

**COMPREHENSIVE ENERGY AUDIT
REPORT
FOR
S.N.D. College of Engineering &
Research Center.**



Babhulgaon, Tal. Yeola, Dist.Nashik-423 401.

DATE OF AUDIT—29th April.2022.

PREPARED BY—

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ACKNOWLEDGEMENT.

We, MM Consultancy Services, Nashik are grateful to the Management of S.N.D. College of Engineering & Research Center (SNDCOE) Yeola, Nashik for giving us an opportunity to carry out detailed Energy Audit of their Campus.

We appreciate the vision & mission of Dr. P.M.Patil, Principal who has initiated this audit to upgrade the existing infrastructure to eliminate wastages & energy losses predominant in the existing structure . Since MET was established back in 2006-07, Dr.Patil recognized the importance of up-gradation of present engineering infrastructure which is old, Energy inefficient & outdated.

We are also thankful to Mr. Dattaraya Kshirsagar, Registrar who supported us during audit for Tech. data collection & provided all other tech. information in time. Without Mr. Kshirsagar's initiatives it may not have been possible for us to carry out this Energy Audit.

We also thank Mr. Rohit Pote & Mr. K.K.Jadhav for his support & cooperation during our audit who provided site information & details as required.

Finally, we appreciate whole SNDCOE management team for taking this initiative for a Noble Cause & wish them all success in achieving their goals through this Audit.

Last but not the least, Energy Audit carried out by our Team was based on the information/data shared with us by SNDCOE Team & it was our sincere effort to make this audit transparent & meaningful. We request SNDCOE management to go through this report & implement our recommendations at earliest possible to achieve the desired results

Energy Audit Team.

- 1. Mukund V. Bhandare, BEE Certified Energy Auditor.**



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EXECUTIVE SUMMARY

Sr. No.	Energy Saving Measure	Yearly	Yearly	Approx.	Simple	Priority
		Energy	Cost	investme-	Pay-	
		Savings	Savings	nt Reqd.	back	
		Kwh	Rs.	Rs.	Months	
1	Availing Credit for Solar Power Plant Generation of Electricity	83340	1000000	500000	6	A
2	Energy Efficient Lighting	Already	being	implemented	--	A
3	Electrical Distribution Network & PF Improvement	--	144000	75000	6	A
4	Replace Existing Fans with Energy Efficient Fans	20000	240000	1000000	48	B
5	Energy Savings in Computers	7512	90144	85000	11	A
6	Improvement in existing water Pumping System	1200	14400	10000	8.5	A
Total -		28712	488544	1670000	13.5	--
6	Present Energy Bill	98494	1179954			
7	% age of energy savings of present energy bill	29.15	41.4			
NOTE-	Savings due to Item 1 not considered in	Total				



INTRODUCTION.



S.N.D. College of Engineering & Research Center (S.N.D.C.O.E. & R.C.), Yeola, Dist. Nashik, Maharashtra is affiliated to Savitribai Phule, Pune University, Pune, Maharashtra, and is approved by A.I.C.T.E. New Delhi.

S.N.D. College of Engineering & Research Center is a brainchild of Honorable Shri. Narendrabhau Darade, (Ex-President MHADA, Nashik & Chairman NDCC Bank). He is the President of Jagdamba Education Society, which is running 23 institutions under various streams of education. His love for education and care for his native district manifested itself in the form of this college. S.N.D. College of Engineering & Research Center was established in the year 2006 with the sole aim to impart quality Technical Education. It is approved by AICTE & affiliated to Savitribai Phule Pune University, Pune Maharashtra state and presently offers undergraduate & postgraduate courses with annual intake of 768 & 162 respectively.

Vision

The vision of the S.N.D College of Engineering & research Center Alumni Association is to reach, engage and serve all alumni and present students by networking with one another to foster a life-long intellectual and emotional connection between the college and its alumni.

Mission

This Alumni Association is aims to provide a common platform for all Alumni of this institution and:



ENERGY SCENARIO.

