# 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 AND SEALESS - ON

ADITI ENGINEERING SERVICES NASHIK

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### **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 Sansthaj 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** 

Breskur

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Email- bldeokar61@gmail.com

Date- 29-10-2024

### **ENERGY AUDIT TEAM**

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

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### 1).INTRODUCTION

Rayat Shikshan Sansthaj 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			
Tariff-	LT VII (B) i	LT II (A)	LT VII (B) i	LT Res 1-	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	O men	12 13 n O	egold olour or	datian/mbg
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

Fixed Charges	5749.34	5934.69	5327.34	1467.24	900	5934.69
Energy Charges	21002.22	5482.68	20032.8	45049.38		54114.63
Wheeling Charges	4061.07	771.03	3875.04	5421.78	#11 1	7539.48
FCA	1350.35	304.95	1283	2783.3		4052.75
Electricity Duty	6754.2	2623.6	6408.8	8755.48	12	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	-	_ d
Locked Credit Amount	-2250.36	Lapan On Mark	2.35/10	o order	ga tino	ert o
Gross Total Amount in Rs	36980.65	15176.54	37226.41	63477.18	i hayb	87910.6
Average Units cost in Rs/KWH	10.65	23.03	11.24	13.7		13.64
ense	131				7439 8/ 2/2/2/	C
Location of meter	Library-B	Bore well	Boys Hostel A	Boys Hos	stel B	Gross Tota
Consumer No :	172031413163	172032338718	172031413228	17203141	3261	Equal
Bill Month	Nov 2023 to Oct 2024	Nov23 to Oct 24	Nov23 to Oct 24 Nov23		oct 24	Transfer of the second
Tariff-	LT II Com Less than 20 KW	LT VII (B) i	LT II Com Less than 20 KW	LT II Com than 20		
Consumption	2307	8557	5834	2459		37677
Number of Months	12	12	12.31	12.31	Survey.	A THE STATE OF THE
Fixed Charges	5935	5327	5934.69	5934.6	9	· · · · · · · · · · · · · · · · · · ·
Energy Charges	19376	51962	48839.93	20756.1	18	March Control
Wheeling Charges	2699	10012	6825.78	2877.0	3	
FCA	1846	4706	4667.2	1967.2		KA PERMIT
Electricity Duty	6270	15024	13916.196	6622.37	11	wisimonii
Tax on Sale	438	1626	1108.46	467.21	es feça	Basinsa - An
Tax on Sale Solar	- Charles (AVA)	O 1 0	នាល់ ខ្លួន ទើបមួយ នា	ARDI YED		JEJONES
Locked Credit Amount	0	0	0 C	0		The Bas selection
Gross Total Amount in Rs	36563	88658	81292.256	38624.6	81	485909.4
Average Units cost in Rs/KWH	16	10.36	13.93	15.71		12.90

# 2) ENERGY & COST SAVING OPPORTUNITIES IDENTIFIED

		THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY.	The street Co.	PARK STREET	
Sr No	Details Of Study	Cost Saving Opportunity Identified	Saving Potential		
	No. C.	All des and the second	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	300000	275365	
4	Replacement Of Existing FTL With Energy Efficient LED Tube Light	Energy Conservation & Saving	6000	77400	
	Total	nephri	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

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Tariff Category in bill has been verified for correct application of billing tariff category by MSEDCL. 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	172030013331												
No:		1 2			т	1/203	1013331						
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-		1 1				LT-V	VII B I						ver ingila
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	0	0	ů č	0	Ö	60 o	S . O	6 O	2250.36	0	0	· 0	-2250.36
Amount 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 Inits 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	50 7 5

