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A Novel Energy Conservation Method in Television Studio Using NI Lab VIEW

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Abstract-The increasing demand for power has led to considerable fossil fuels burning which has in turn had an adverse impact on environment. In this context, efficient use of energy and its conservation is of paramount importance. It has been estimated that nearly 25,000 MW can be saved by implementing end-use energy efficiency and demand side management measures throughout India. Television in India is a huge industry which has thousands of programmes in many languages. India has 44.21 million private DTH subscribers and 825 channels according to the Telecom Regulatory Authority of India as of 31 December 2011.A large no of Television studios cater to these channels. Energy conservation in Television industry is very important & it will lead to huge energy saving.

Keywords — NI Lab VIEW, Television industry, Energy management software, Energy saving.

I. INTRODUCTION

Television Studios make television programs which are watched by the TV audience. Energy Management in television studios is of interest as the demand for television content is increasing day by day. So, there is a need for energy conservation in TV Studios. Television studios consume a lot of energy. Two main factors are responsible for the energy consumption

A. Lighting
B. Air conditioning

Maximum energy consumed is due to lighting in two ways:

A. Actual energy consumed by lighting.
B. Heat is generated by the high wattage lighting which requires cooling by air-conditioning.

Air-conditioning itself consumes a lot of energy.

II. GLOBAL NEED TO CONSERVE ENERGY

A. Every day the number of Electrical appliances are increasing and at the same time the demand for energy is also increasing. But the electrical power generations are not increasing in the same ratio. This leads energy crisis in the country.
B. Coal being one of the main sources of electrical , is in limited amount. In the coming 50-60 years, it is expected that it will be fully consumed. Then it will become main problem for the country to generate the electricity.
C. If energy will not be preserved and manage properly a huge problem of energy crisis will take place and collapse condition may reach.

III. BENIFITS OF USING ENEGRY EFFICIENT LIGHTING SYSTEM

A. Higher efficiency
B. Low billing rate
C. Less UV Emission
D. High intensity of light
E. Increased life span of lights
F. Huge saving in electricity bill

IV. BENEFITS OF ENERGY MANAGEMENT SOFTWARE

Using software for energy management has tremendous benefit over traditional one. Main need for using this software based street

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lights are[1], [2],[3],-

A. Environmentally friendly – 100% powered by the sun, solar panels reduce fossil fuel consumption, eliminating pollution
B. Fully automatic system – Automatically turns off the street light as per time schedule
C. Better light source – LED lamps has high intensity of lights with less electricity consumption. It also does not decrease the power quality
D. Sufficient backup power is provided for rainy , cloudy or any other this type of situation
E. Distributed light and power - no single point of failure for enhanced security
F. Easy to install
G. Low maintenance cost
H. Due to proper switching and intensity control, electricity bill reduces as well as the life of light increases
I. Less losses

V. ENERGY CONSERVATION SOFTWARE

The energy conservation software for T.V studio is shown in Fig.1. The concept behind this software is to change the high power lamps with high intensity LED lights. This energy efficient lighting system will save the electrical energy as well as its life and intensity will also increase. Due to less power consumption in lighting system, the heat losses will decrease, therefore the consumption of electricity in air conditioner will also decrease. This cumulative action will save the overall electricity. The front panel is shown in Fig 1[4], [5], [6], [7] Left side of old lighting system denoted by

A. No. of lights in first R – It is the total number of lights used in old conventional lighting system in 1st row
B. No. of lights in 2nd R – It is the total number of lights used in old conventional lighting system in 2nd row
C. No. of lights in 3rd R – It is the total number of lights used in old conventional lighting system in 3rd row

