

Kakatiya Institute of Technology & Science :: Warangal

(Sponsored by Ekasila Education Society)

Energy Audit Report

of 2018 – 2019

19th April 2019



KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

Opp. Yerragattu Hillock, Hasanparthi - Hanamkonda

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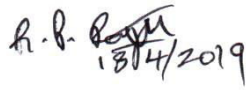



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Preface

Data collection for energy audit of the Kakatiya Institute of Technology & Science, Warangal Campus was conducted by team for the period of 1st April 2018 to 31st March 2019. This audit was over sighted to inquire about convenience to progress the energy competence of the campus. To drop of energy utilization whilst cultivate or humanizing comfort, health and safety were of prime anxiety. This audit required to recognize the mainly energy proficient appliances. Besides, several each day processes concerning common appliances have been provided which facilitate sinking the energy expenditure. The energy audit survey was completed by Department of Electrical & Electronics Engineering, KITS. All data collected from each classroom, laboratory, every room. The work is completed by considering, how many tubes, fans, A.Cs, electronic instruments, motors, etc are in each room. How much was participation of each component in total electricity consumption.

Members of the Committee

1. Head of Department , Electrical & Electronics Engineering -  18/4/19
2. Dr G. Rajender, Associate Professor, Department of EEE 
3. Dr. L Sudheer Reddy, Dean Planning and Execution. 
4. Sri. R.Prasad Raju, Asst. Project Officer.  18/4/2019
5. Sri. T.Raju, Electrician. 



Energy Audit Report

In this report, college electricity audit has been done considering laboratory instruments, Fans, Lights, air conditioners, Computers, Motors, etc. We have studied total budget of the college, total economic investment of college on the electricity and total generation of electricity from the solar electricity generation units. Also, we have studied total saving of electricity and money from solar generation and requirement of solar energy. Also, the exact contribution of bulbs, fans, computers, instruments, a c's , motors etc in the total requirement of electricity is studied. We studied all these mentioned things by collecting exact data form survey.



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Data collection:

The required data is collected by project office and Department of Electrical & Electronics Engineering. According to survey following data is collected for FY 2018-2019.