# 2) VARDA

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

				M-183	7.0	Land Carlot	~ P	7 ( )				· I	
A = 1				-		17203	1413180		1		DEC-23	NOV-23	To
Consumer No :					JUN-24	MAY-24	APR-24 MAR-24		FEB-24	JAN-24	DEG-20		
Bill Month	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24		Com		H	10.7			
Tariff-						LTI	l Com	11	15.0		101	163	6
rariii-					16	15	17	16	135	101	101	- 1 - 20	
Consumption	51	17	15	, 12	10	96 1 C		0.03	1.07	1.07	0.97	. 1	1
Number of Months	1	1	1.07	0.97	1.1	3 1,	1 1	0.93				470	59:
		F.(-7	517	517	517	517	482.69	470	470	470	470	410	
Fixed Charges	517	517	517	3	-		141.84	132,32	1116.45	835.27	835.27	1348.01	54
Energy Charges	434.52	144.84	127.8	102.24	136.32	127.8	141.04	102.02	n	And a second		400.74	
	59.67	19.89	17.55	14.04	18.72	17.55	19.89	18.72	157.95	118.17	118.17	190.71	3-1
Wheeling Charges	33.01		1		11.2	10.5	7.65	7.2	60.75	45.45	45.45	40.75	30
FCA	40.8	13.6	-, 12	9.6	15,11.2	3.10.0	94.01					420.20	20
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	
Liconiting 2 2 3		4.00	1.2	0.96	1.28	1.2	1.36	1.28	10.8	8.08	8.08	13.04	5
Tax on Sale	4.08	1.36	31,4	Carlot			- 10			The second problem	7-1-1	4 7	T <sub>u</sub>
Tax on Sale Solar	, 0.53	0.18	0.16	0.12	0.17	0.16	0.18	0.17	2.5.1.4	1.05	1.05	1.7	
Locked Credit	0	. 0	0	. O	Tr. 2 0	0	0	0 es	6-10	0 2	0	0	· · · · · · · · · · · · · · · · · · ·
Amount	-		047.22	778.96	828.17	815.51	790.54	761.62	2196.43	1786,49	1786.49	2494.6	15
Gross Total Amount in Rs	1277.52	842.89	817.32	110.50	J20.11	13/2-1		1,01.02	-130.43	1700,49	1700.49	A STATE OF THE STA	- year
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	
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 MSEDC 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-

- control of the cont													
Consumer No :	. 1	v .	17.			1720325	14435	. 2E	. 1	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	Total
Tariff-	100	. (*	- t			LTR	les	+ 41 1 2	48.5	u. L. J.	L .		
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	<b>0</b>	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

Consumer No :						172031	1413155						
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	Tota
Tariff-					l	LT II Com Les	ss than 20 l	KW EEL	raje priješ	1-1-11	noite	unnot	
Consumption	473	792	314	307	300	546	559	591	487	663	800	612	644
Number of Months	1.03	1	1.07	0.97	1.1	1	(4) <b>1</b>	0.93	1.07	1.07	0.97	11.17	12.3
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	187 92 1 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	r. Lend

### 5) LIBRARY-B

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

#### **Connection No-172031413163**

				100								ola telade	. , ,
Consumer No:	- i				VARIABLE ALL	172031	413163			1 1 102	4	la d	
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				4.25 %		II Com Le	ss than 20 l	kW	13 =		3		
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 <sub>T.1</sub>	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	<u> </u>	434	1006	408	731	320	6270
Tax on Sale	32	33	30	28	31	33	38	30	80	27	56 <sup>Jac</sup>	20	438
Tax on Sale Solar	0	0	.3 <b>0</b>	0	0	3 0 1	0	0 0	6 <b>0</b> 37	8 O X	0	en (10 0 M v m	
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	7

### a visin 6) BOYS HOSTEL- Borod Final galliss or Tubullet.

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

#### Connection No-172031413261

Consumer No:		172031413261												
Bill Month	OCT- 24	SEP- 24	AUG- 24	JUL-24	JUN-24	MAY-	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 43	467	
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	2.00	
Locked Credit Amount	0	0	0	0	0	0	0	0	0	0	0	0 ~~	0	
Gross Total Amount in Rs	3988	3808	U 3988	3460	å 3898 °	3846	€ 3006 €	1965	2582	<b># 2330</b>	2317	y 3437 A	∜ 38625	
Average Units cost in Rs/KWH	15	15	15	16	15	15	16	18	16	17	17	15° n	76116	
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	. 18.27	нажы	

### 7) BOYS HOSTEL A

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

#### Connection No- 172031413228

Consumer No :				3 2		17203	1413228						
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			3 13 165	James de		II Com Le	ss than 20	ĸw	J. Carrie	A selection	t er Fu	MEED	-
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	156	149	176	116	86	131	1108
Tax on Sale Solar	0	0	0	0	0	0	0	0	0	0	0	0	1100

