

ENERGY AUDIT REPORT

**M.KUMARSAMY COLLEGE OF ENGINEERING,
Thalavapalayam, Karur – 639113, Tamilnadu.**

Ph: 04324 272155, 270755

Fax: 04324 – 272457

www.mkce.ac.in



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL SCIENCES
KONGU ENGINEERING COLLEGE

(Autonomous Institution, Affiliated to Anna University, Chennai)

PERUNDURAI, ERODE – 638 060. TAMILNADU, INDIA.

Ph: 04294 - 226538, 220562 Fax: 04294 - 220087

www.kongu.ac.in E-mail : hod_eee@kongu.ac.in



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Kongu Engineering College Energy Audit team wishes to thank M. Kumarasamy College of Engineering, Karur for giving an opportunity to carry out the energy audit in their institution and providing all support to the team during the audit. Our sincere thanks to Dr.N.Ramesh Babu - Principal, Dr.C.Kumar -Head of the Department, Electrical and Electronics Engineering and Faculty team from Department of Electrical and Electronics Engineering , Electrical Supervisor for the support and information to carry out the measurements for the successful submission of this report.

Dr. T. Logeswaran
Associate Professor & Energy Auditor (EA-13164)
Dept. of Electrical and Electronics Engineering
Kongu Engineering College,
Perundurai, Erode – 638 060

Dr. P. Selvakumar
Associate Professor
Dept. of Mechanical Engineering,
Kongu Engineering College,
Perundurai, Erode – 638 060

Mr. P. Gowrishankar
Assistant Professor & Energy Auditor (EA-25956)
Dept. of Electrical and Electronics Engineering
Kongu Engineering College,
Perundurai, Erode – 638 060

Dr. R. Naveen Kumar
Associate Professor
Dept. of Mechanical Engineering,
Kongu Engineering College, Perundurai, Erode – 638 060

Mr. P. Tamilarasu
Assistant Professor (Sr. Grade)
Dept. of Electrical and Electronics Engineering
Kongu Engineering College,
Perundurai, Erode – 638 060

Dr. R. MEENAKUMARI
PROFESSOR AND HEAD
DEPT. OF ELECTRICAL & ELECTRONICS ENGG
KONGU ENGINEERING COLLEGE
THOPPUPALAYAM (PO)
PERUNDURAI (TK), ERODE - 638 060.

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2.1 SUMMARY STATEMENT

M.Kumarasamy College of Engineering, Karur had agreed to provide access to Kongu Engineering College to undertake Energy Audit (21.10.2022) related measurements at the plant's PCC location and optionally at other down-stream feeders, as required.

(i) The measurements were undertaken using Fluke 435 Power Quality Analyzer at the plant PCC-LT side. The following relevant electrical parameters are recorded by the above instrument with the set recording sample time of 30 seconds. In addition measurements were undertaken at the downstream feeders. At each downstream feeder, the measurements were carried out for a period of 10-15 minutes to take care of different loading situations.

(ii) The parameters monitored are:

1. 3-phase average line or phase voltages
2. 3-phase average line currents.
3. 3-phase average fundamental line or phase voltages.
4. 3-phase average line currents.
5. Frequency
6. Total average power factor
7. Percentage 3-phase voltage THD
8. Percentage 3-phase current THD


(iii) The maintenance of Power room should be carried out frequently.

(iv) For safety purpose, rubber mats should be placed in front of panels and also in the power room and Electrical machines lab.

(v) The energy saving opportunities for various equipment and cost savings are discussed in subsequent chapters.

(vi) The college installed the solar power plant (roof top) rating of 250KW and wind power plant rating of 350KW for load sharing.

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Due to the usage of renewable energy sources (Solar power plant and Wind power plant), the energy consumptions charges are also reduced.

(vii) All class rooms and laboratories to have display messages regarding optimum use of electrical appliances in the room like lights, fans, computers and projection systems.

(viii) Usage of day lighting in offices and class rooms during the day-time, will lead to energy saving practices.

(ix) All projection systems must be kept off or in idle mode, if there is no need presentation slides.

(x) All computers to have power saving settings to turn off monitors and hard disks, say after 10/30 minutes of idleness.

(xi) The efficient and comfort air conditioning temperature to be set between 21°C to 23°C for all the air conditioners.

