12.31
Average Units	384	252	282	344	381	371	367	348	356	353	389	380	4207
Fixed Charges	128	128	128	128	128	128	119.24	116	116	116	116	116	1467.24
Energy Charges	8414.33	7385.88	2561.97	1794.57	1670.58	3940.35	3992.88	2910.89	3160.89	3650.85	2143.69	3422.5	45049.38
Wheeling Charges	800.28	721.89	359.19	265.59	259.74	464.49	484.38	387.27	429.39	471.51	321.75	456.3	5421.78
FCA	632.1	559.55	208.15	147.65	122.4	272.15	183.4	138.15	150.65	172.25	104.35	92.5	2783.3
Electricity Duty	1595.95	1407.25	521.17	373.73	348.92	768.8	764.78	568.37	617.11	705.7	429.73	653.97	8755.48
Tax on Sale	0	0	0	0	0	0	0	0	0	0	0	0	0
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	0
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount in Rs	11570.66	10202.57	3778.48	2709.54	2529.64	5573.79	5544.68	4120.68	4474.04	5116.31	3115.52	4741.27	63477.18
Average Units cost in Rs/KWH	11233.65	10202.57	3531.29	2793.34	2299.67	5573.79	5544.68	4430.84	4181.35	4781.60	3211.88	4310.25	13.70
Rate Rs/KWH	12.30	11.97	8.35	7.91	7.53	9.93	9.64	8.79	8.61	9.06	7.80	8.78	

4) LIBRARY-A

Tariff Category in bill - LT II Com - 1-Phase up to 20 KW

Connection No-172031413155

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT II Com is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDCL for correct billing at correct tariff rate. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172031413155												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-	LT II Com Less than 20 KW												
Consumption	473	792	314	307	300	546	559	591	487	663	800	612	6444
Number of Months	1.03	1	1.07	0.97	1.1	1	1	0.93	1.07	1.07	0.97	1.1	12.31
Fixed Charges	517	517	517	517	517	517	482.69	470	470	470	470	470	5934
Energy Charges	4029.96	6747.84	2675.28	2615.64	2556	4651.92	4762.6	4887.57	4027.49	5483.01	6616	5061.24	54114
Wheeling Charges	553.41	926.64	367.38	359.19	351	638.82	654.03	691.47	569.79	775.71	936	716.04	7539
FCA	378.4	633.6	251.2	245.6	240	436.8	447.2	352.35	415.8	274.05	204.75	173	4052
Electricity Duty	1150.5	1853.2	800.2	784.8	769.4	1311.3	1332.7	1344.2	1151.4	1470.5	1727.6	1348.2	15044
Tax on Sale	89.87	150.48	59.66	58.33	57	103.74	106.2	112.29	92.53	125.97	152	116.28	1224
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount in Rs	6719.1	10828.8	4670.8	4580.6	4490.4	7659.6	7785.5	7857.9	6727.0	8599.3	10106.3	7884.8	87910
Average Units cost in Rs/KWH	14.21	13.67	14.88	14.92	14.97	14.03	13.93	13.30	13.81	12.97	12.63	12.88	13.64
Rate Rs/KWH	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.27	8.27	8.27	8.27	8.27	

5) LIBRARY-B

Tariff Category in bill - LT II Com - 1-Phase up to 20 KW

Connection No-172031413163

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT II Com is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDCL for correct billing at correct tariff rate. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172031413163												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-Duty	LT II Com Less than 20 KW												
Consumption	168	176	159	146	164	173	202	156	422	144	294	103	2307
Number of Months	1	1	1	1	1	1	1	1	1	1	1	1	12
Fixed Charges	517	517	517	517	517	517	483	470	470	470	470	470	5935
Energy Charges	1431	1500	1355	1244	1397	1474	1721	1290	3490	1191	2431	852	19376
Wheeling Charges	197	206	186	171	192	202	236	183	494	168	344	121	2699
FCA	134	141	127	117	131	138	162	125	338	115	235	82	1846
Electricity Duty	479	496	459	430	470	490	546	434	1006	408	731	320	6270
Tax on Sale	32	33	30	28	31	33	38	30	80	27	56	20	438
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount in Rs	2790	2893	2674	2506	2738	2854	3186	2531	5878	2380	4267	1864	36563
Average Units cost in Rs/KWH	17	16	17	17	17	16	16	16	14	17	15	18	16
Rate Rs/KWH	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.27	8.27	8.27	8.27	8.27	

6) BOYS HOSTEL- B

Tariff Category in bill - LT II Com - 1-Phase up to 20 KW

Connection No-172031413261

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT II Com is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDCL for correct billing at correct tariff rate. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172031413261												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-Duty	LT II Com Less than 20 KW												
Consumption	261	247	261	220	254	250	188	111	160	140	139	228	2459
Number of Months	1	1	1	1	1	1	1	1	1	1	1	1	12
Fixed Charges	517	517	517	517	517	517	483	470	470	470	470	470	5935
Energy Charges	2224	2104	2224	1874	2164	2130	1602	918	1323	1158	1150	1886	20756
Wheeling Charges	305	289	305	257	297	293	220	130	187	164	163	267	2877
FCA	209	198	209	176	203	200	150	89	128	112	111	182	1967
Electricity Duty	684	653	684	593	668	659	516	337	443	400	398	589	6622
Tax on Sale	50	47	50	42	48	48	36	21	30	27	26	43	467
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount in Rs	3988	3808	3988	3460	3898	3846	3006	1965	2582	2330	2317	3437	38625
Average Units cost in Rs/KWH	15	15	15	16	15	15	16	18	16	17	17	15	16
Rate Rs/KWH	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.27	8.27	8.27	8.27	8.27	

7) BOYS HOSTEL A

Tariff Category in bill - LT II Com - 1-Phase up to 20 KW

Connection No- 172031413228

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT II Com is incorrect. It should be LT VII (B) (i) for load < 20KW. It shall be get changed from MSEDCL for correct billing at correct tariff rate. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172031413228												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-Duty	LT II Com Less than 20 KW												
Consumption	154	98	22	133	530	614	820	783	924	609	455	692	5834
Number of Months	1	1	1	1	1	1	1	1	1	1	1	1	12
Fixed Charges	517	517	517	517	517	517	483	470	470	470	470	470	5935
Energy Charges	1312	835	187	1133	4516	5231	6986	6475	7641	5036	3763	5723	48840
Wheeling Charges	180	115	26	156	620	718	959	916	1081	713	532	810	6826
FCA	123	78	18	106	424	491	656	626	739	487	364	554	4667
Electricity Duty	448	324	157	402	1276	1461	1908	1782	2086	1408	1077	1587	13916
Tax on Sale	29	19	4	25	101	117	150	149	176	116	86	131	1108
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	

Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount In Rs	2610	1888	909	2339	7454	8538	11148	10419	12193	8230	8293	9274	81292
Average Units cost In Rs/KWH	17	19	41	18	14	14	14	13	13	14	14	13	14
Rate Rs/KWH	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.27	8.27	8.27	8.27	8.27	

8) ANIKET

Tariff Category in bill - LT VII (B) (i) - 1-Phase up to 20 KW

Connection No- 172032323036

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT VII (B) (i) which is correct.

Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172032323036												Nov23 to Oct 24
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	
Tariff-Duty	LT VII B i												
Consumption	0	555	532	845	992	875	925	794	849	793	657	740	8557
Number of Months	1	1	1	1	1	1	1	1	1	1	1	1	12
Fixed Charges	464	464	464	464	464	464	433	422	422	422	422	422	5327
Energy Charges	0	3430	3288	5222	6131	5408	5717	4716	5043	4710	3903	4396	51962
Wheeling Charges	0	649	622	989	1161	1024	1082	929	993	928	769	866	10012
FCA	0	305	293	465	546	481	509	437	467	436	361	407	4706
Electricity Duty	0	0	1	2	3	4	5	6	7	8	9	10	55
Tax on Sale	0	105	101	161	188	166	176	151	161	151	125	141	1626
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	0
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount In Rs	464	4954	4769	7302	8492	7547	7922	6661	7094	6655	5588	6241	73689
Average Units cost In Rs/KWH	#DIV/0!	8.93	8.96	8.64	8.56	8.62	8.56	8.39	8.36	8.39	8.51	8.43	8.61
Rate Rs/KWH	#DIV/0!	6.18	6.18	6.18	6.18	6.18	6.18	5.94	5.94	5.94	5.94	5.94	

9) BORE WELL

Tariff Category in bill - LT VII (B) (i) - 3-Phase up to 20 KW

Connection No-172032338718 Load - 3.73 KW

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDC. The Billing Tariff Category applied by MSEDC in monthly energy bill is LT VII (B) (i) which is correct.

Average cost of power purchased from MSEDC has been worked out as below-

Consumer No :	172032338718												
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	Total
Tariff-	LT VII B I												
Consumption	0	555	532	845	992	875	925	794	849	793	657	740	8557
Number of Months	1	1	1	1	1	1	1	1	1	1	1	1	12
Fixed Charges	464	464	464	464	464	464	433	422	422	422	422	422	5327
Energy Charges	0	3430	3288	5222	6131	5408	5717	4716	5043	4710	3903	4396	51962
Wheeling Charges	0	649	622	989	1161	1024	1082	929	993	928	769	866	10012
FCA	0	305	293	465	546	481	509	437	467	436	361	407	4706
Electricity Duty	0	0	1	2	3	4	5	6	7	8	9	10	55
Tax on Sale	0	105	101	161	188	166	176	151	161	151	125	141	1626
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	0
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0	0
Gross Total Amount In Rs	464	4954	4769	7302	8492	7547	7922	6661	7094	6655	5588	6241	73689
Average Units cost in Rs/KWH	#DIV/0!	8.93	8.96	8.64	8.56	8.62	8.56	8.39	8.36	8.39	8.51	8.43	8.61
Rate Rs/KWH	#DIV/0!	6.18	6.18	6.18	6.18	6.18	6.18	5.94	5.94	5.94	5.94	5.94	

CORRECTION REQUIRED IN APPLIED TARIFF CATEGORY TO SAVE COST-

Tariff category of many connections has been applied wrong by MSEDC. So college has to pay the electricity Bill with higher rate of tariff unnecessary making it financial loss of college. So it is necessary to get changed tariff Category from MSEDC as suggested to enable to pay bill with actual applicable tariff to save cost & cheapen average cost of tariff.

Particulars	position With Existing tariff category				
Location of meter	Boys Hostel B	Boys Hostel A	Library-B	Ladies Hostel	Gross Total

Consumer No :	172031413261	172031413228	172031413155	172032514435	
Bill Month	Nov23 to Oct 24	Nov23 to Oct 24	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024	
Tariff-	LT II Com Less than 20 KW	LT II (A)	LT II Com Less than 20 KW	LT Res 1-phase	
Consumption	2459	5834	6444	4634	19371
Number of Months	12	12	12.31	12.31	48.62
Fixed Charges	5935	5935	5934.69	1467.24	19271.93
Energy Charges	20756	48840	54114.63	45049.38	168760.01
Wheeling Charges	2877	6826	7539.48	5421.78	22664.26
FCA	1967	4667	4052.75	2783.3	13470.05
Electricity Duty	6622	13916	15044.7255	8755.48	44338.2055
Tax on Sale	467	1108	1224.36	0	2799.36
Locked Credit Amount	0	0	0	0	0
Gross Total Amount in Rs	38625	81292	87910.6355	63477.18	271304.8155
Average Units cost in Rs/KWH	15.71	13.93	13.64	13.70	14.01

Particulars	Position after changing correct tariff category					Saving in amount Rs
Location of meter	Ladies Hostel	Library-B	Boys Hostel A	Boys Hostel B	Gross Total	
Consumer No :	172032514435	172031413155	172031413228	172031413261		
Bill Month	Nov 2023 to Oct 2024	Nov 2023 to Oct 2024	Nov23 to Oct 24	Nov23 to Oct 24		
Tariff-	LT-VII B i	LT-VII B i	LT-VII B i	LT-VII B i		
Consumption	4634	6444	5834	2459	19371	0
Number of Months	12.31	12.31	12	12	48.62	0
Fixed Charges	5358	5358	5358	5358	21432	-2160.07
Energy Charges	28214.28	39067.2	35223	15010	117514.5	51245.53
Wheeling Charges	5421.78	7539.48	6826	2877	22664.26	0
FCA	2548.7	3544.2	3209	1352	10653.9	2816.15
Electricity Duty	8723.98	11656.86	10629	5165	36174.84	8163.366
Tax on Sale	880.46	1224.36	1108	467	3679.82	-880.46
Locked Credit Amount	0	0	0	0	0	0

Gross Total Amount In Rs	51147.2	68390.1048	62353	30230	212120.3	59184.51
Average Units cost in Rs/KWH	11.04	10.61	10.69	12.29	10.95	

COLLEGE MAIN BUILDING-

Tariff Category in bill - LT VII (B) (i) - 3-Phase up to 20 KW

Connection No-172032561441 with NET Meter connection Billing

Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. The Billing Tariff Category applied by MSEDCL in monthly energy bill is LT VII (B) (i) for contract demand 31 KVA is incorrect. It should be LT VII (B) (ii) for load > 20 KW & < 50KW. Average cost of power purchased from MSEDCL has been worked out as below-

Consumer No :	172032561441											
Bill Month	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23
Tariff - Duty	LT-VII B I											
Conn Load in KW	25	25	25	25	25	25	25	25	25	25	25	25
Contract Demand KVA	31	31	31	31	31	31	31	31	31	31	31	31
Billing PF	0.98	0.98	0.99	1	1	0.99	0.99	0.99	0.99	1	0.99	0.98
Actual 40 % Bill Demand	12	12	12	12	12	12	12	12	12	12	12	12
Recorded Demand	13	17	12	10	15	18	15	11	12	9	16	11
Consumption KWH	2052	2339	2002	2133	2239	2871	2711	2455	2403	1590	247	217
Bill For Number of Months	1	1.03	1.03	1	1.03	1	1.03	0.97	1.03	1.03	1	1.03
Demand Charges	5568.0	5568.0	5568.0	5568.0	5568.0	5568.0	5064.0	5064.0	5064.0	5064.0	5064.0	5064.0

Energy Charges	20068.6	22875.4	19579.6	20860.7	21097.4	20078.4	25483.4	23077.0	22588.2	14946.0	2321.8	2039.8	223816.3
Wheeling Charges	2400.8	2736.6	2342.3	2495.6	2619.6	3359.1	3171.9	2872.4	2811.5	1860.3	289.0	253.9	27213.0
FCA Amount	1744.2	1988.2	1701.7	1813.1	1679.3	2153.3	1355.5	1227.5	1201.5	795.0	123.5	54.3	15836.9
Electricity Duty	6271.8	6995.9	6122.4	6424.5	6649.3	8216.6	7318.9	6735.1	6622.4	4894.7	1694.7	1606.6	69552.8
Tax on Sale Rs	369.4	421.0	360.4	383.9	403.0	516.8	488.0	441.9	432.5	286.2	44.5	39.1	4186.6
PF Penalty/Incentive	-448.0	-499.7	-728.9	-1070.7	-1108.2	-978.2	-871.3	-801.8	-788.4	-815.8	-201.8	-114.8	-8427.4
LF Penalty/Incentive	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Demand Penalty	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locked Cr. Amount	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOD Charges in Rs	84.0	145.5	-37.3	-144.8	-101.1	-32.0	-222.8	-169.2	-130.1	643.0	271.7	238.7	545.6
Incremental Consumption Rebate	-1026.8	-989.3	-1087.5	-1167.0	-1641.0	-431.3	-1329.0	-1290.0	-680.3	0.0	0.0	-27.8	-9669.8
Debit bill Adjustment Amount	0.0	0.0	0.0	0.0	0.0	1089.8	0.0	0.0	0.0	0.0	0.0	0.0	
Bill Amount	35032.0	39241.6	33820.7	35163.3	35966.3	47540.4	40458.6	37156.8	37121.4	27673.5	9607.4	9153.8	387935.7
Average Units cost in Rs/KWH	17	17	17	16	16	17	15	15	15	17	39	42	17
Solar Rooftop Capacity KW	20	20	20	20	20	20	20	20	20	20	20	20	
Solar Generation Units	0	0	0	0	0	0	0	0	0	0	1906	2591	4497
Tariff Rs/KWH	9.78	9.78	9.78	9.78	9.78	9.78	9.4	9.4	9.4	9.4	9.4	9.4	

Average cost of power in Rs/KWH- 17

Note- Average Power factor of load is maintained very good & received incentive amount Rs 8427 in MSEDCCL monthly electricity bill during Oct 2023 to Sept 2024.