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	8536	11148	10419	12193	8230	6293	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	

### 

### 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 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 :						172032	323036		323 1	- 204	A so let	· 是我的手机。	
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	Nov23 to Oct 24
4		9 = -	V	9		LTV	'II B i	194	rer i	20.			- NE
Tariff-Duty	1.1		11	) ° †	17.6	0 1	to the latest transfer	794	849	793	657	740	8557
Consumption	0	555	532	845	992	875	925				1	1	12
Number of Months	1	1	1	1	1	<sub>0</sub> 1	1	1 1	ρ 1	<sub>6</sub> 1	2		
		464	464	464	464	464	433	422	422	422	422	422	5327
Fixed Charges	464			5222	6131	5408	5717	4716	5043	4710	3903	4396	51962
<b>Energy Charges</b>	0,1	3430	3288					929	993	928	769	··· 866	10012
Wheeling Charges	0	649	622	989	1161	1024	1082		11	53.45	14.1	407	4706
FCA	0	305	293	465	546	481	509	437	467	436	361		
		0	1	2	3	4	5 - 5	6	7	8	9	10	55
Electricity Duty	0				188	166	176	151	161	151	125	141	1626
Tax on Sale	0	105	101	161					0	0	0	0	0
Tax on Sale Solar	0	0	0	0	0	0	0	0	0 0	I SMEEN	1 The term	30 2 2 9	<del>                                     </del>
Locked Credit	0	0	0 10	Ō	0	0	0	0	0	0	0	0	0
Amount Gross Total Amount in Rs	464	4954	4769	7302	8492	7547	7922	6661	7094	6655	5588	6241	73689
Average Units	#DIV/01	8.93	8.96	8.64	8.56	8.62	8.56	8.39	8.36	8.39	) 8.51 ·	8.43	8.61
cost in Rs/KWH Rate Rs/KWH	#DIV/01	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 MSEDCL. 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 :						172032	2338718	- E4.20 (19.5×)			d mair		
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	10
Tariff-	41					LT	/II B I	VIONO	1.2 01	al good	G by	_	
Consumption	0	555	532	845	992	875	925	794	849	793	657	740	85
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	<b>422</b>	422	53:
Energy Charges	0	3430	3288	5222	6131	5408	5717	4716	5043	4710	3903	4396	519
Wheeling Charges	0	649	622	989	1161	1024	1082	929	993	928	769	866	100
FCA	0	305	293	465	546	481	509	437	467	436	361	407	470
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	· <u>«1</u> 10	1.0° O	332 o	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	7368
Average Units cost in Rs/KWH	#DIV/01	8.93	8.96	8.64	8.56	8.62	8.56	8.39	8.36	8.39	8.51	8.43	8.6
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 MSEDCL. 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 MSEDCL 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		
and the same of th			гигагу-В	Ladies Hostel	<b>Gross Total</b>

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	was state opening to
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
<b>Energy Charges</b>	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	TEST TO LIO	2799.36
Locked Credit Amount	185 c <b>0</b> 5c sol	Miles of the	tition of hear	C KVAO's Inco	special dominand.
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			hanging correct tari	ff 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	12.	
Tariff-	LT-VII B i	LT-VII B i	LT-VII B i	LT-VII B i	80.37	
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	O	0	0	0	0

				30230	212120.3	59184.51
Gross Total Amount in Rs	51147.2	68390.1048		12.29	10.95	
Average Units cost in Rs/KWH	11.04	10.61	10.69		J 14 1	

# **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 MSEDC 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 & < 50 kW. Average cost of power purchased from MSEDC has been worked out as below-