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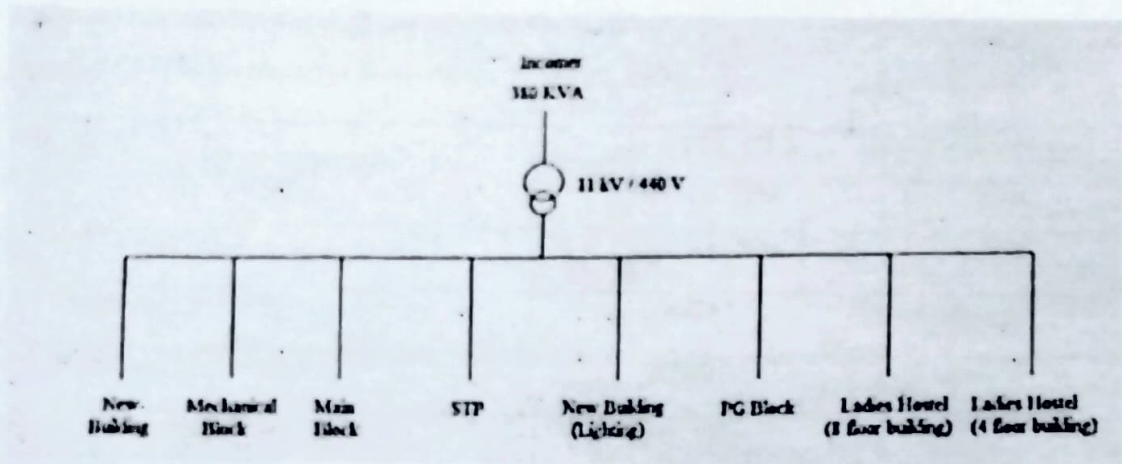


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2.2 TYPICAL SINGLE LINE DIAGRAM

SINGLE LINE DIAGRAM



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M. Kumarasamy College of Engineering
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
3. ENERGY SAVING OPPORTUNITIES

3.1 LIGHTING:

A Sample calculation of energy saving opportunity by replacing the conventional fluorescent lights by LED lights has been shown in the following table;

DESCRIPTION	FTL Fittings	LED Fittings
	40W	18W
NO. OF FITTINGS	500	575
WATTS(lamp)	20000	10350
Total Watts	20000	10350
Consumption units per day	200.000	103.50
Running cost per day	1270.00	615.50
Savings LED installed of FTL in Watts	11350	
Units savings per day	105.00	
Units savings per month	3150.00	
Running hours per day	10	
TNEB Units cost Rs.	6.35	
Cost savings per day	645.50	
Cost savings per month	19330.00	
LED Fittings total expensed Rs. (1224 * Rs.679)	9,25,625.00	
Cost returned period in days	824	
Cost returned period in months	31.20	
Cost returned period in Years	2.24	

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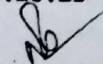

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PRINCIPAL
M. Kumarasamy College of Engineering
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3.2 Fan:

A Sample calculation of energy saving opportunity by replacing the conventional fan by BLDC fans has been shown in the following table;

DESCRIPTION	Conventional Fan	BLDC Fan
	72W	30W(approx.)
NO. OF FITTINGS	1000	1000
WATTS(lamp)	72000	30000
Total Watts	72000	30000
Consumption units per day	720.000	300.000
Running cost per day	4572.00	1905.00
Savings LED installed of FTL in Watts	42000	
Units savings per day	420.00	
Units savings per month	12600.00	
Running hours per day	10	
TNEB Units cost Rs.	6.35	
Cost savings per day	2667.00	
Cost savings per month	80010.00	
LED Fittings total expensed Rs. (1037 * Rs.3250)	33,70,250.00	
Cost returned period in days	1324	
Cost returned period in months	40.20	
Cost returned period in Years	3.42	

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PRINCIPAL

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3.3 AIR CONDITIONER

Model	Star rating	Energy Efficient Rating(EE R)	Cooling capacity(m ³)	Power Consumption (Watts/Hr)	Watts saved/hr	Units saved/8 hr	Savings (Rs/Yr) (300 days)
Split AC	5 Star	3.59	6545	1140	814	8.0	14240
	3 Star	3.12	6044	1690	984	8.5	15247
	2 Star	3	6610	2140	724	6.3	1105