EXCESS CONTRACT DEMAND & EXCESS PAYMENT THERE OF

KVA Contract Demand borne on NET Meter connection serviced by MSEDCL is at very higher side. Recorded KVA demand on this connection doesn't fulfill even minimum billing criteria of Distribution Licensees. So college is paying unnecessary excess demand charges in electricity bill making financial loss to college. This is illustrated as below.

The contract demand sought by college & approved by MSEDCL is at very higher side & is making financial loss of college by paying unnecessary over demand charges.

Consumer No :	172032561441												Gross To
Bill Month	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	
Tariff - Duty	LT-VII B I												
Conn Load in KW	25	25	25	25	25	25	25	25	25	25	25	25	
Contract Demand KVA	31	31	31	31	31	31	31	31	31	31	31	31	
Demand charges Rs/KVA	464	464	464	464	464	464	422	422	422	422	422	422	
Recorded Demand in KVA	13	17	12	10	15	18	15	11	12	9	16	11	
40 % of Contract Demand in KVA	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	
65% of Recorded Demand in KVA	8.45	11.05	7.8	6.5	9.75	11.7	9.75	7.15	7.8	5.85	10.4	7.15	
Billing Demand in KVA	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	
Total Demand charges in Rs	5,753.60	5,753.60	5,753.60	5,753.60	5,753.60	5,753.60	5,232.80	5,232.80	5,232.80	5,232.80	5,232.80	5,232.80	65,918.40
Excess Demand charges paid in Rs	1,832.80	626.40	2,134.40	2,737.60	1,229.60	324.80	1,118.30	2,215.50	1,941.20	2,764.10	844.00	2,215.50	19,984.00

Recommendation- Contract Demand of this connection vide Consumer No 172032561441 shall be got reduced from 31 KVA to 25 KVA from MSEDCL to save unnecessary excess payment.

6).WORKING LOAD MEASUREMENT OF MAIN BUILDING

Power demand is measured at various location to know real time demand. It is also tried to measure solar power generation at generation meter. But it is found & measured that no power is delivered either to load or grid. Hence total demand on NET meter is met by grid power at costly tariff. College is losing return on investment. So Solar power system shall be got rectified from authorized vendor & operation shall be resumed to use maximum solar power in day time to save costly power drawl from grid.

Measurement Location	Power measured at output terminal of meter								% Reference Voltage Unbalance
	Phase	KW	KVAR	KVA	PF	Volt	Amps	Hz	
Transformer DB	R	2.47	-0.21	2.48	0.996	241.6	10.3	50.1	0.33
	Y	1.66	0.48	1.73	0.960	243.8	7.1		
	B	6.54	-1.24	6.65	0.983	241.5	27.6		
	Total	10.67	-0.97	10.86	0.983	242.3	15		
MSEDCL NET Meter	R	1.58	-0.53	1.68	0.940	241.5	6.9	50	3.65
	Y	3.36	-0.71	3.45	0.974	236.6	14.6		
	B	2.9	-0.41	2.94	0.986	226.2	13		
	Total	7.84	-1.65	8.07	0.971	234.8	11.5		
Solar Generation Meter	R	0	0	0	0	240.3	0	50.1	
	Y	0	0	0	0	235.1	0		
	B	0	0	0	0	230.8	0		
	Total	0	0	0	0				

Note-

- 1) % Reference Voltage Unbalance is exceeding permissible limit 2V. Supply voltage is supposed to balance to possible extent. This may happen due to shifting of neutral on account of working unbalance load on LT circuit. This may lead to exceed voltage more than rated voltage of load & damage it. So limit the unbalance voltage upto 2V.
- 2) This excessive unbalance voltage may restrain operation of solar power system leading to financial loss.

7).ELECTRICAL CONNECTED LOAD INVENTORY-

Electrical load other than motive power load has been physically inventoried & recorded in table in various types of load. Details of various load inventories are given below. As Viewed from below table, it understands that lighting & fan load , water cooler ,PC load & Split AC load has dominance in total load mix & shares more electrical consumption. This load has most potential to identify energy saving opportunity. College has been taking initiative in energy conservation & energy saving work. As part of this college has replaced almost FTL with LED down light & LED Tube light during year 2023-2024. This work benefitted college to reduce electrical load for same output leading to reduction in annual energy cost.

Sr No	Building	Location	LED Tube light			Ceiling fan			LED panel Light			Computer /monitor		
			No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Total
1	Administrative building A-Wing	Administrative office	14	20	280	16	70	1120			0	10	60	600
		Principal Cabin	1	20	20	6	70	420	20	18	360	1	150	150
		Karmveer Auditorium			0			0	28	18	504			0
		Administrative building toilet	2	20	40			0			0			0
			2	13	26			0			0			0
	Building -A	Department of BBA(Computer Lab)	10	20	200	6	45	270			0	45	60	2700
		IQAC			0	2	70	140	10	18	180	2	60	120
		Examination office	1	20	20	4	70	280	6	18	108	1	60	60
		Computer Lab (A12)			0	2	70	140	12	18	216	20	60	1200
		Class room (A13)			0	2	70	140			0			0
		Class room (A14)			0	2	70	140			0			0
		Class room (A15)	1	20	20	2	70	140			0			0
		Class room (A16)	3	20	60	2	70	140			0			0
		Class room (A17)	1	20	20	1	70	70			0			0
		Class room (A18)			0	2	70	140			0			0
		Biology Lab (A19)Junior	3	20	60	3	70	210			0	1	20	20
		Phd Research centre (A10)	5	20	100	2	70	140			0			0
		Porch	8	9	72			0			0			0
		Staff Room Botany	2	20	40	1	70	70			0	1	60	60
		Botany Lab(A2.2)	9	20	180	7	70	490			0	1	60	60
		Department of botany (A2.3)	10	20	200	1	45	45			0	1	60	60
		Zoology (A2.1)	3	20	60	2	70	140			0	3	60	180