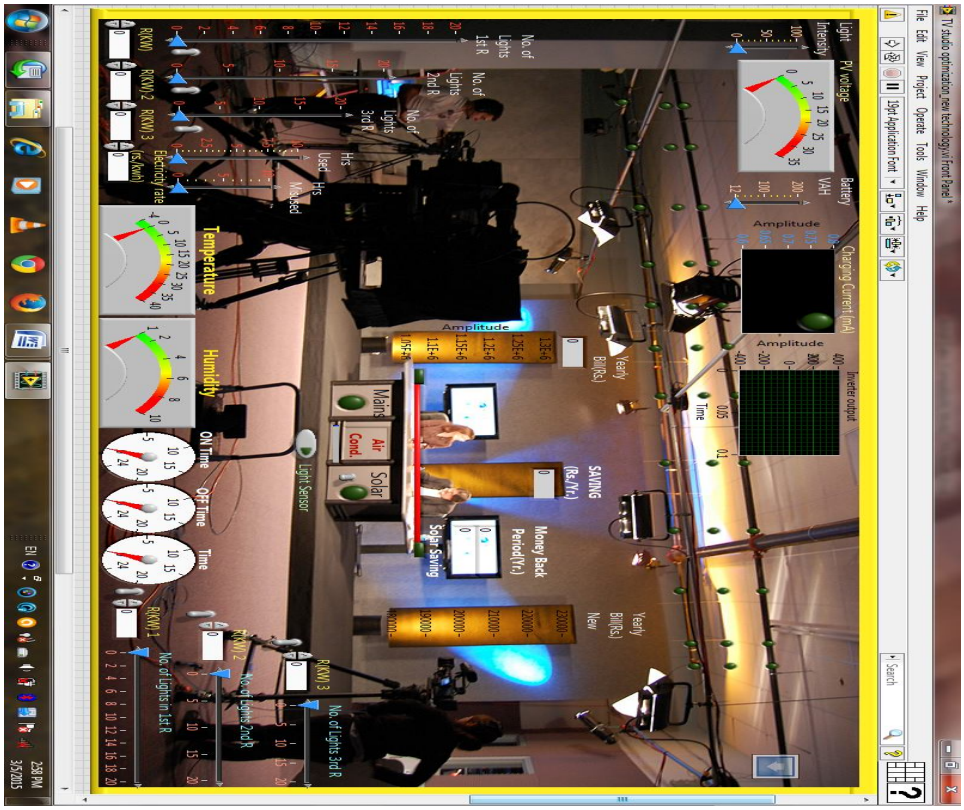

Fig. 1 Front panel of TV studio

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Right side of lighting is new lighting system and are denoted by

A. No. of lights in first R – It is the total number of lights used in new energy efficient lighting system in 1st row
B. No. of lights in 2nd R – It is the total number of lights used in new energy efficient lighting system in 2nd row
C. No. of lights in 3rd R – It is the total number of lights used in new energy efficient lighting system in 3rd row Also respective power wattage is given

In the front panel, following controls are there:

A. ON Time – This is the starting time of the T.V studio lighting system. It will decide at which time the lights has to get ON
B. OFF Time – This is the end time of the T.V studio lighting system. It will decide at which time the lights has to get OFF
C. Time – This is the present time. If this time is lying between ON time and OFF time, then only practically all lights will be ON.
D. AIR conditioner– This control will show by how much strength AC is ON.
E. Light intensity– This control will show the sun intensity for PV cell.
F. PV voltage– This control will show how much voltage is developed on PV cell.
G. Temperature- This control will show the present temperature inside the studio.
H. Humidity- This control will show the present humidity inside the studio.
I. Battery VAH- This control will show the voltage amp hour rating of the battery used for backup.
J. Charging current- This control will show the charging current of the battery
K. Inverter output- This control will show the inverter voltage output of the inverter used in studio.
L. Yearly bill- This control will show the present yearly bill when using old system.
M. New bill - This control will show the present yearly bill when new system
N. Pay back period – This control will show how much time is consumed in paying the money back.
O. Day - Day is used to schedule the street lights. On alternate day, half the street lights will get on/off.

VI. WORKING PRINCIPLE

Fig.2. shows the working of the software. The light will be ON only when the sensor senses that someone is there on the stage. If nobody is there on the stage, the stage lights will off. Also the lights will be ON when the time will lie between ON time and OFF time. The air conditioner will also automatically adjust according to the temperature and humidity.