| S.No | Nameofthebuilding | Energy Efficient Fans | Normal Fans | LED Tube Lights | Normal Tube Lights | CFL Lights | AirConditioners | Fridge/ Geysers | Computer | Printer | Scanner | Xerox Machine | LCD Projector | Motors | Steet Lights | TotalWattage |
|------|--------------------------|-----------------------|---------------|-----------------|--------------------|-------------|-----------------|-----------------|--------------|--------------|-------------|---------------|---------------|---------------|--------------|-------------------|
| | WattageofEquipment | 28 | 60 | 20 | 40 | 20 | 1000 | 1500 | 30 | 250 | 32 | 1000 | 300 | 750 | 90 | |
| 1 | Block-I | 4 | 190 | 49 | 195 | 0 | 32 | 2 | 357 | 9 | 3 | 1 | 7 | 25 | | |
| 2 | Block- II | 14 | 65 | 180 | 29 | 42 | 71 | 2 | 303 | 14 | 11 | 0 | 6 | | | |
| 3 | Block-III | 5 | 170 | 55 | 194 | 0 | 22 | 2 | 200 | 7 | 3 | 0 | 5 | 150 | | |
| 4 | Block-IV | 30 | 465 | 56 | 640 | 50 | 122 | 9 | 423 | 16 | 13 | 5 | 50 | 5 | | |
| 5 | Block-V | 3 | 119 | 14 | 182 | 10 | 72 | 2 | 365 | 10 | 10 | 2 | 12 | 7 | | |
| 6 | Block-VI | 173 | 0 | 209 | 5 | 8 | 6 | 6 | 42 | 7 | 2 | 0 | 19 | 20 | | |
| 7 | Workshop-II(New) | | 28 | 28 | | | | 1 | | | | | | 12 | | |
| 8 | SH-1(DwgHallBlock-6) | | 12 | | 12 | | | 1 | | | | | | | | |
| 9 | SH-2 (L HBlock-7) | | 4 | | 4 | | | | | | | | | | | |
| 10 | SH-3(LHBlock-8) | | 12 | | 12 | | | | | | | | | | | |
| 11 | SH-4(HOSTELTVROOM) | | 10 | 6 | 12 | | | | | | | | | | | |
| 12 | IndoorStadium | | 39 | 190 | 8 | 13 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 3 | | |
| 13 | Auditorium | | 20 | 14 | 2 | | 4 | 1 | | | | | 2 | | | |
| 14 | BoysHostelShedBlock-1 | | 24 | 6 | 24 | | | | | | | | | | | |
| 15 | BoysHostelShedBlock-2 | | 24 | 6 | 24 | | | | | | | | | | | |
| 16 | BoysHostelShedBlock-3 | | 24 | 6 | 24 | | | | | | | | | | | |
| 17 | BoysHostelShedBlock-4 | | 24 | 2 | 24 | | | | | | | | | | | |
| 18 | BoysHostelShedBlock-5 | | 24 | 3 | 24 | | | | | | | | | | | |
| 19 | OldDin Hall&Kitchen | | 12 | 2 | 24 | | | | | | | | | 3 | | |
| 20 | GirlsHostelBuilding | | 276 | 10 | 277 | | | | | | | | | 1.5 | | |
| 21 | BoysHostelBuilding-1 | | 260 | 11 | 251 | | | 5 | | | | | | | | |
| 22 | BoysHostelBuilding-2 | | 86 | 6 | 80 | 10 | | 2 | | | | | | 1.5 | | |
| 23 | StaffQuarters-I | | 24 | 6 | 36 | 6 | 6 | | | | | | | | | |
| 24 | StaffQuarters-II | | 24 | 6 | 36 | 6 | 6 | | | | | | | | | |
| 25 | ParkingShedatBlock-I | | | 6 | | | | | | | | | | | | |
| 26 | ROWaterPlant&Parking | | 2 | 2 | 4 | | | 1 | | | | | | 10 | | |
| 27 | Power&GeneratorRoom | | 6 | 4 | 6 | | | 1 | | | | | | | | |
| 28 | SecurityRoom | | 1 | | 6 | | | 1 | | | | | | | | |
| 29 | StoresShed | | 6 | 2 | 6 | | | | | | | | | | | |
| 30 | Dispensary | | 3 | 2 | 6 | | | | | | | | | | | |
| 31 | Coffeeday | | 1 | 2 | 4 | | | | | | | | | | | |
| 32 | ProjectOffice&Xerox | | 4 | 2 | 9 | | | | | | | | | | | |
| 33 | Bank/GuestHouseBldng | | 24 | 5 | 36 | | 20 | 2 | | | | | | | | |
| 34 | STP Plant | | 3 | 6 | 6 | | | | | | | | | 25 | | |
| 35 | StreetLight | | | | | | | | | | | | | | 50 | |
| 36 | Well&SumpMotors | | | | 12 | | | | | | | | | 45 | | |
| 37 | WaterSoftners | | | | | | | | | | | | | 2 | | |
| 38 | LectureHallShed-1,2,3,4 | | 20 | | 20 | | | | | | | | | | | |
| | TotalNumbers | 229 | 2006 | 896 | 2234 | 145 | 361 | 40 | 1692 | 65 | 44 | 8 | 101 | 310 | 50 | |
| | TotalWattage/HOUR | 6412 | 120360 | 17920 | 89360 | 2900 | 361000 | 60000 | 50760 | 16250 | 1408 | 8000 | 30300 | 232500 | 4500 | 1001670 |
| | Total Wattagein aday | 44884 | 842520 | 125440 | 625520 | 20300 | 1805000 | 420000 | 355320 | 32500 | 2816 | 40000 | 151500 | 930000 | 22500 | 5418300.00 |
| | Total Wattage /month | 942564 | 17692920 | 2634240 | 13135920 | 426300 | 37905000 | 8820000 | 7461720 | 682500 | 59136 | 840000 | 3181500 | 19530000 | 472500 | 113784300 |
| | Permonth WattageinKWH | 942.564 | 17692.92 | 2634.24 | 13135.92 | 426.3 | 37905 | 8820 | 7461.72 | 682.5 | 59.136 | 840 | 3181.5 | 19530 | 472.5 | 113784.30 |

Total power consumption of electrical equipment = 1,13,784 kW / month



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Power Consumption of Electricity Board

| Sr.No. | Month | Consumption Unit(KW) |
|---|--------------|---------------------------------|
| 1 | Apr-18 | 49807 |
| 2 | May-18 | 52107 |
| 3 | June-18 | 33050 |
| 4 | July-18 | 38503 |
| 5 | Aug-18 | 61245 |
| 6 | Sept-18 | 55521 |
| 7 | Oct-18 | 46312 |
| 8 | Nov-18 | 47447 |
| 9 | Dec-18 | 41169 |
| 10 | Jan-19 | 33031 |
| 11 | Feb-19 | 46736 |
| 12 | Mar-19 | 51200 |
| Total Power Consumption in Yearly | | KW 556128 |
| Average Power Consumption in Monthly | | KW 46344 |