Consumer No :	W.A.S		(5.7	,	:4.11	1720325	61441			+ 1: 	Copie F		
Bill Month	SEP-24	AUG-	JUL-24	JUN-24	MAY-	APR-24	MAR-	FEB-24	JAN-24	DEC-23	NOV- 23	OCT- 23	
Tariff - Duty	0.53			encirco.	Fr) + J=+1	LT-VII		11905	Y		1 1.782.	-1	
Conn Load in KW	25	25	25	25	7. l s -	25	25	25	25	25	25	25	
Contract Demand KVA	31	31	31	31	31	31	31	31 (0 vol.	31 07.5%	31 12. VO11	31	31	
Billing PF	0.98	0.98	0.99	, 5 <b>,1</b>		0.99	0.99	0.99	0.99	17 × 7 <b>1</b>	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 1000	12	9	16	11	
Consumption KWH	2052	2339	2002	2133	2239	2871	2711	2455	2403	1590	247	217	232
Bill For Number of Months	1	1.03	1.03	1	1.03	" <sup>6</sup> 1	1.03	0.97	1.03	1.03	1 1	1.03	12.1
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	6379

Energy Charges	20068.6	22875.4	19579.6	20860.7	21897.4	28078.4	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.	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	e) pare-
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	9.4 181 10	9.4	9.4 12 F	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 MSEDCL 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 :						172032	561441			DEC-23	NOV-23	OCT-23	Gross
Bill Month	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23		001-23	_
Tariff - Duty		Į.				LT-V	II B I						<u> </u>
Conn Load						25	25	25	25	25	25	25	
in KW	25	25	25	25	25	25	To State	100 TO 100 TO	Wiles Inc	31	31	31	
Contract Demand KVA	31	31	31	31	31	31	31	31	31	A city	1 1 War	YHATE	
Demand charges	464	464	464	464	464	464	422	422	422	422	422	422	_
Rs/KVA Recorded Demand in KVA	13	17	12	10	15	18	15	11	12	9 701	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
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

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		Pov		ured at outp	ut termina		na result		% Reference Voltage Unbalance
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	Phase	кw	KVAR	KVA	PF	Volt	Amps	Hz	
Transformer DB	R	2.47	-0.21	2.48		241.6	10.3	50.1	0.33
	Y	1.66	0.48	1.73	0.960	243.8	7.1	341	in Ministra
	В	6.54	-1.24	6.65	0.983	241.5	27.6	+0	Brighting 1
	Total	10.67	-0.97	10.86	0.983	242.3	15		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
MSEDCL NET Meter	R	1.58	-0.53	1.68	0.940	241.5	6.9	50	3.65
Wieter	Υ	3.36	-0.71	3.45	0.974	236.6	<b>14.6</b>	7 N .	
	В	2.9	-0.41	2.94	0.986	226.2	13	<u> </u>	g cather serves
<u> </u>	Total	7.84	-1.65	8.07	0.971	234.8	11.5		and the second second
Solar Generation	R	0	2/41	65 B	0	240.3	Lean Rest Leaf O	50.1	anti-usi
Meter			0	0 70	05.0	235.1	more Online	1	1
00 ou	Y <sub>2</sub>	B1 0 0	0	0	0:0	230.8	0		
VAI	B Total	0 A	0	0	0	230.8	(AL2)	. 1	

#### 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 lig			Ceiling fa		LI	ED panel Li	ght each	Co	mputer/m	onito
	т д	a / _ 1	No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Total	No	Watt/no	Tot
1	Administrative building A- Wing	Administrative office	14	20	280	16	70	1120	, t)	: 1 ! å _	0	10	60	600
	VVIIIg	Principal Cabin	1	20	20	6	70	420	20	18	360	1	150	15
		Karmveer Auditorium	- ·	2 1	0	3	1	0	28 ,	18	504		193-W	1
		Administrative building toilet	2	20	40	<u>d</u>	.€	( X . 0 .	- 8		0	i.		_ 0
	<u> </u>	1	2 /	13	26	-		, . 0		100 mm	0	-		0
	Building -A	Department of BBA( Computer Lab)	10	20	200	6	45	270		1	0	45	60	270
		IQAC		1	0 1	2	70	140	10	18	180	2	60	12
		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	120
-		Class room (A13)			0	2	70	140			0			0
- 1	,	Class room (A14)			0	2	70	140			0			0
		Class room (A15)	1	/ 20 m	20	2	70	140	15 1	s. Section	· 0 🛌	, i'' '4		0
	43 = 8	Class room (A16)	3 🦸	7 E 20	60	- 2	70	140	1775	F. P 137 (2)	0			(
		Class room (A17)	1 -	20,,,,	20	1	70	70	10-0-	130 000	0, 1			(
		Class room (A18)		21	, 0	2	70	140	ı,		0			(
		Biology Lab (A19)Junior	3 ,	20	60	3	70	210	-		0	<u>_</u> 1	20	2
	mais,is i	Phd Research centre (A10)	√5.√	20	100	2	>( <b>70</b> €	140	idm.	ovican	X ! O " \	1 (		0
		Porch .	_8	9	72			0	1 15 [ ]	TEATH OF	0	}.1		-
		Staff Room Botany	2 <	20	40	1	70	70			0	1	60	6
		Botany Lab(A2.2)	9 .	20	180	7	70	490			0	1	60	6
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,	/	Phd Research centre (A10)		Ş-	0		inc	1956 RE			0
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- 2	-	Zoology (A2.5)			0			**************************************	~ <u>1</u> -		0
		Staff room (Physics & Electronics)	1	250	250		3 (2)	0	:-	,	0
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	Total	20		7250	4		5600	12	The second second second	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.
1일 경에 가는 사람들이 하는 건강에 가지 않았다. 그 전략적으로 보고 선명이 다른 제 <del>이 기계 기</del>	230	13850	20
Computer / monitor 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	n avalt to trad avail