TABLE-1

Bill Month	Consumption (Units)	Bill Demand (KVA)	Bill Amount	PF
Mar-22	14978	24	186041	0.97
Feb-22	8912	22	105396	0.97
Jan-22	9154	20	107518	0.96
Dec-21	10203	22	119267	0.98
Nov-21	6873	28	92400	0.97
Oct-21	10555	20	119746	0.99
Sep-21	7035	17	82238	0.98
Aug-21	6828	16	80061	0.96
Jul-21	6616	13	76873	0.95
Jun-21	5988	21	74045	0.93
May-21	4360	13	53351	0.88
Apr-21	6992	18	83018	0.94
	98494		1179954	
Average Rate (Rs/KWh)			11.979958	

TABLE-2

Total Calculated Domestic Load Appliances

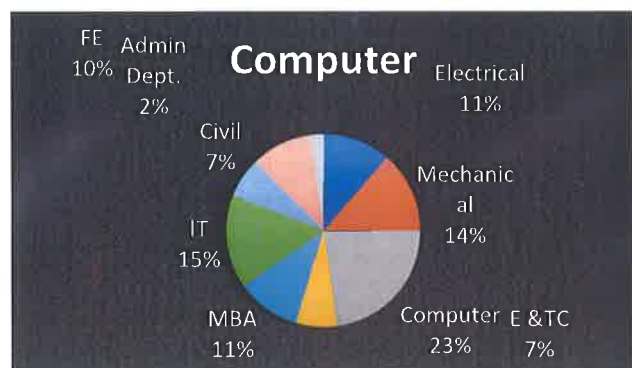
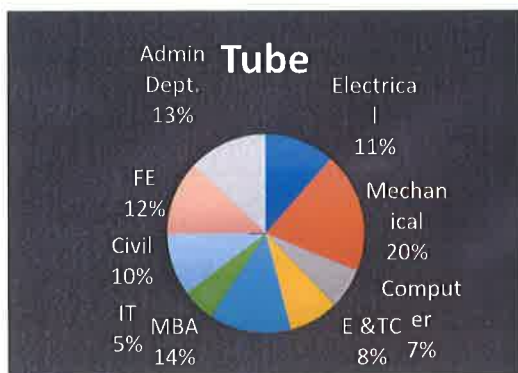
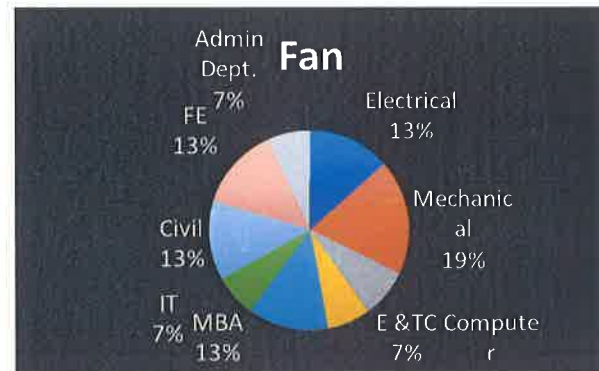
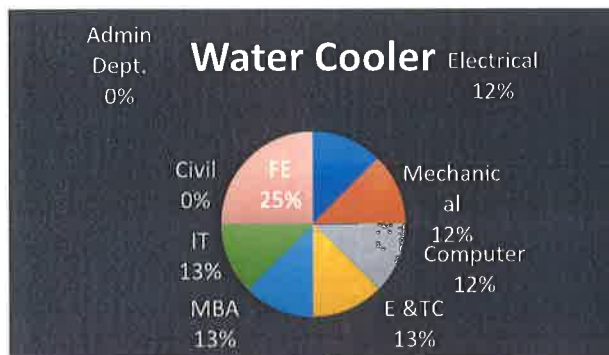
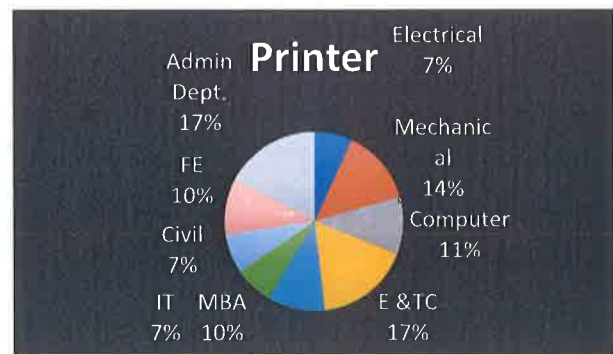
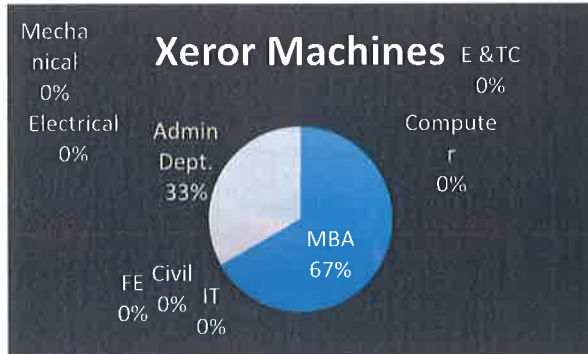
Sr. No.	Name of Department	Fan	Tube	Computer	Printer	Water Cooler	UPS in KVA	Xeror Machines
1	Electrical	64	63	71	2	1	8.5	
2	Mechanical	89	107	86	4	1	8.5	
3	Computer	38	36	143	3	1	19	
4	E &TC	33	44	42	5	1	10	
5	MBA	62	74	67	3	1	17.5	2
6	IT	32	29	97	2	1	8.5	
7	Civil	60	55	42	2		5	
8	FE	64	66	63	3	2	8.5	
9	Admin Dept.	33	71	15	5		8.5	1
Total		475	545	626	29	8	94	3