	Zoology (A2.5)	7	20	140	7	70	490			0			0
	Staff room (Physics & Electronics)	2	20	40	1	70	70			0	1	60	60
	Physics Lab(A1.2)	4	20	80	3	70	210			0			0
	Senior physics lab(A1.3)	6	20	120	9	70	630			0	15	60	900
	Chemistry Department			0			0			0			0
	Staff Room A011	2	20	40	1	70	70			0	2	60	120
	Chemistry Laboratory A012	10	20	200	1	35	35			0			0
		1	12	12	5	70	350			0			0
	Physical chemistry	1	20	20	2	70	140			0	1	60	60
	Room A013	3	20	60	1	70	70			0			0
				0	3	45	135			0			0
	Chemistry Research lab A010	2	20	40	2	70	140			0	1	60	60
	Junior Lab A09			0	2	70	140			0			0
	Class Room A08	4	20	80	2	70	140			0			0
	Department of Geography	1	20	20	2	70	140			0	1	60	60
	Class Room A06	6	20	120	3	70	210			0			0
	Class Room A05	3	20	60	2	70	140			0			0
	Class Room A04	1	20	20	1	70	70			0			0
	Class Room A03	1	20	20	1	70	70			0			0
	Department of mathematics(Comp. Lab)			0	2	70	140	12	16	192	20	60	1200
	Departments			0			0			0			0
	Political science	1	20	20	1	70	70			0	1	60	60
	Marathi	2	20	40	1	70	70			0	1	60	60
	Economics	2	20	40	1	70	70			0	1	60	60
	YMC	1	20	20	1	70	70			0	1	60	60
	Karmveer Anna Statue			0	3	70	210	10	9	90			0
	Department of mathematics	1	20	20	2	45	90			0	1	60	60
	IPRC Cell	1	20	20	1	70	70			0			0
	Health centre	1	20	20	1	70	70			0			0
	Ladies common room	1	20	20	1	70	70			0			0
	Department of psychology			0	1	70	70	13	12	156	1	60	60
	Student facility centre	1	20	20	1	70	70			0			0
	Store (Sale)			0	1	45	45	1	15	15			0
Building- B	Commerce Department staff room	2	20	40	2	70	140			0			0
	Class Room B11	2	20	40	3	70	210			0			0
	Class Room B12	1	20	20	3	70	210			0			0

		Class Room B13	3	20	60	3	70	210			0			0
		Class Room B14	1	20	20	3	70	210			0	1	60	0
		Staff Room Junior	2	20	40	1	70	70			0			60
		Class Room B04	2	20	40	3	70	210			0			0
		Class Room B03	1	20	20	2	70	140			0			0
		Class Room B02	1	20	20	3	70	210			0			0
		Class Room B01	3	20	60	1	70	70			0			0
		Marathi Depart. Junior	2	20	40	2	70	140			0			0
3	C-Building	Class Room No-C 5	5	20	100	4	70	280			0			0
		Class Room No-C 4	2	20	40	2	70	140			0			0
		Class Room No-C 3	6	20	120	3	70	210			0			0
		Class Room No-C 2	6	20	120	4	70	280			0			0
		Information Technology Laboratory			0			0	12	18	216	30	60	1800
		Department of B Voc Food processing & quality management	8	20	160	4	70	280			0	1	60	60
4	Main Library - Knowledge Resource Centre	Junior Science staff room			0	1	70	70			0	1	60	60
		Ladies Room	3	20	60			0			0			0
		Book Stack-1	3	20	60	3	70	210			0			0
		Library office	7	20	140	3	70	210			0	6	60	360
		Book Stack-2	6	20	120	3	70	210			0	2	60	120
		Reading Room	6	20	120			0			0			0
			2	13	26	3	70	210			0			0
		Department of biotechnology & ES (L10)	6	20	120	3	70	210			0	1	60	60
		Tissue culture laboratory (L11)	6	20	120	1	45	45			0			0
		Department of English language			0			0			0	17	60	1020
		Commerce Department staff room (L9)	4	20	80	3	70	210			0	16	60	960
		Commerce class room (L 7)	8	20	160	5	70	350			0			0
		History & competitive Exam	21	20	420	9	70	630			0	1	60	60
		Department of B. Voc(Accounting & Taxation)			0			0			0			0
		Computer Lab			0	6	70	420	16	15	240	21	60	1260
5	Ladies hostel	Ladies hostel	22	20	440	22	70	1540			0			0
		porch	2	13	26			0	2	16	32			0

		23 ✓	7	161			0		0			0
	Girls gymnastics	5 ✓	20	100	5	70	350		0			0
	Corridor	21 ✓	20	420			0		0			0
	Rector room	3 ✓	20	60	2	70	140		0			0
	office	1 ✓	20	20	1	70	70		0			0
	Patient room	1 ✓	20	20	1	70	70		0			0
	Room	2 ✓	20	40	2	70	140		0			0
Boys hostel	Boys hostel	9 ✓	20	180	9	70	630		0			0
		9 ✓	7	63			0		0			0
Aniket hall		17 ✓	20	340	3	70	210		0			0
				0	6	35	210		0			0
Gymkhana		10 ✓	20	200	4	70	280		0			0
Security room		2 ✓	50	100	1	70	70		0			0
		1	13	13			0		0			0
	Total	387		7239	267		18095	142	2309	230		13850

Sr No	Building	Location	FTL			Split AC			Fridge		
			No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Total
1	Administrative building A-Wing	Administrative office	7	36	252			0			0
		Principal Cabin			0	1	1800	1800	1	400	400
		Karmveer Auditorium			0	1	1800	1800			0
		Administrative building toilet			0			0			0
					0			0			0
	Building -A	Department of BBA(Computer Lab)	2	36	72			0			0
		IQAC			0			0			0
		Examination office	2	36	72			0			0
		Computer Lab (A12)			0			0			0
		Class room (A13)	1	36	36			0			0
		Class room (A14)	1	36	36			0			0
		Class room (A15)			0			0			0
		Class room (A16)	1	36	36			0			0
		Class room (A17)			0			0			0
		Class room (A18)	1	36	36			0			0
		Biology Lab (A19)Junior	3	36	108			0			0

		Phd Research centre (A10)	1	40	40			0		0
		Porch			0			0		0
		Staff Room Botany			0			0		0
		Botany Lab(A2.2)			0			0	1	360
		Department of botany (A2.3)	1	36	36	1	1800	1800		0
		Zoology (A2.1)			0			0		0
		Zoology (A2.5)	3	36	108			0	1	360
		Staff room (Physics & Electronics)			0			0		0
		Physics Lab(A1.2)			0			0		0
		Senior physics la((A1.3)	6	36	216			0		0
		Chemistry Department			0			0		0
		Staff Room A011			0			0		0
		Chemistry Laboratory A012	1	36	36			0		0
					0			0		0
		Physical chemistry			0			0		0
		Room A013			0			0		0
					0			0		0
		Chemistry Reaserch lab A010			0			0		0
		Junior Lab A09	3	36	108			0		0
		Class Room A08	1	36	36			0		0
		Department of Geography			0			0		0
		Class Room A06			0			0		0
		Class Room A05			0			0		0
		Class Room A04			0			0		0
		Class Room A03			0			0		0
		Department of mathematics(Comp. Lab)			0			0		0
		Departments			0			0		0
		Political science			0			0		0
		Marathi			0			0		0
		Economics			0			0		0
		YMC			0			0		0
		Karmveer Anna Statue	1	36	36			0		0
		Department of mathematics	1	36	36			0		0
		IPRC Cell			0			0		0
		Health centre			0			0		0

		Ladles common room			0		0		0		
		Department of psychology			0		0		0		
		Student facility centre			0		0		0		
		Store (Sale)			0		0		0		
2	Building- B	Commerce Department staff room			0		0		0		
		Class Room B11	1	36	36		0		0		
		Class Room B12	2	36	72		0		0		
		Class Room B13			0		0		0		
		Class Room B14	2	36	72		0		0		
		Staff Room junior			0		0		0		
		Class Room B04	1	36	36		0		0		
		Class Room B03	2	36	72		0		0		
		Class Room B02	2	36	72		0		0		
		Class Room B01			0		0		0		
		Marathi Depart. Junior			0		0		0		
3	C-Building	Class Room No-C 5			0		0		0		
		Class Room No-C 4			0		0		0		
		Class Room No-C 3			0		0		0		
		Class Room No-C 2			0		0		0		
		Information Technology Laboratory			0		0		0		
		Department of B Voc Food processing & quality management			0		0	2	400	800	
4	Main Library - Knowledge Resource Centre	Junior Science staff room	2	36	72		0		0		
		Ladies Room			0		0		0		
		Book Stack-1	3	36	108		0		0		
		Library office			0		0		0		
		Book Stack-2	1	36	36		0		0		
		Reading Room			0		0		0		
			1	36	36		0		0		
		Department of biotechnology & ES (L10)	1	36	36		0		0		
		Tissue culture laboratory (L11)			0	1	1800	1800	1	360	360
		Department of English language	6	36	216		0		0		