Fig. 2 TV studio in working mode

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VII. RESULT & CONCLUSION

In the Fig.2, typical studio lighting has been simulated. it is clear that the conservation software is saving 1.76497E+6 lakhs Rs. in the studio per year. The money back period is 0.0489592 years. The yearly old billing was 2.24677E+6 and new yearly billing is about 4.8 lakhs. This is a big saving which this software has accomplished.

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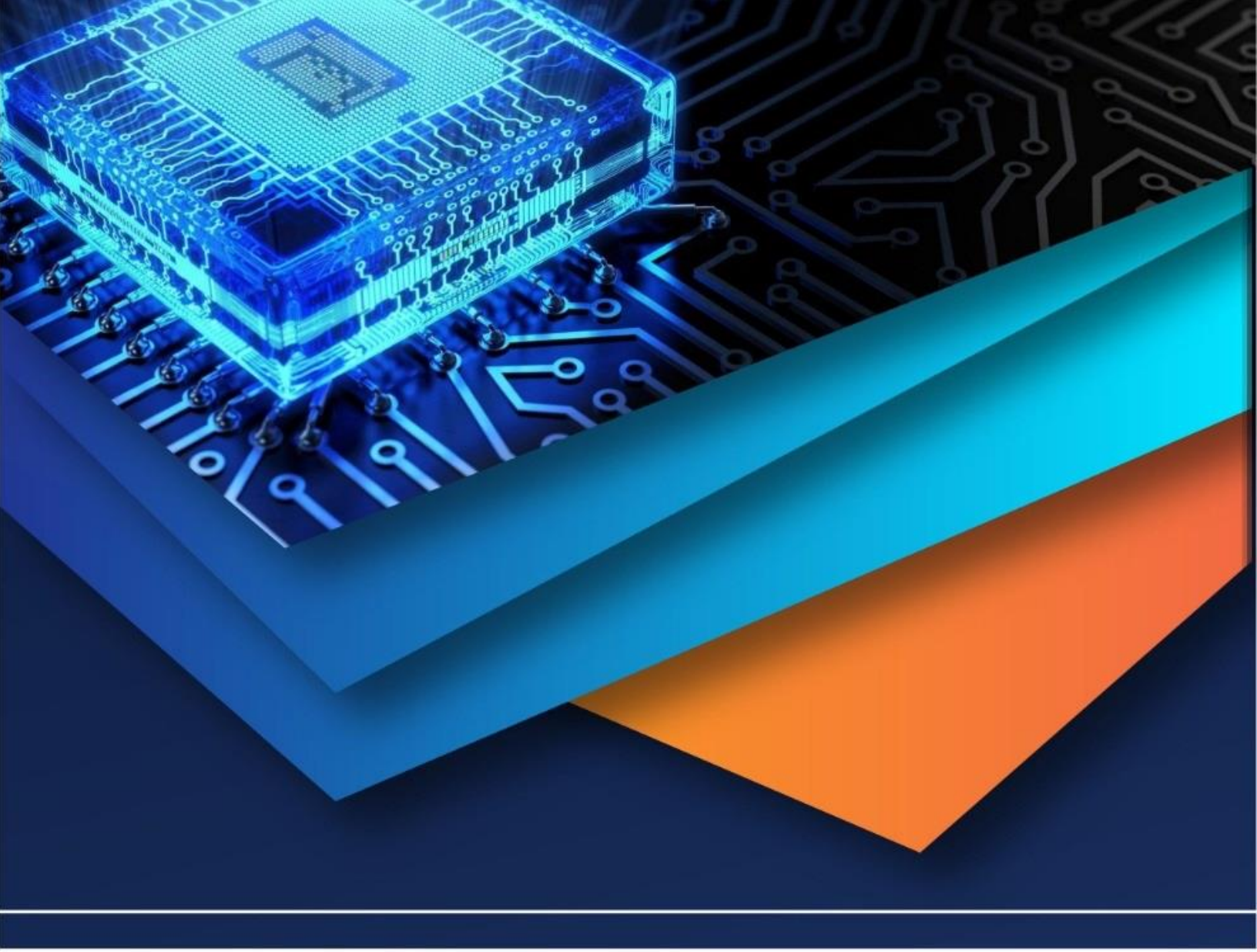

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