Per Pice Power Consumption	75	40	100	40	300		625
Power Consumption	35625	21800	62600	1160	2400	75200	1875

Total Power Consumption=130765 Watts= 130.765 KW

Electrical Power Distribution Utility Wise—is given below.



Remarks—Energy Consumption Pattern & it's implications on Bill are presented in Tables -1 &2. Average Rate of power purchased comes to Rs. 12 per Kwh as per Table-1.



ENERGY CONSERVATION OPPORTUNITIES.

1. Solar Power Plant.

SNDCOE have 10 Kw Roof top Solar power generating facility installed & commissioned & supplying power to GRID.

It is however observed that from March 2022 Bill that no credit is given by MSEDCL for solar generation of 10 Kw.

Import of 14978 Units has been shown in the bill & charged for the same.

Solar generation is not recorded as per bill.

It is therefore proposed to get credit from MSEDCL for the solar power generation to reduce the effective Bill.

Approx. 12000 units can be generated with existing solar plant & thus 12000 Units can be credited to SNDCOE per month.

Savings in Bill due to this credit @ Rs. 12 per unit == Rs144000./- per month

Thus Current Bill for March-2022 can be reduced to $(186041 - 144000) =$ Rs.42041. only.

Annualized savings in Bill considering 8 months operation of Solar Plant is estimated @ Rs. 1000000/- considering various loads in every month.

Approx. Investment In Admin expenses to get Credit for solar generation Rs. 500000./-

Simple financial Pay-back works out to six months only.

Recommendation—It is strongly recommended to get credit on units generated every month from Soalar power Plant from MSEDCL.



2. ENERGY EFFICIENT LIGHTING.

SNDCOE have successfully replaced old & inefficient Lighting fixtures with energy efficient LED lighting fixtures to reduce energy consumption of lighting. Almost 80 % work has been completed so far as mentioned in TABLE-2 & balance replacement shall be completed shortly.

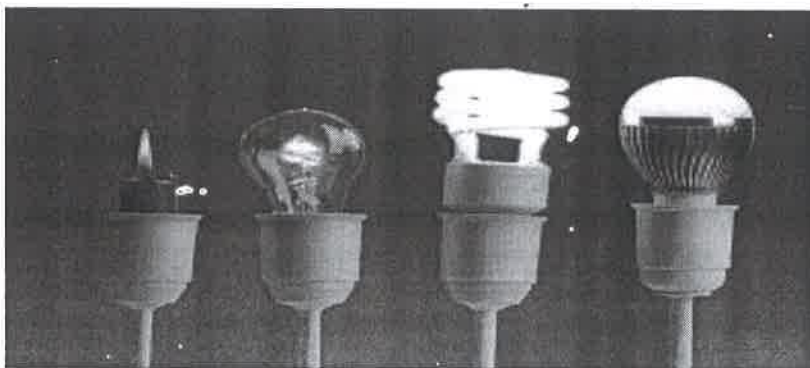
Apart from 50 % lower power consumption on average of LED Lights, they have long life of over 5 yeras & therefore in addition, offer savings in maintenance & replacement costs.

We fully understand the concern of any management to implement this proposal because of capital investment. Nevertheless, there are now many reputed LED manufacturers offering LED Lights with 5 year guarantee on BOT basis. Thus " Earning without Investment " is very much possible leading to APC reduction in this area.

We are recommending following reputed LED manufacturer to help you in execution of this project without any investment. Pl. Contact---

Rayon Illuminations & Energy Solutions Pvt. Ltd.
Plot No. A-38, Sector A, Shendra Five Star MIDC, Aurangabad-431 201.
Contacts-9730771119, Website-www.rayonilluminations.com.

You may claim appropriate disposal value for existing lights which need to be replaced from above party.