		Commerce Department staff room (L9)			0			0		0
		Commerce class room (L 7)			0			0		0
		History & competitive Exam			0	2	1800	3600		0
		Department of B. Voc(Accounting & Taxation)			0			0		0
		Computer Lab			0			0		0
5	Ladies hostel	Ladies hostel			0			0		0
		porch			0			0		0
					0			0		0
		Girls gymnastics			0			0		0
		Corridor			0			0		0
		Rector room			0			0		0
		office			0			0		0
		Patient room			0			0		0
		Room			0			0		0
6	Boys hostel	Boys hostel			0			0		0
					0			0		0
7	Aniket hall				0			0		0
					0			0		0
8	Gymkhana				0			0		0
9	Security room				0			0		0
					0			0		0
		Total	60		2164	6		10800	6	2280

Sr No	Building	Location	Printer			Xerox machine			Wall bracket fan		
			No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Total
1	Administrative building A-Wing	Administrative office	6	500	3000			0			0
		Principal Cabin			0			0			0
		Karmveer Auditorium			0			0	8	45	360

	Administrative building toilet			0			0		0
				0			0		0
Building -A	Department of BBA(Computer Lab)			0			0		0
	IQAC			0			0		0
	Examination office	1	250	250	3	1400	4200		0
	Computer Lab (A12)			0			0		0
	Class room (A13)			0			0		0
	Class room (A14)			0			0		0
	Class room (A15)			0			0		0
	Class room (A16)			0			0		0
	Class room (A17)			0			0		0
	Class room (A18)			0			0		0
	Biology Lab (A19)Junior			0			0		0
	Phd Research centre (A10)			0			0		0
	Porch			0			0		0
	Staff Room Botany	1	250	250			0		0
	Botany Lab(A2.2)			0			0		0
	Department of botany (A2.3)			0			0		0
	Zoology (A2.1)			0			0		0
	Zoology (A2.5)			0			0		0
	Staff room (Physics & Electronics)	1	250	250			0		0
	Physics Lab(A1.2)			0			0		0

		Administrative building toilet			0			0		0
					0			0		0
	Building -A	Department of BBA(Computer Lab)			0			0		0
		IQAC			0			0		0
		Examination office	1	250	250	3	1400	4200		0
		Computer Lab (A12)			0			0		0
		Class room (A13)			0			0		0
		Class room (A14)			0			0		0
		Class room (A15)			0			0		0
		Class room (A16)			0			0		0
		Class room (A17)			0			0		0
		Class room (A18)			0			0		0
		Biology Lab (A19)Junior			0			0		0
		Phd Research centre (A10)			0			0		0
		Porch			0			0		0
		Staff Room Botany	1	250	250			0		0
		Botany Lab(A2.2)			0			0		0
		Department of botany (A2.3)			0			0		0
		Zoology (A2.1)			0			0		0
		Zoology (A2.5)			0			0		0
		Staff room (Physics & Electronics)	1	250	250			0		0
		Physics Lab(A1.2)			0			0		0

		Senior physics la((A1.3)	1	250	250		0		0
		Chemistry Department			0		0		0
		Staff Room A011	1	250	250		0		0
		Chemistry Laboratory A012			0		0		0
					0		0		0
		Physical chemistry			0		0		0
		Room A013			0		0		0
					0		0		0
		Chemistry Research lab A010			0		0		0
		Junior Lab A09			0		0		0
		Class Room A08			0		0		0
		Department of Geography			0		0		0
		Class Room A06			0		0		0
		Class Room A05			0		0		0
		Class Room A04			0		0		0
		Class Room A03			0		0		0
		Department of mathematics(Comp. Lab)			0		0		0
		Departments			0		0		0
		Political science			0		0		0
		Marathi			0		0		0
		Economics			0		0		0
		YMC			0		0		0

		Karmveer Anna Statue			0			0		0
		Department of mathematics	1	250	250			0		0
		IPRC Cell			0			0		0
		Health centre			0			0		0
		Ladies common room			0			0		0
		Department of psychology	1	250	250	1	1400	1400		0
		Student facility centre			0			0		0
		Store (Sale)			0			0		0
2	Building- B	Commerce Department staff room			0			0		0
		Class Room B11			0			0		0
		Class Room B12			0			0		0
		Class Room B13			0			0		0
		Class Room B14			0			0		0
		Staff Room junior			0			0		0
		Class Room B04			0			0		0
		Class Room B03			0			0		0
		Class Room B02			0			0		0
		Class Room B01			0			0		0
		Marathi Depart. Junior			0			0		0
3	C-Building	Class Room No-C 5			0			0		0
		Class Room No-C 4			0			0		0
		Class Room No-C 3			0			0		0
		Class Room No-C 2			0			0		0

		Information Technology Laboratory			0		0	4	45	180
		Department of B Voc Food processing & quality management	1	500	500		0			0
4	Main Library - Knowledge Resource Centre	Junior Science staff room	1	500	500		0			0
		Ladies Room			0		0			0
		Book Stack-1			0		0			0
		Library office	1	500	500		0			0
		Book Stack-2			0		0			0
		Reading Room			0		0			0
					0		0			0
		Department of biotechnology & ES (L10)	1	250	250		0			0
		Tissue culture laboratory (L11)			0		0			0
		Department of English language	1	250	250		0			0
		Commerce Department staff room (L9)	1	250	250		0			0
		Commerce class room (L 7)			0		0			0
		History & competitive Exam	1	250	250		0			0
		Department of B. Voc(Accounting & Taxation)			0		0			0
		Computer Lab			0		0			0
5	Ladies hostel	Ladies hostel			0		0			0

		porch		0		0		0
				0		0		0
		Girls gymnastics		0		0		0
		Corridor		0		0		0
		Rector room		0		0		0
		office		0		0		0
		Patient room		0		0		0
		Room		0		0		0
6	Boys hostel	Boys hostel		0		0		0
				0		0		0
7	Aniket hall			0		0		0
				0		0		0
8	Gymkhana			0		0		0
9	Security room			0		0		0
				0		0		0
		Total	20	7250	4	5600	12	540

ANALYSIS OF CONNECTED LOAD MIX IN CAMPUS

As Viewed from below table, it understands that lighting & fan load , PC load & Split AC load has dominance in total load mix & shares more electrical consumption. These load operation has more saving potential by supervision & precise control.

The total inventoried load has been classified as below.

Type of Load	Quantity in No	Total Load in Watts	% on Total
LED Tube light / LED panel Light	529	9548	14
Ceiling fan/Wall bracket / Exhaust fan	279	18635	27
Computer / monitor	230	13850	20
FTL	60	2164	3
Split AC/ Fridge	12	13080	19
Printer /Xerox machine	24	12850	18
Total	1134	70127	100

LED LIGHTING LOAD SHARING IN TOTAL LIGHTING LOAD

Type of Load	Quantity In No	Total Load in Watts	% on Total
LED Tube light / LED panel Light	529	9548	82
FTL	60	2164	18
Total	589	11712	100

8).MOTOR LOADING STUDY-

There is many submersible pump at various location which pumps the water to supply usable water other than drinking water & drinking water. Nobody could tell rating of motor. Input electrical power is measured during its normal operation. The rating of motor is guessed from input power measured. Input power is measured in which power factor of motor found good. No motor found overloaded.

