

Energy Management & Renewable Energy Technology

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Abstract— Energy management falls under the big umbrella of social responsibility and the narrower category of pollution control and environmental management. Energy management includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need. It is connected closely to environmental management, production management, logistics and other established business functions. Energy management is gaining considerable importance among corporations and managers. The Environmental Protection Agency has established guidelines for superior energy management. Renewable energy technology can help countries meet their policy goals for secure, reliable and affordable energy to expand electricity access and promote development. The costs and performance of renewable energy technologies have reached the stage where the number of economical applications in developing countries is increasing, particularly in the grid and off-grid markets for electricity.

Key words: Environment, Solar Energy, Energy Management, Optimization

I. INTRODUCTION

Energy management" is a term that has a number of meanings, but we're mainly concerned with the one that relates to saving energy in businesses, public-sector/government organizations, and homes. Which is define as "The judicious and effective use of energy to maximize profits (minimize costs) and enhance competitive positions." In another way it can define as "Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the requirements, taking into account environmental and economic objectives". Another comprehensive definition is "The strategy of adjusting and optimizing energy, using systems and procedures so as to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems." Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat. Renewable energy often provides energy in four important areas: electricity generation, air and water heating/cooling, transportation, and rural (off-grid) energy services. India has the fifth-largest power generation portfolio worldwide. The country transitioned from being the world's seventh-largest energy consumer in 2000 to the fourth-largest one within a decade. This rapid growth of power capacity and a subsequent rise in demand can be attributed to several factors:

- Economic growth and increasing prosperity
- Growing rate of urbanization
- Rising per capita energy consumption
- Widening access to energy in the country.

With this several factors affecting rise in demand of electric generation increases, and with it the demand for renewable energy technology increases.

Types of renewable sources are solar, hydro resource, wind resource, geothermal sources.

II. METHODS & MATERIALS

- As per the energy management is consent, survey was perform in K.D.K Clg of Engineering on block A, B and workshop building.
- Under analysis or only Lights, Fans, AC, Computer Monitors are considered as only these appliances are found to be affordable and replaceable.

A. Complete Statistical Data

| SR. NO. | MONTHS | ENERGY CHARGES. |
|---------|-----------|-----------------|
| 1. | AUG-2014 | 140597 |
| 2. | SEP -2014 | 171196 |
| 3. | OCT-2014 | 112095 |
| 4. | NOVE-2014 | 106199 |
| 5. | DEC-2014 | 78472 |
| 6. | JAN-2015 | 99886 |
| 7. | FEB-2015 | 90878 |
| 8. | MAR-2015 | 131457 |
| 9. | APR -2015 | 125720 |
| 10. | MAY-2015 | 106748 |
| 11. | JUN-2015 | 138465 |
| 12. | JULY-2015 | 183977 |

Table 1: Total Energy Charges = 1485690.

B. Equipmental Data

| NAME OF EQUIP. | TYPES OF EQUIP | NO OF EQUI | WATT-AGE OF EQ. | WORK-ING HR'S |
|----------------|----------------|------------|-------------------|---------------|
| FANS | Electric | 469 | 80 | 4 |
| | Electronic | 159 | 30-40% Efficiency | 4 |
| TUBE LIGHT | Fluorescent | 587 | 40 | 4 |
| | LED | 361 | 15 | 4 |
| | Incandescen t | 69 | 60 | 2 |
| MONITR | LCD | 402 | 20 | 3 |
| | Crt | 176 | 65 | 3 |
| AC | Window | 35 | 900 | 1.5 |
| | Inverter | 9 | 540 | 1.5 |

Table 2:

| KW MONTHLY CONSUMTION. | TOTAL KW COSUMTION. | RS. |
|------------------------|---------------------|-------|
| 3893.76 | 4422.912 | 33835 |
| 529.152 | | |
| 2441.92 | 3220.36 | 24635 |

| | | |
|--------|---------|-------|
| 563.16 | | |
| 215.28 | | |
| 627.12 | 1519.44 | 11622 |
| 892.32 | | |
| 1228.5 | 1418.04 | 10848 |
| 189.54 | | |

Table 3: TOTAL RS =80942

III. CALCULATIONS

FAN REGULATORS

468 electric fans consume 80W

= 37440W in 1hr

=149760W in 4 hr.

