Artificial solar oxygen tree

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ABSTRACT

In this, we proposed, to convert solar energy from the solar tree for the generation of Hydrogen, Oxygen and light. Very small space requires a solar tree than conventional solar panel system. The solar panels on solar tree convert solar radiation into electricity, which is used for decomposition of water into oxygen and hydrogen. Oxygen is released in the air to breathe and hydrogen is stored as fuel. Light Emitting Diode (LED) lights, driven from the generated electricity are used to radiate light during the night. Solar Tree can be implemented to meet oxygen and Hydrogen fuel requirements and lighting demands of the cities in an eco-friendly manner. The main component of this tracker is Microcontroller 89s51 which is programmed to detect the sunlight with the help of Solar panels.

Keywords— Electrolysis, PV cells, Solar energy, Street lamps, Rechargeable battery

1. INTRODUCTION

Trees naturally possess an ability to convert carbon dioxide into oxygen. But today because of Humans Greed, We are cutting trees and forests and in that place, we humans are building white cement forest. Hence we are facing scarcity of pure air. The population is increasing and the number of tresses is decreasing still people are obliterating trees after trees, to build and fill their pockets. CO2 is hazardous for humans but Trees convert CO2 into oxygen which we humans need to survive. Further depreciating of trees will lead to an extreme Global warming problem, Acid Rain, a respiratory disease many more. Hence science and technology have given birth tour saviour, An Artificial Oxygen Tree.

2. LITERATURE SURVEY

Many research laboratories around the world are working towards the same objective to implement innovative and environment-friendly industrial design solutions. K. S. Lackner’s work includes demonstrating and improving passive methods to remove carbon dioxide from the atmosphere in the context of addressing climate change. This paper presents Solar Tree implementation as an alternate source of energy in urban cities. A new idea of a solar tree designs us in the nanowire solar cells presented. Nanowires possess high physical light absorption properties which can be improved tremendously. Hence we can say that it is a revolutionary urban lighting concept and these technologies lead to the development of high efficiency.

3. OBJECTIVE

The main objective of this project is making efficient use of sunlight to carry out an important task like electrolysis, street lamps and also generations of electricity. By achieving this goal project will be of great help for rural areas where electricity is a major issue and also in polluted metropolitan areas.

4. PROCESS FLOW

The whole setup consists of total 6 solar panels from which three panels are connected in series and remaining three also connected in series, both sets of series panels are connected in parallel. Each solar cell gives an output of 4V and 300mA of current. After connecting each set parallel we get the output of 12V and 600mA. At the output of each set of solar panel one reverse polarity diode is connected to prevent supply from coming back at panels. To store the electric energy generated from panels we need batteries. We have two batteries of 6V each. We also have a plastic container filled with water to perform the electrolysis process. Two carbon/Graphite rods are placed in the water one rod is given with positive supply and another one is given with negative supply. The rod given with positive supply generates oxygen and the negative supply rod generates hydrogen. The ratio of generation is 2:1. Now comes the automation part where conversion of values from analogue to digital and commands process is done. The values that we measure from battery levels and all the sensors present in the project are in analogue format, we need to convert them into digital one in order to make microcontroller understand them. For this, we require Analog to Digital converter i.e. ADC0808. This is a 28 pin IC. We require 5V input signal to power the ADC0808 but out the battery gives an output of 12V, so we use a potential divider at the end of the battery. The ratio of the potential divider is 10k:1k. The point between 1k and GND is connected to the VCC of ADC. The first sensor is LDR [Light Dependent Resistor], whenever the atmospheric light increases the resistance of LDR increases and vice versa. This sensor is mainly used to monitor lightning conditions and turn the street lights [LED] accordingly. If the atmospheric temperature
increases above 35 degree Celsius then there are chances of the explosion of hydrogen gas being generated at the electrolysis process. To prevent that from happening we need to monitor the temperature. Thermistors of 10K [NTC] is used for this purpose. When temperature increases the voltage increases and vice versa. ADC always selects one input at a time so to define the selected input there is address line present. Example if 000 is input given to ADC then it will select the first sensor and likewise. The start of conversion and end of conversion pins are short so that IC goes in freeze mode and it will perform conversion continuously. ADC0808 also requires a clock signal to generate this signal we have connected IC7414 for NOT gate operation with positive feedback and capacitor for grounding the noise. This IC generates 560 kHz of the clock signal for ADC0808. At the end of all the conversion process, we get 8Bit output. This 8 Bit output is given to the Micro-controller AT 89s51.

AT89s51 is 40pin Micro-controller with 4Kbytes of programmable flash memory, 128kb RAM and 4 I/O ports and on-chip oscillator. 40th pin of IC is given with 5v of supply, the 20th pin is ground. On the pin 18 and 19 crystal oscillator is present which generates 11.0592 MHz of a signal on the chip. All the data collected form ADC is given to port 2 of microcontroller, the port 1 is given with address and latch. Port 0 have LCD [16x2] display connected to it. We are using the LCD on 4-bit mode so only D4, D5, D6, D7 bits are active. The LCD screen will show the Battery percentage.

Now the control actions are going to take place in the project. Port 3 output is going to the transistors which are acting as a real driver who is going to amplify the signal to contacts. All the transistors have common emitter setup on each collector end the relay contact is placed. Relay one is connected to solar panel supply which is going to a battery in series, so if the battery goes above 13v the controller will send the command to transistor and relay will cut the supply to battery coming from solar panels. Relay 2 is for electrolysis process when the battery goes below 10V then electrolysis must stop and it also cuts supply when the nearby temperature is above 35d as we discussed earlier. Relay 3 is for switching the LED lights ON or OFF according to the lighting conditions. If the light goes below 100 Lux then street lights are turned ON. Next very important process is voltage regulation.

5. CONCLUSION
This project aims to generate electrical energy from natural sources which are available around us. Using solar energy converting sunlight into electrical energy and using the same energy to run electrolysis which will provide oxygen which is directly set free in air and hydrogen gas which can be used as fuel.

6. REFERENCES