3. ELECTRICAL DISTRIBUTION SYSTEM.

The Institution have 11 KV Express feeder from MSEDCL with a 250 KVA Transformer to cater to LT power requirement of the whole campus. 25 KVA DG Set is available to meet emergency power requirement in case of Main Power Failure. Contract Demand is 33 KVA & Billing Demand is well within Limit as mentioned in TABLE-1.

Power Factor each month recorded is shown in TABLE -1 which needs to be optimized to 0.99.

Benefits of Optimum power factor is to avail full incentive Of Rs. 7500 per month & to avoid penalty imposed for low power factor by MSEDCL.

Since MSEDCL is going to charge energy consumption on KVAH basis since April 2023, huge savings are possible by maintaining power factor to 0.99 all the time thereby substantial reduction in KVAH & Bill.

It is estimated that approx.. Rs. 12000 per month can be saved in electricity Bill by maintaining power factor to optimum @ 0.99.

Annualized Savings in Electricity Bill –144000./-

Approx. Investment—Rs.75000./-

Simple Financial Pay-back—Six Months only.

Recommendations—We therefore recommend to install Automatic Power Factor Controller (APFC) to maintain the power factor at optimum.



4. ENERGY EFFICIENT FANS.

Meet India's most energy-efficient motor

Why BLDC motor-powered Atomberg fans are the future

1. Super-Efficient: consumes only 28W of energy, almost 1/3rd of an induction motor
2. Runs 3 times longer on an inverter battery
3. Noiseless operation
4. Intelligent electronics & AtomSENSE algorithm
5. Smart Remote control
6. No heating: ensures longer motor life
7. Consistent output even with fluctuating input voltage

Here's why you need to replace your fans immediately

1. Extremely inefficient: Consumes 75-80W of energy with enormous heating losses
2. Humming noise
3. Failures in bearing and copper windings
4. Non-consistent output
5. Dependency on external capacitor and regulator: This results in associated losses and costs
6. Zero flexibility: in terms of design, material selection and size
7. No compatibility with IoT: plain mechanical devices
8. No scope for innovation

It is recommended to replace existing ceiling & wall mounted energy inefficient fans with energy efficient fans having BLDC Motor. Impact on energy savings by adapting to energy efficient fans is given in following Table-

Atom berg Make modern energy efficient fans is highly recommended with remote control facility.



Energy Savings—

Existing Total No. of Fans –475

Existing Power Consumption--@ 55 watts per Fan—26.125 Kwh

Energy Savings in power consumption –12.5 Kwh

Annualized Power Savings for 8 hours a day for 200 days—20000 Kwh

Annualized Cost Savings--@ Rs. 12 per Kwh—Rs. 240000/- per year

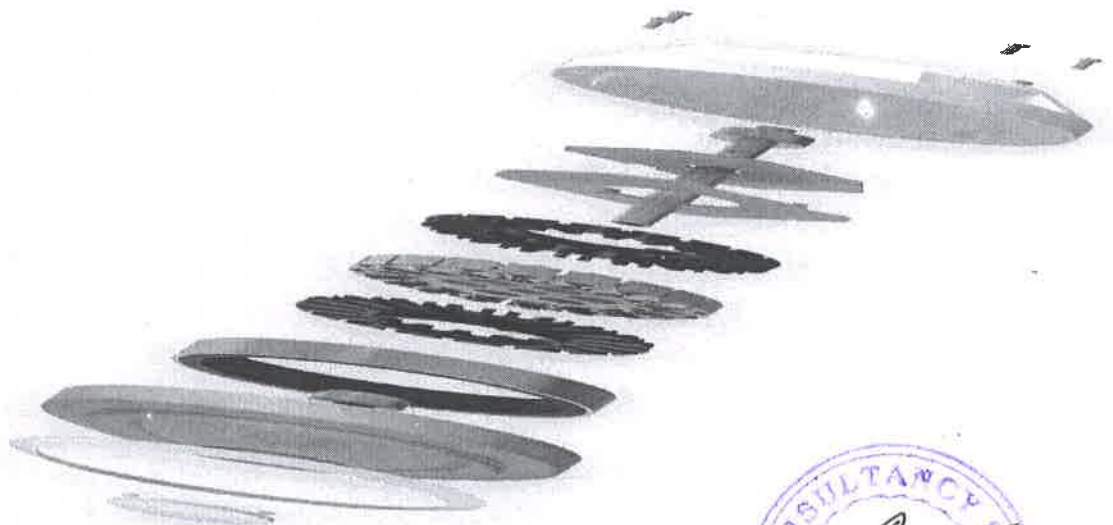
Approx. Investment for replacement with buy back value for existing fans—Rs. 1000000./-

Simple financial Pay-back- 4 Years

Recommendations—

Although financial pay-back is on higher side, we recommend to replace existing old & energy inefficient fans with Energy efficient fans . On long term basis in addition to recurring power savings every year, this will drastically reduce Co2 emissions thus improving your carbon foot prints record.