=3893760 in 26 days

=38,393.7 KW

Monthly bill =38393.7 x 7.65

MONTHLY BILL WILL BE 29,787 RS.

Replacement of electric fans by electronic fans.

468 electronics fans will consume 80W =38393.7 x 0.4

(30%40 efficiency) =1557.4 KW

Monthly bill =1557.4 x 7.65

=11914.9 RS.

MONTHLY BILL WILL BE 11,914.9 RS.

SAVING =29787-11914

=17,872 RS

REPLACEMENT COST =468x200

=93,600 RS.

A. Monitors

176 CRT consumes 65W =11440W in 1 hr

=34320W in 3 HR

=892320 in 26 days

=892.32 KW

MONTHLY BILL WILL BE 6,826 RS

Replacement of CRT by LCD

176 LCD consumes 20 W =3520 W in 1 hr.

=10560W in 3 hr.

=274560 W in 26 days

= 274.5 KW

MONTHLY BILL WILL BE 2,100RS

SAVING = 4,725.8 RS

REPLACEMENT COST=176 X 4000

=7,04,000RS

[Similar types of calculation are for TUBELIGHT & AC, which is 11,675 and 3,759 as saving and 2,34,800 and 8,75,000 as replacement cost respectively]

- Annual energy charges = 14, 85,690 RS

- Avg monthly energy charges =1, 23,807 RS Monthly consumption bill =80,942 RS (Excluding machines)

- Total monthly consumption of equipment before replacement =64,692 RS

- Total annual consumption of equipment before replacement =3, 19,911 RS

- Total monthly saving =38,032 RS

- Total annual saving =4, 56,392 RS

- Total replacement cost = 19, 07,400 RS

IV. IMPLEMENTATION OF RENEWABLE TECHNOLOGY RECURSE

A. Solar Panel

- As per the measurement and survey done,
- Solar panels can be provided in 15,000 sq feet area.
- 480 solar panels can be installed in this much area.
- Each panel is capable of generation 315 wattage
- Cost of each solar panels is about Rs 12,000/

B. Calculations

Solar panels.

480 panels generates 315 W=151200W/hr.

=1209600W in 8 hr.

=36288000W in 30days

=36288kw

Monthly saving in bill = 2, 77,603.2 RS.

Annual saving bill =33, 31,238.4

Investment Cost For Solar Equipment

FOR SOLAR PANELS

Cost of one solar panel =12,000

Cost for 480 solar panels =480x12000

Total cost of replacement =57,60,000

For Inverter

Cost of single inverter =35,000

No of inverters provided =6 UNIT

Total cost of inverter =2,10,000

Total cost of solar panels and inverters =59,70,000

V. RESULT

The recovery coasting of solar panels and inverter will only 2 years.

As investment coast is recovered this panels will require only maintenance cost, generation of electricity and deliverance will be off without cost.

VI. CONCLUSION

The conclusions are,

- Management on utilization and consumption of energy/electricity is essential as per the ongoing trend and necessity.
- The paper evaluates about, the idea of reducing cost (on energy charges) or consumptions of energy by replacing less efficient equipment's to more efficient equipment.
- Investments in renewable energy should be helped by competition and regulatory reform in the energy industry, in the electricity industry since such reforms should reduce the subsidies, which historically have permeated the countries' industries, for electricity production from fossil and hydro resources.
- The scope for further cost reductions is appreciable in all key technologies. There are positive externalities to investment, in the sense that each generation of investments is acting to reduce the costs of future generations; such benefits ideally need to be recognized in tax and regulatory policies and in budgetary allocations for research and development (R&D) and education and training.
- Investment on Solar technology is more appropriate and profitable investment as it generate the energy from the

renewable sources (sun), which leads to limit the use of non-renewable sources, and helps not to extinct (fossil fuel).

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