### 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	% Loadi on mote
English Medium Compound	Submersible Mon block	7.5	86	R   c	3.96	1.95	4.42	0.896	225.2	19.6	50	1.46	141
				Υ	4.14	1.82	4.53	0.914	229.4	19.7	70.		
				В	4.18	2.2	4.73	0.884	231	20.5		4. 40.17	SEE SELVE
				Total	12.28	5.97	13.68	0.898	228.5	19.9			Appropriate V
, di	Submersible Mon block	3.7	86	R	1.52	1.28	2	0.760	227.3	8.8	50	-2.24	107
	E .	- 1 T	. 81	Υ	1.48	1.16	1.88	0.787	225.3	8.4			
				В	1.59	1.15	1.97	0.807	234	8.4		1	
			-	Total	4.59	3.59	5.85	0.785	228.9	8.5		775	
Highway	Submersible Mon block	3.7	86	R	1.67	1.23	2.08	0.803	218.5	9.5	50	5.06	102
		1.0	F	Y	1.12	0.68	1.37	0.818	203.3	6.3		*-11	
	T.	(L)	P	В	1.58	0.73	1.74	0.908	220.6	7.9		11111	547
			4	Total	4.37	2.64	5.19	0.842	214.1	7.9			Bus .

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- OHrs** 

### **ROOF TOP SYSTEM ON MAIN BUILDING**

### 1) PV Panel Details-

Make	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-

hase	inverter		DCI	nput		AC Output							
lake	Model	Max DC Volt input	DC input Voltage	MPP Volt Range	Max DC input current	Max Apparent power KVA	Nominal output Volt	PF	Hz				
elta	April 1		No	name p	late found aff	ixed to body		7.49					

# FINANCIAL LOSS OCCURRED DUE TO DEFECTIVE ROOF TOP

Solar power system found switched off at the time of study & found 0 Watt power delivery dely 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. LIAN- DEC- NOV- OCT-

	SEP-	AUG-	JUL-	JUN-	MAY-	APR-	MAR-	FEB-	JAN- 24	23	23	23	Total
Bill Month	24	24	24	24	24	24	24		20	20	20	20	
Installed solar capacity in KW	20	20	20	20	20	20	20	20	T 154 /		7	: * . /t . ·	
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	4 g 77		369175
Total amount Bill paid- Solar system on							_	.i 21	1. 7. 1.4	1 2 7	9607	9154	18761
Total amount Bill would have					26.5	sh = =, :							
paid if Solar system had been on	9381	9381	9381	9381	9381	9381	9381	9381	9381	9381		aditto	93810
Total Measured financial Loss amount Rs				Į.		A	37.0	19 S. S.				A Zancin	27536