BLDC Motor Of Energy Efficient Fan



5. ENERGY SAVINGS IN COMPUTERS.

Energy saving tips for your PC

Use a smart strip, especially for computers you cannot turn off

A smart strip is a series of several electrical outlets in one strip, with circuits to monitor and maximize your gadgets' power consumption. By connecting your PC and its peripherals (printer, speakers, scanners, etc.) to the smart strip, you don't need to unplug your equipment when you're not using them.

Adjust your computer's energy settings

You can also consume less energy by adjusting your PC's power settings. For example, you can make sure your hard drive and monitor go into "sleep" mode when they're left idle for a few minutes. Lowering the screen brightness will also help you save electricity.

Shutdown and unplug your computer when not in use

If you are not yet using a smart strip, then it's best to shut down the computer when you're not using it. Also, make sure to unplug it, as leaving it plugged consumes standby power.

And should you be in the market for a new PC, choose one that's Energy Star compliant

Energy Star is the U.S. Environmental Protection Agency (EPA)'s symbol for energy efficiency. Every product that earns the Energy Star symbol is guaranteed to deliver quality performance and energy savings. Studies have shown that a single Energy Star compliant computer and monitor can save from \$7 to \$52 per year in electricity bills.

Total No. of Computers in use at present—626

Existing Power Consumption—62.6 Kwh

Estimated Savings by incorporating above measures—10% = 6.26 Kwh

Annualized power savings for 200days @ 6 hours per day—7512 Kwh

Annualized Cost Savings--@ Rs. 12 per Kwh—Rs.90144./-

Approx. Investment of modifications—Rs. 85000./-

Simple Financial Pay-back—11 months.

Recommendations-- Recommended for implementation as above.



6. PUMPING SYSTEM FOR WATER SUPPLY—

Raw water from Bore well is pumped to underground tank in the campus premises. A 5 HP pump draws water from this underground tank & pumps to 2 nos. overhead tanks to cater to domestic water requirements of the campus. Drinking water resource is however separate & there is a separate overhead tank for storage.

5 HP pump is started manually as & when level of the above ground tanks comes down as viewed manually by security person & pumped is stopped manually when there is a overflow of water from Overhead tanks as observed by the security guard with naked eyes.

Above system is energy inefficient as it involves a manual action which can not be 100 % accurate & reliable.

It is therefore recommended to install an automatic level switch with level indicator & controller to switch off the pump automatically at a predetermined high level & auto start the pump at predetermined low levels in overhead water tanks. This will eliminate unnecessary running of the pump & also the human errors to upgrade the present system.

Estimated Power Savings per day for 4 hours pump operation—1.2 Kwh

Annualized Power Savings for 250 Days a year= 1200 Kwh

Annualized Cost Savings @ Rs. 12 per Kwh—Rs. 14400./-

Approx. Investment required—Rs. 10000./-

Simple Financial Pay-back—8.5 Months.

Recommendations-- Apart from energy savings, this proposal if implemented would raise the reliability levels of operation & strongly recommended.



CONCLUSION.

We have tried our level best to carry out this energy audit in a most professional & transparent manner & we are really grateful to Dr. P.M.Patil & His Team for providing us all the data required to carry out this audit successfully.

In our efforts to identify the scope & potential for energy saving opportunities, it was a great experience to work with your people who were found having adequate exposure & skills to understand our findings as the purpose of this audit was not intended to find faults with the present working system but to add value to good work which SNDCOE is already doing to optimize their present energy cost.

As detailed in our report, our audit findings are purely technical & supported by strong engineering base provided by our professional energy auditors. Whole purpose of our Energy Audit of your campus was to demonstrate that actual savings achieved are in line with what we have projected in this report.

The energy savings identified during our audit are enormous & achievable on sustainable basis , the financial pay-backs are extremely attractive & we request SNDCOE Management to go ahead for implementing our findings to optimize their present energy cost by 50 % which would be a great achievement for SNDCOE as well as tremendous aspiration to others to follow this Noble Cause.

Thanks Once Again--

MM Consultancy Energy Audit Team.