Motor Pump set Location	Motor Pump set	Rating in KW	% Motor Efficiency	Phase	KW	KVAR	KVA	PF	Volt	Amps	Hz	% Reference Voltage Unbalance	% Loading on motor
English Medium Compound	Submersible Mon block	7.5	86	R	3.96	1.95	4.42	0.896	225.2	19.6	50	1.46	141
				Y	4.14	1.82	4.53	0.914	229.4	19.7			
				B	4.18	2.2	4.73	0.884	231	20.5			
				Total	12.28	5.97	13.68	0.898	228.5	19.9			
	Submersible Mon block	3.7	86	R	1.52	1.28	2	0.760	227.3	8.8	50	-2.24	107
				Y	1.48	1.16	1.88	0.787	225.3	8.4			
				B	1.59	1.15	1.97	0.807	234	8.4			
				Total	4.59	3.59	5.85	0.785	228.9	8.5			
Highway	Submersible Mon block	3.7	86	R	1.67	1.23	2.08	0.803	218.5	9.5	50	5.06	102
				Y	1.12	0.68	1.37	0.818	203.3	6.3			
				B	1.58	0.73	1.74	0.908	220.6	7.9			
				Total	4.37	2.64	5.19	0.842	214.1	7.9			

Motors are drawing more power than expected according to stated their rated power & may be wasting energy. Corrective action is required.

9).PHOTOVOLTAIC SOLAR POWER SYSTEM STUDY-

The college has taken prudential step & holistic approach & installed one photovoltaic roof top solar power system to meet its partly electrical power requirement. In this mechanism of NET Metering policy of MSEDCL, surplus solar power is exported to MSEDCL grid when demand of power of college is lean & imported power from MSEDCL when demand of power of college is more than solar generation. Electrical KWH exported to MSEDCL grid is accounted for Relief in electricity bill. **However photovoltaic roof top solar power system has been found commissioned & connected in NET metering mechanism but is switched off which is very unfortunate & serious. The college is neither benefited by such huge capital investment nor got any benefit or relief in MSEDCL electricity bill since having become defective solar system. It is advised to get checked from vendor & switched on photovoltaic roof top solar power system on top priority under MSEDCL NET metering arrangement to derive financial benefit without fail & further delay.**

Inverter Display Reading-

E Today-0 KWH Power-0KW Running Hours- 0Hrs

ROOF TOP SYSTEM ON MAIN BUILDING

1) PV Panel Details-

Make	Max power watt	open circuit voltage	Max power volt	Max power current Amp	Total Panel No	Total string	Total installed capacity in Watt
Renewsys India	330	46.24	37.67	8.79	61	3	20130

2) PV Grid Inverter Details-

Phase inverter		DC Input				AC Output			
Make	Model	Max DC Volt input	DC input Voltage	MPP Volt Range	Max DC input current	Max Apparent power KVA	Nominal output Volt	PF	Hz
Delta	No name plate found affixed to body								

FINANCIAL LOSS OCCURRED DUE TO DEFECTIVE ROOF TOP SOLAR POWER SYSTEM-

Solar power system found switched off at the time of study & found 0 Watt power delivery during measurement. The solar system might be defective or off since December 2023. Costly grid power is used since then. It is very necessary on top priority to get repaired system & resume its operation in grid to enjoy financial & environmental benefits of solar energy.

Bill Month	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	Total
Installed solar capacity in KW	20	20	20	20	20	20	20	20	20	20	20	20	
Estimated Average KWH generation	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	28800
NET Meter Billed Consumption KWH	2052	2339	2002	2133	2239	2871	2711	2455	2403	1590	247	217	23259
Bill Amount in Rs	35032	39242	33821	35163	35966	47540	40459	37157	37121	27674	9607	9154	387936
Solar System working status	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	On	On	
Total amount Bill paid- Solar system off	35032	39242	33821	35163	35966	47540	40459	37157	37121	27674			369175
Total amount Bill paid- Solar system on											9607	9154	18761
Total amount Bill would have paid if Solar system had been on	9381	9381	9381	9381	9381	9381	9381	9381	9381	9381			93810
Total Measured financial Loss amount Rs													275365

Note -Generation/KW Soar Capacity- 4

Financial loss assessed in Rs per in year- 275365

10).UPS LOADING STUDY

There are following online UPS working in college Building which caters exclusively load of computers. Loading study of all UPS has been carried out & following are major observation in output power measurement.

Location	Online UPS /Inverter	Details							12 V Battery			Remark
		Make	KVA	Phases	Input Volt	Output Volt	Hz	Input DC Volt	Volt	No	AH	
Administrative Building A-Wing	UPS	Microtech	3.5	Input 1-Phase 2W , Output 1-Phase 2W	230	230	50	48	12	4	100	Very under loaded
Library Building	UPS	Microtech	10	Input 1-Phase Output 1-Phase	230	230	50	192	12	16	100	Very under loaded
Ladies Hostel	Inverter	Microtech	0.82 5	Input 1-Phase Output 1-Phase	230	230	50	12	12	1	165	Loads when MSEDCL supply interrupts

11).REPLACEMENT OF EXISTING FTL WITH ENERGY EFFICIENT LED TUBE LIGHT

It has been told that most of replacement of existing FTL with energy efficient LED Tube Light has been completed & minor work is remained. It is proposed to replace remaining FTL with energy efficient LED tube light. This Energy saving & conservation opportunities is mentioned below with cost benefit analysis based on annual average cost of power.

Existing				Proposed			Saving in
Type of lamp	No	Watt/unit (inclusive of choke watt)	Total Load in Watt	Type of lamp	Watt/Lamp including Driver	Total Load in Watt	Watt
FTL T5	60	40	2400	LED Tube light	20	1200	1200

Saving in	working hours per year	Saving in energy	Average cost of power	Saving In Amount Rs	Capital investment in Rs		Pay-back period
				Rs	Cost per unit in Rs	Total Cost in Rs	
Watt	No	KWH	Rs/KWH				Months
1200	5000	6000	12.9	77400	450	24300	4

Total Saving per annum in Energy – 6000 KWH

Total Saving Per Annum in Cost in Rs – 77400

SOLAR WATER HEATER

College has installed solar water heater in Girls hostel to harness cost free solar green energy for heating water requiring for bath by student. This reduces demand of conventional commercial energy. This will also help to reduce greenhouse gas emission mitigating environmental damage. Application of this hot water in various laboratory can be explored which is generated without input energy cost.

Make	Capacity in LPD	Hot water supply
Jain Irrigation	500	Ladies Hostel

Quantification of heat gained & equivalent electrical KWH harnessed

Solar Heater(SH) Location	No of Student occupancy	No of Solar Heaters	Each SH Capacity in Ltrs/Day	Specific heat of water	Average Water Temperature		Total Solar Heat gained by water per Day in	Equivalent Electricity saving in KWH per year	Average Electricity Cost in Rs/KWH	Electricity Cost saving in Rs per year	Estimated CO2 Green House Gas Emission reduction per year in Kg
			Litres	Kcal/Kg/oC	Hot (Out)	Cold (In)	Kcal				
Ladies Hostel	44	1	500	1	60	20	20000	8488.37	12.9	109500.00	7215.12

12).DEDICATED DISTRIBUTION TRANSFORMER FOR COLLEGE

It has been studied voltage profile in measurement at transformer which indicates normality in Voltage magnitude & Voltage unbalance. However at NET Meter unbalance voltage exceeds permissible limit i.e. 2 % .this may be due to unbalance distribution of load on LT circuits emanating from transformer of MSEDCL. It is advised to take care of this to normalize voltage profile.

Total Saving per annum in Energy – 6000 KWH

Total Saving Per Annum in Cost in Rs – 77400

SOLAR WATER HEATER-

College has installed solar water heater in Girls hostel to harness cost free solar green energy for heating water requiring for bath by student. This reduces demand of conventional commercial energy. This will also help to reduce greenhouse gas emission mitigating environmental damage. Application of this hot water in various laboratory can be explored which is generated without input energy cost.