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Total requirement of electricity, generation of electricity using renewable energy sources.-

| Power requirement met by renewable energy sources | Total power requirement | Renewable energy source | Renewable energy generated and used |
|--|--------------------------------|--------------------------------|--|
| 79,932 units /Month | 90,655 units/Month | Solar Power | 44,311 / 33,588 units /Month |

Alternate Energy Initiatives:

Percentage of power requirement of the institute met by the renewable energy sources

Formula =

$$\frac{\text{Power requirement met by renewable energy sources}}{\text{Total power requirement}} \times 100 = 37.25 \% (5\text{yrs})$$

| Financial Year | Total Units from TSNPDCL | Units generated from Solar Plant | Total Units | Units exported to TSNPDCL | Units used from SCPP by KITSW | Total Units Consumed by KITSW | % of Power requirement met by renewable sources |
|-----------------------|---------------------------------|---|--------------------|----------------------------------|--------------------------------------|--------------------------------------|--|
| 2014-15 | 499692 | 130442 | 630134 | 0 | 130442 | 629031 | 20.74 |
| 2015-16 | 505601 | 301998 | 807599 | 30105 | 271893 | 777494 | 34.97 |
| 2016-17 | 451250 | 369932 | 821182 | 110891 | 267509 | 718759 | 37.22 |
| 2017-18 | 446262 | 593942 | 1040204 | 207842 | 386100 | 832362 | 46.39 |
| 2018-19 | 556128 | 531729 | 1087857 | 128674 | 403055 | 959183 | 42.02 |
| Total | 2458933 | 1928043 | 4386976 | 477512 | 1458999 | 3916829 | 37.25 |



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Photographs of Renewable Energy Sources-



Fig- Roof Top Solar Energy Generation system

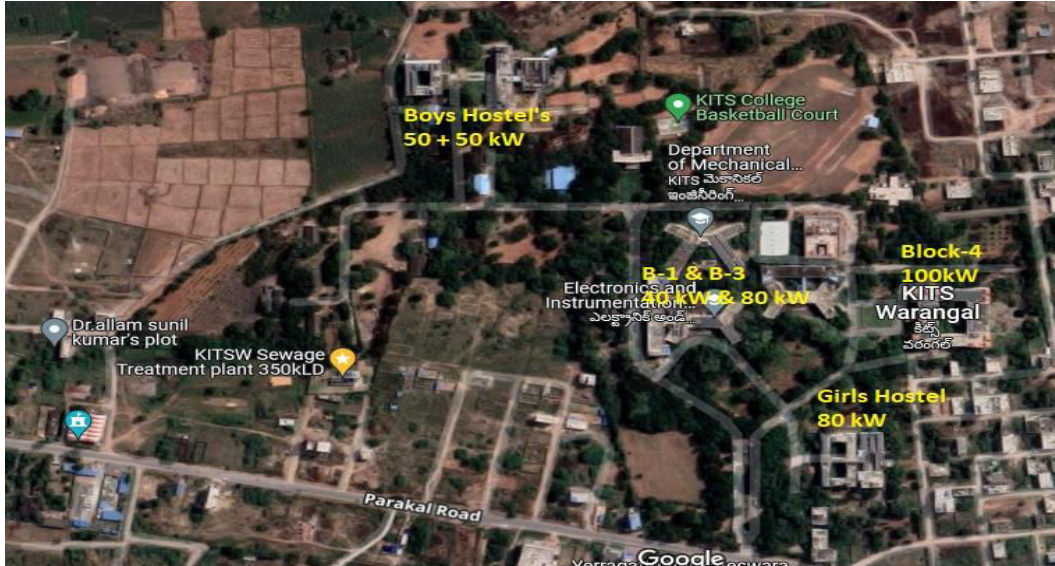


Fig. Birds Eye View of 400 kW Roof Top Solar Generation

The Solar energy generation devices contain solar panels and generation device generates about 1,457 units per day.



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Conclusion:

In conclusion, data generated in energy audit are useful for understanding the energy distribution and its utilization in college. The college needs maximum 1,13,784 KW of electricity. In other words college needs 1,13,784 Units/month and Solar energy generation device generate the only 44,311 units/month.

Recommendation:

- 1) Replace all CFL Tube light using LED Bulb, to save morepower.
- 2) Replace CRT monitor using LED or LCD monitor.
- 3) Replace old fans with new fans
- 4) Replace old Re-Wound motors with new one.

Results and discussion:

As far as the energy audit is concerned, its main concern is regarding educational institution. We have collected data by considering the tube light, fan, computer, printer, A.C, motors and instruments. The total required energy is **1,13,784 KW**. Energy Consumption through all device is **79,932 Unit /Month** and Renewable source Generate **44,311 Unit /Month**.




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