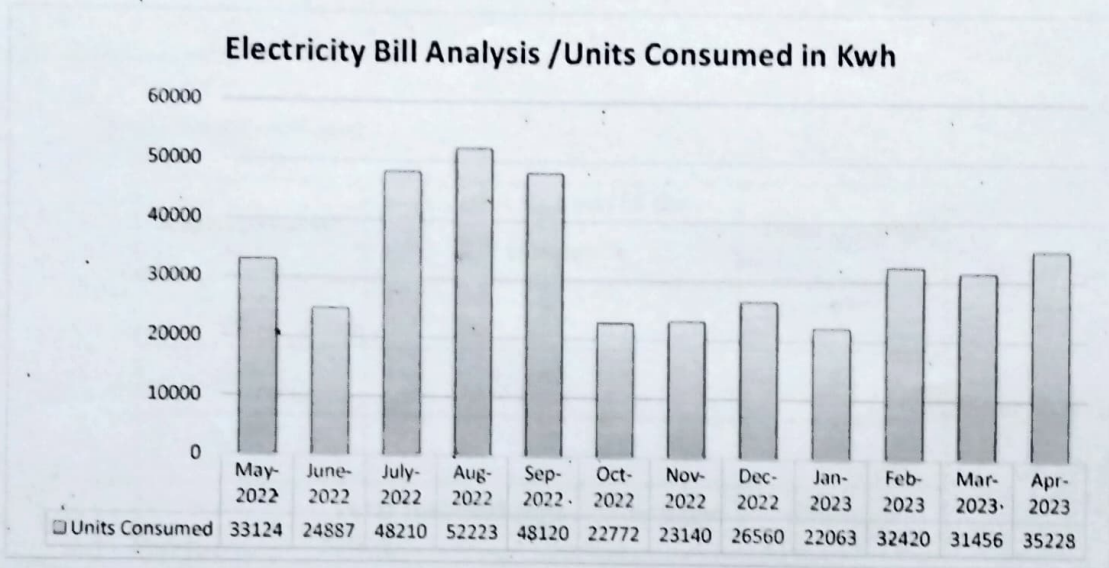
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Dr. N.RAKESH BABU,
PRINCIPAL

M. Kumarasamy College of Engineering
Thalavapalayam, Karur - 639 113.

4. BILL ANALYSIS



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PRINCIPAL
M. Kumarasamy College of Engineering
Thalavapalayam, Karur - 639 113.

5. OBSERVATIONS AND COMMENTS/SUGGESTIONS

5.1 - OBSERVATIONS

Renewable power:

On-grid Rooftop solar photovoltaic power plant will help in electrical energy savings with capacity of about 250Kw is installed in the campus. This meets (250/Sanctioned demand) % of the institutions energy demand.

Air conditioners:

Total tonnage: 166 tons

Capacity(tons)	No. of A.C. units in the campus	Total tonnage
1.5	50	75
2	42	84
1	7	7
Total Installed capacity(tonnage)		166 tons

5.2 COMMENTS/SUGGESTIONS

Lighting

- One of the best energy-saving devices is the light switch. Turn off lights when not required.
- Many automatic devices can help in saving energy used in lighting.
- As far as possible use task lighting, which focuses light where it's needed. A reading lamp, for example, lights only reading material rather than the whole room.

Air Conditioners


- Use ceiling or table fan as first line of defense against summer heat. Ceiling fans, for instance, cost about 30 paise an hour to operate – much less than air conditioners (Rs.10.00 per hour).

- One will use 3 to 5 percent less energy for each degree air conditioner is set above 22°C (71.5°F), so set the thermostat of room air conditioner at 25°C (77°F) to provide the most comfort at the least cost.
- Using ceiling or room fans allows you to set the thermostat higher because the air movement will cool the room.
- A good air conditioner will cool and dehumidify a room in about 30 minutes, so use a timer and leave the unit off for some time.
- Keep doors to air-conditioned rooms closed as often as possible.
- Clean the air-conditioner filter every month. A dirty air filter reduces airflow and may damage the unit. Clean filters enable the unit to cool down quickly and use less energy.

Computers

- Turn off your home office equipment when not in use. A computer that runs 24 hours a day, for instance, uses – more power than an energy-efficient refrigerator.
- If your computer must be left on, turn off the monitor; this device alone uses more than half the system's energy.
- Setting computers, monitors, and copiers to use sleep-mode when not in use helps cut energy costs by approximately 40%.
- Battery chargers, such as those for laptops, cell phones and digital cameras, draw power whenever they are plugged in and are very inefficient. Pull the plug and save.
- Screen savers save computer screens, not energy. Start-ups and shutdowns do not use any extra energy, nor are they hard on your computer components. In fact, shutting computers down when you are finished using them actually reduces system wear – and saves energy

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Dr. N. RAKESH BABU,
PRINCIPAL

M. Kumarasamy College of Engineering
Thalavapalayam, Karur - 639 113.