Make	Capacity in LPD	Hot water supply
Jain Irrigation	500	Ladies Hostel

Quantification of heat gained & equivalent electrical KWH harnessed

Solar Heater(SH) Location	No of Student occupancy	No of Solar Heaters	Each SH Capacity in Ltrs/Day	Specific heat of water	Average Water Temperature		Total Solar Heat gained by water per Day in	Equivalent Electricity saving in KWH per year	Average Electricity Cost in Rs/KWH	Electricity Cost saving in Rs per year	Estimate CO2 Greer House Gas Emissic reductio per yea in Kg
			Litres	Kcal/Kg/oC	Hot (Out)	Cold (In)	Kcal				
Ladies Hostel	44	1	500	1	60	20	20000	8488.37	12.9	109500.00	7215.1

12).DEDICATED DISTRIBUTION TRANSFORMER FOR COLLEGE

It has been studied voltage profile in measurement at transformer which indicates normality in Voltage magnitude & Voltage unbalance. However at NET Meter unbalance voltage exceeds permissible limit i.e. 2 % .this may be due to unbalance distribution of load on LT circuits emanating from transformer of MSEDCL. It is advised to take care of this to normalize voltage profile.

The adverse effects of abnormal unbalance voltage exceeding permissible limit i.e. 2 % are described as below.

- 1) Abnormal rise in supply voltage leads to damage electrical & electronics loads i.e. tube, fan, bulb , motor, PCS
- 2) Increment in power consumption by load & electricity bill.
- 3) Deterioration in performance of 3- Phase motor loads & failure of motor.
- 4) Increment in maintenance cost.
- 5) Disturbances in various activity due to unpredictable failures.
- 6) Most of time isolation of Photovoltaic Solar power system from MSEDCL supply grid & this makes stop to deliver solar power to load & import maximum time costly power from MSEDCL grid leading to increase power procurement expenses imposing additional financial burden on college.

13).OBSERVATION & RECOMMENDATION-

Following are observation & recommendation for implementation subsequent to conducted energy audit.

- 1) **20 KW photovoltaic roof top solar power system has been defective since December 2023 which is losing financial & environment benefits unfortunately. The college is neither benefited by such huge capital investment nor got any benefit or relief in MSEDCL electricity bill since defective. It is advised to get rectified photovoltaic roof top solar power system on top priority under MSEDCL NET metering arrangement to derive financial benefit without fail & further delay.**
- 2) Solar energy project relieves college by & large from dependency on MSEDCL as well as relieves from costly power procurement from MSEDCL. Solar project also mitigates greenhouse gas emission leading to protect environment from pollution.
- 3) It is necessary to watch & witness regularly whether MSEDCL representatives reads monthly regularly & correctly to avoid any exorbitant cost of accumulated KWH units
- 4) It is necessary to wash & clean regularly dirt & dust deposited on photovoltaic solar power panel to get optimum output power .
- 5) It was found many rooms without occupancy during campus electrical load inventory round. However Tube light & ceiling fan loads were on wasting costly electrical energy as well as adding unwanted cost to college. It is proposed herewith to stick **Awareness cum Warning Sticker** to each switch board to take care of this negligence i.e. **Don't keep on light & fan when leave room**
- 6) It is reviewed about Awareness program if any undertaken at college level for optimum use of electricity & water as well as its saving. There is still tremendous scope to create awareness

among user about efficient & optimum use of energy & water to save. Instruction cum Request Sign board shall be displayed near each switch-board, toilet block & bathrooms to influence & guide to user to arrest misuse & wastage of power & water.

- 7) Single Line Diagram of supply is flow is advised to be drawn & maintained for more safety during normal & emergency situation.
- 8) Fridge, Split AC found STAR RATED & energy efficient.
- 9) Battery terminal maintenance of 10KVA UPS in library building is necessary as carbonization is significantly taking place.
- 10) The UPS capacity is very higher side. Excess capacity battery consume power for trickle charging & make the loss of energy leading to increment in operating cost .So it is strongly recommended to optimize UPS capacity for total PC load to save the wasting cost & energy
- 11) Analysis of Connected Load Mix in Campus
The total inventoried load has been classified as below.

Type of Load	Quantity in No	Total Load in Watts	% on Total
LED Tube light / LED panel Light	529	9548	14
Ceiling fan/Wall bracket / Exhaust fan	279	18635	27
Computer / monitor	230	13850	20
FTL	60	2164	3
Split AC/ Fridge	12	13080	19
Printer /Xerox machine	24	12850	18
Total	1134	70127	100

LED LIGHTING LOAD SHARING IN TOTAL LIGHTING LOAD

Type of Load	Quantity in No	Total Load in Watts	% on Total
LED Tube light / LED panel Light	529	9548	82
FTL	60	2164	18
Total	589	11712	100

Monitoring & controlling is necessary on use of lighting, fan & split Air conditioner load to save the cost. Because these load dominate total load mix.

- 12) It is proposed to replace remaining FTL with energy efficient LED tube light.
- 13) As there is student occupancy & movement in college campus; It needs to identify electrical risk hazards to rectify them to ensure maximum electrical safety to human-being & costly equipment. So it is recommended to get Electrical Safety Audit done
- 14) Cable termination in Distribution Box on transformer shall be well dressed & tightened firmly.

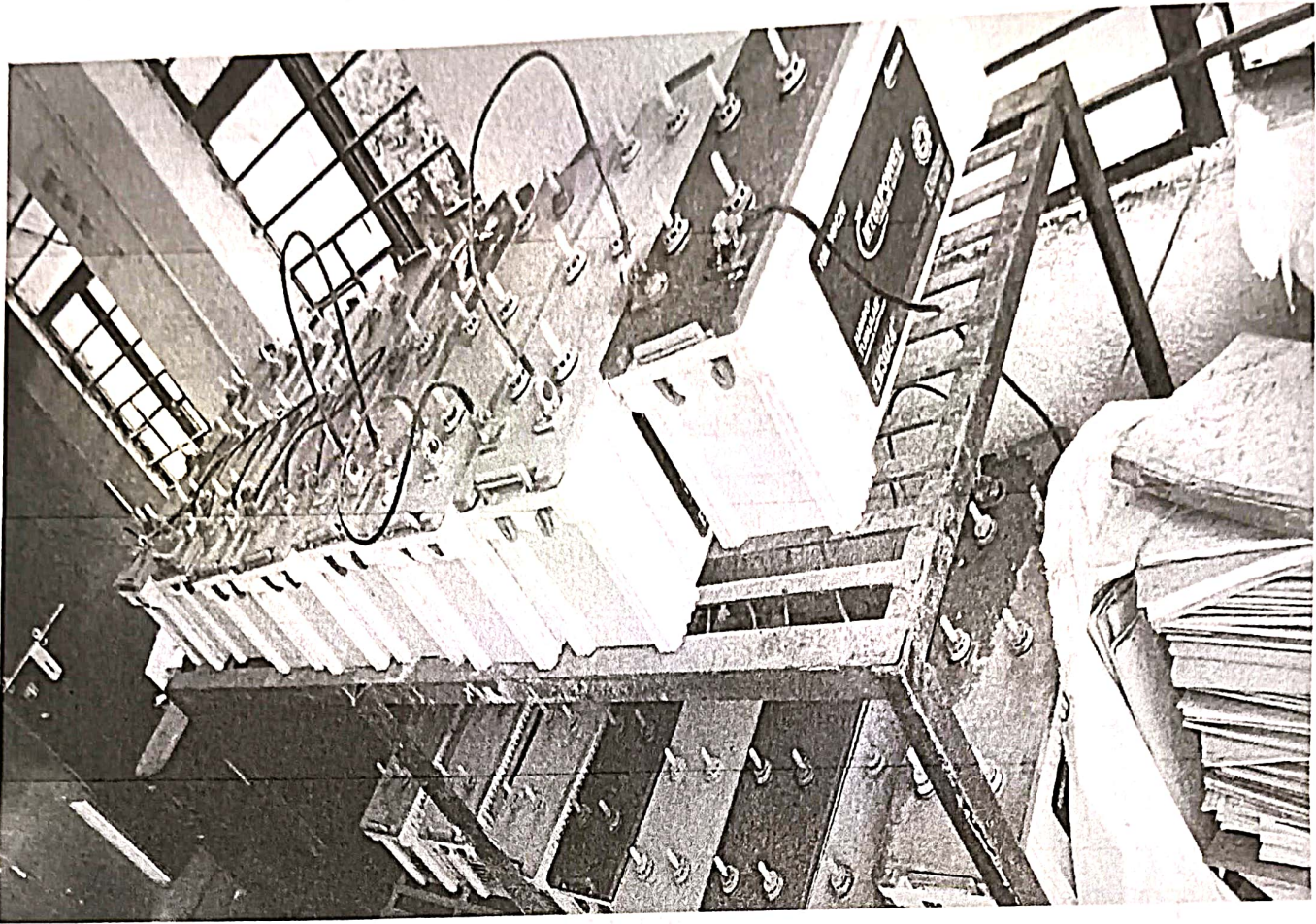
(Note- You are requested to refer entire report to understand things clearly)