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										ery	Remark
	10 (	Make	KVA	Phases	Input Volt	Output Volt	Hz	Input DC Volt	Volt	No	АН	3 3-1-2 14 <sup>2</sup>
<sub>Idministrative</sub> Building A-Wing	UPS	Microtech	3.5	Input 1- Phase 2W , Output 1- Phase 2W	230	230	50	- 48 - 48	12	4	100	Very under loaded
<sub>brary</sub> Building	UPS	Microtech	10	Input 1- Phase Output 1- Phase	230	230	50	192	12	16	100	Very under loaded
<sub>Ladies</sub> Hostel	Inverter	Microtech	0.82 5	Input 1- Phase Output 1- Phase	230	230	50	12	12	1 3	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.

	m Ch E	xisting	n <sub>s</sub> of t	0á   t	Proposed	f	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

, *1	working hours	Javiib	Average cost	Saving in Amount Rs	Capital inve	estment in	Pay-back period
Saving in	per year	energy	of power Rs/KWH	RSup J.J.	Cost per unit in Rs	Total Cost in Rs	Months
Watt	No	KWH	NS/ RVIII	dinion of sing	450	24300	4
1200	5000	6000	12.9	77400	430	24300	3-12-5

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
	500	Ladies Hostel
Jain Irrigation		

## 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	heat of Temperature		Average Heat Electric Water gained saving Temperature by Water KWH p		uivalent ectricity aving in WH per year  Average Electricity Cost in Rs/KWH	Electricity Cost saving in Rs per year	Estimated CO2 C Green House C Gas Emission reduction per year in Kg
		1 17	Litres	Kcal/Kg/oC	Hot (Out)	Cold (In)	Kcal	HZVIZTE ST			
Ladies Hostel	44	1	500	y + - 1	60	20	20000	8488.37	12.9	109500.00	7215.1

## 12), DEDICATED DISTRIBUTION TRANSFORMER 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
	500	Ladies Hostel
Jain Irrigation	1 1 1	

# 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 Wa heat of Tempe		Average Water g Temperature		Total Solar Heat gained by water per Day in		Electricity Cost saving in Rs per year	Estimat CO2 Green House Gas Emissic reduction per yea in Kg
	5 - 1 mg - 7 1 to	8 · ·	Litres	Kcal/Kg/oC	Hot (Out)	Cold (In)	Kcal	ezjona <b>ti</b>			ala a
Ladies Hostel	44	1	500	) 1 <b>1</b>	60	20	20000	8488.37	12.9	109500.00	7215.1

# 2).DEDICATED DISTRIBUTION TRANSFORMER

## 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
- 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.
- 9) Battery terminal maintenance of 10KVA UPS in library building is necessary as carbonization
- The UPS capacity is very higher side. Excess capacity battery consume power for trickle is significantly taking place. charging & make the loss of energy leading to increment in operating cost .So it is strongly 10) recommended to optimize UPS capacity for total PC load to save the wasting cost & energy
- Analysis of Connected Load Mix in Campus 11) 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
LED Tube light / LED panel Light	279	18635	27
Ceiling fan/Wall bracket / Exhaust fan	230	13850	20
Computer / monitor 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.

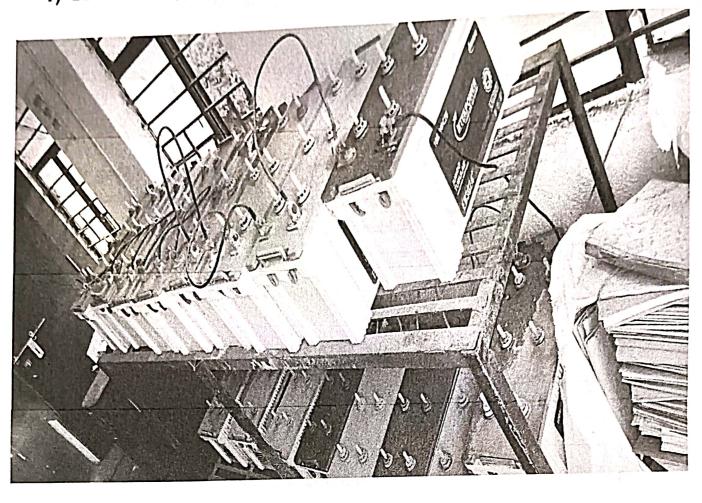
(Note- You are requested to refer entire report to understand things clearly)

# 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 (S
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