13).LIST OF INSTRUMENT USED FOR MEASUREMENT IN ENERGY AUDIT

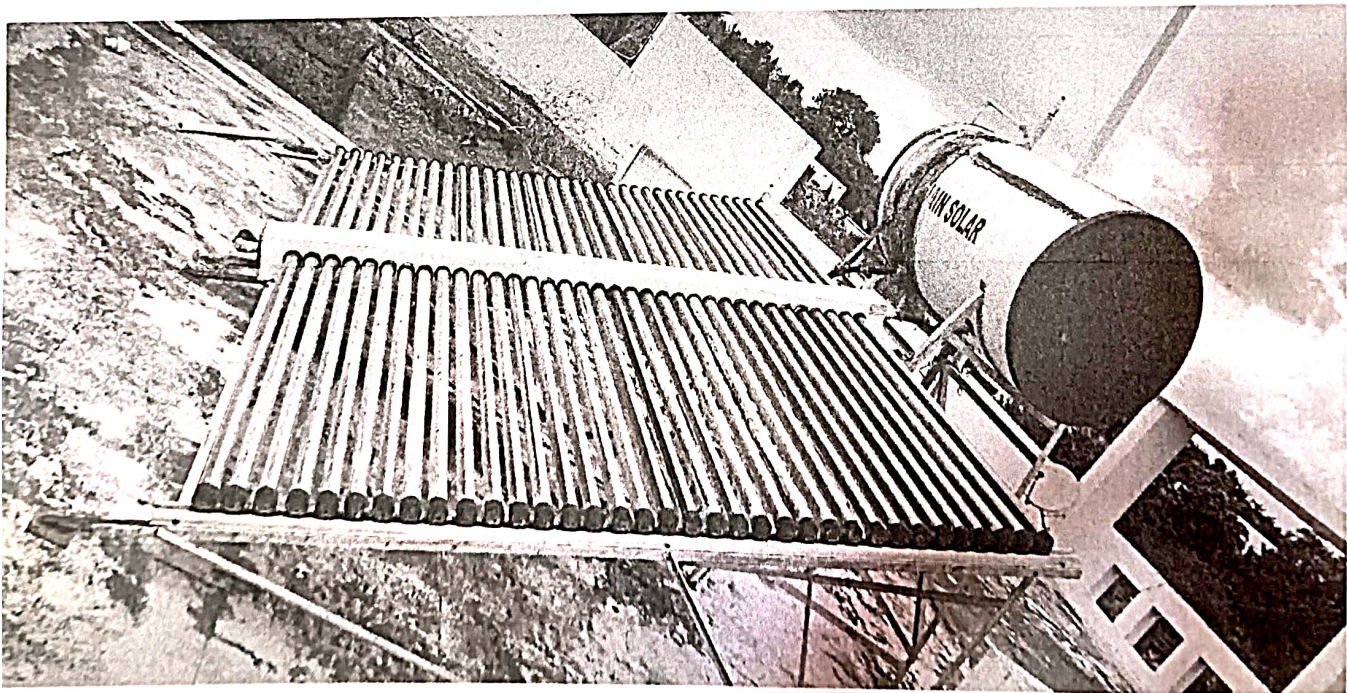
Sr No	Instrument Name
1	3- Phase Electric Power Analyzer
2	Lux Meter
3	Infrared Thermometer
4	Whirling psychomotor
5	Measuring tape

Representative photo

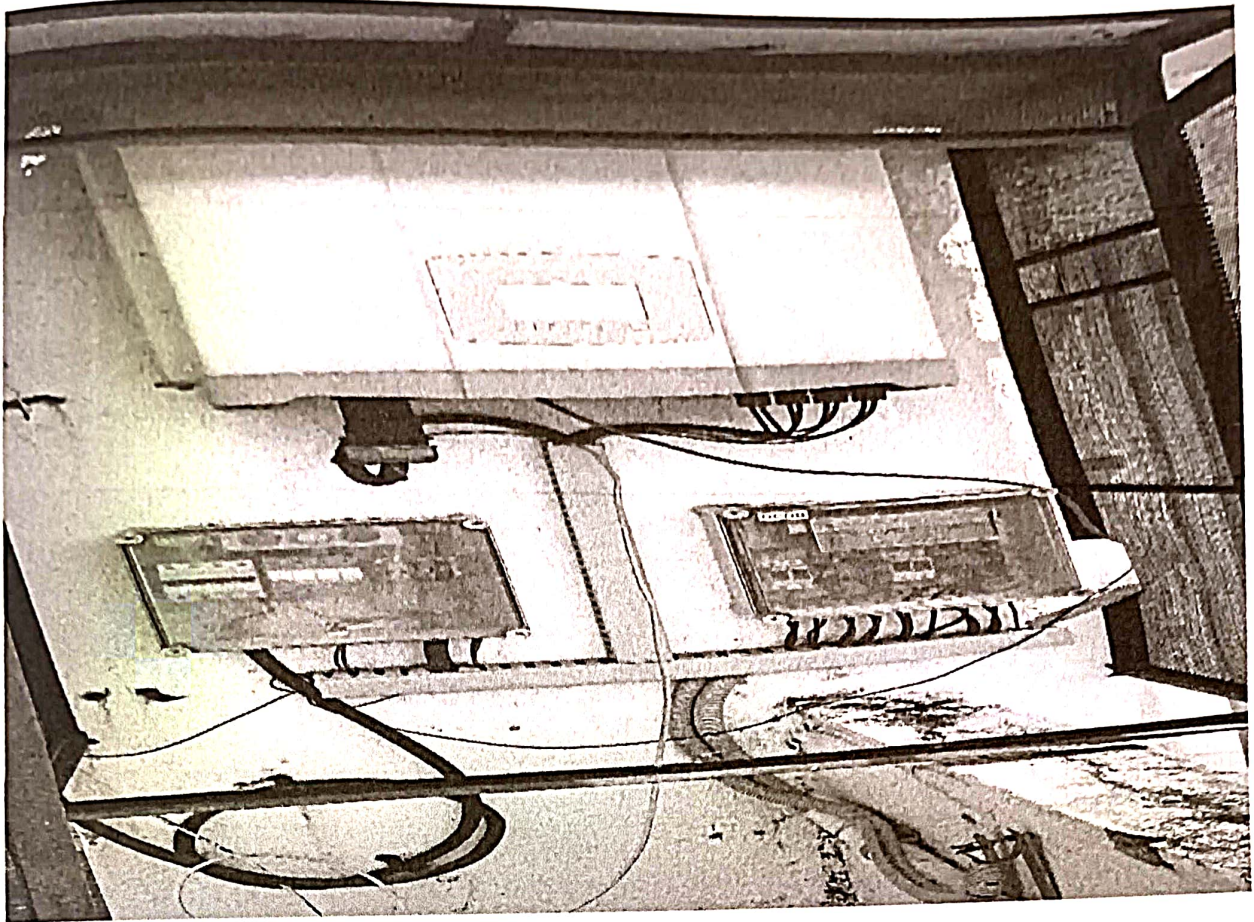
1) UPS Battery maintenance is necessary in library building.



2) Solar water heater on ladies hostel



3) Solar Power system is not working. Needs rectification.



4) NET Metering Installation

