Industrial Engineering Journal
ISSN: 0970-2555
Volume : 52, Issue 3, March : 2023

SOLAR AND WIND MOBILE & LAPTOP CHARGING SYSTEM

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Abstract

Travelers frequently run out of battery power for their laptops and mobile devices. There is virtually no way to charge a laptop or a mobile device outside during these periods. While travelling a long distance or in an area without a power source, charging mobile devices and laptops is a major issue. A universal mobile and laptop charging solution that can run on solar and window energy is what this proposal suggests. Given that it draws its power from unconventional energy sources, this charging device is both extremely effective and cost- effective. The proposed charging mechanism also addresses the issue of charging while travelling. This project lists the various renewable energy sources that have been employed to construct mobile and laptop charging stations that may be used either stationary or portability, along with this system is designed by using raspberry Pi Pico as controlling heart. It is the overall functional a accumulation of the BMS (Battery Management System) & PMC (Power Management Circuit) circuits. There is authentication add on feature for the saved energy within the batteries.

Keywords: *Mobile, Laptop, Solar & Wind Energy, Universal Mobile Charging System,Affordable Mobile Charger.*

I. INTRODUCTION

Because all of these devices use rechargeable batteries that require frequent charging, fuelling them is obvious in order to run smart phones or any other smart communication device to communicate with the rest of the world. We therefore cannot function without electricity for even a day, and the issue only grows worse during prolonged load shedding. We must find a suitable substitute for the conventional electricity generators that burn fossil and fossil fuel- based energy sources (Gas, Coal, and Oil), as this causes the depletion of fossil fuel reserves, harm to the environment, loss of human life due to greenhouse gas emissions, and other environmental issues. Clearly, the only option to address this situation is renewable energy.

Mobile phone charging while travelling is a major hassle because power sources are frequently inaccessible. There are portable chargers for cell phones, iPods, and MP3 players, but they are pricey and require different models for charging at home and in the drive. Hence, a wind and solar energy-powered mobile and laptop charging system is presented. Wind energy is used to generate 6 volts using a generator, while solar energy is used to generate 8 volts using solar panels. The suggested charger will address the issues of laptop and mobile device charging when travelling, power outages, and lack of power in distant regions.

Solar power systems are extremely dependable and virtually maintenance-free. Although it has the potential to be ahead, the restrictions of a greater investment cost and a lower energy conversion efficiency are holding it back. A safe, untapped source of energy, solar energy is now being used in more modern aspects of our daily lives. This essay examines a few of these solar energy applications, in which solar-powered charging units have been created for use as emergency response power supplies.

II. LITERATURE SURVEY

A dependable charging infrastructure is increasingly required to support the rapid public acceptance of this mode of transportation as demand for mobile and laptop charging rises. Local electrical networks are simultaneously under stress and need assistance from cheap, abundant, and renewable energy sources like wind and solar. This is the reason why recently the world has seen the introduction of highly praised renewable energy-based charging stations. In this project, we present analyses pertaining to this kind of infrastructure for charging alternative energy sources. We offer thorough study on crucial topics in this area, such as resource potentiality, planning, control, and price. As part of this research, problems with this kind of electric charging station will also be examined, clarified, and relevant solutions will be suggested. Our project seeks to provide the groundwork for future study in this important area by giving readers an overview of how to charge laptops and mobile devices with renewable energy.

Yet, because they may provide electricity at low power levels, programmable dispatch loads or energy storage systems are the potential method for balancing the output of electricity from renewable energy sources. The use of energy storage systems to stabilise the electrical grid is no longer a cutting-edge innovation. Various technologies have been used as energy sources, like concentrated solar power. Emerging technologies in the sector include power converters, smart metres, wireless sensors, and enhanced communication. Uncontrolled charging was said

to contribute to the overloading of transformers, feeders, and ultimately the power supply. As a result, stationary energy storage quick charging devices have been recommended in the majority of the literature as a solution to these difficult issues. Energy storage reduces the need for a charging infrastructure and lowers operating costs by supporting laptop and mobile charging stability by giving the necessary emergency energy to reach charging stations.

III. PROPOSED METHODOLOGY

In this section, this this, both the design, this, the design, in this the design our, this, both our description the design our proposed, our, both our proposed system, our, Raspberry Pi Pico is the brain of this system. It is a dual core custom-design architecture microcontroller comes under the family of ARMs. It has 40 GPIOs (general purpose input and output pins) with gold coated. Which controls the entire sources and components connected to it, such as V & I sensors, solar panels, USB ports, dynamo motor, LCD displays etc. as we aim to design a system with a source which cannot harmful for the environment as well as humans.

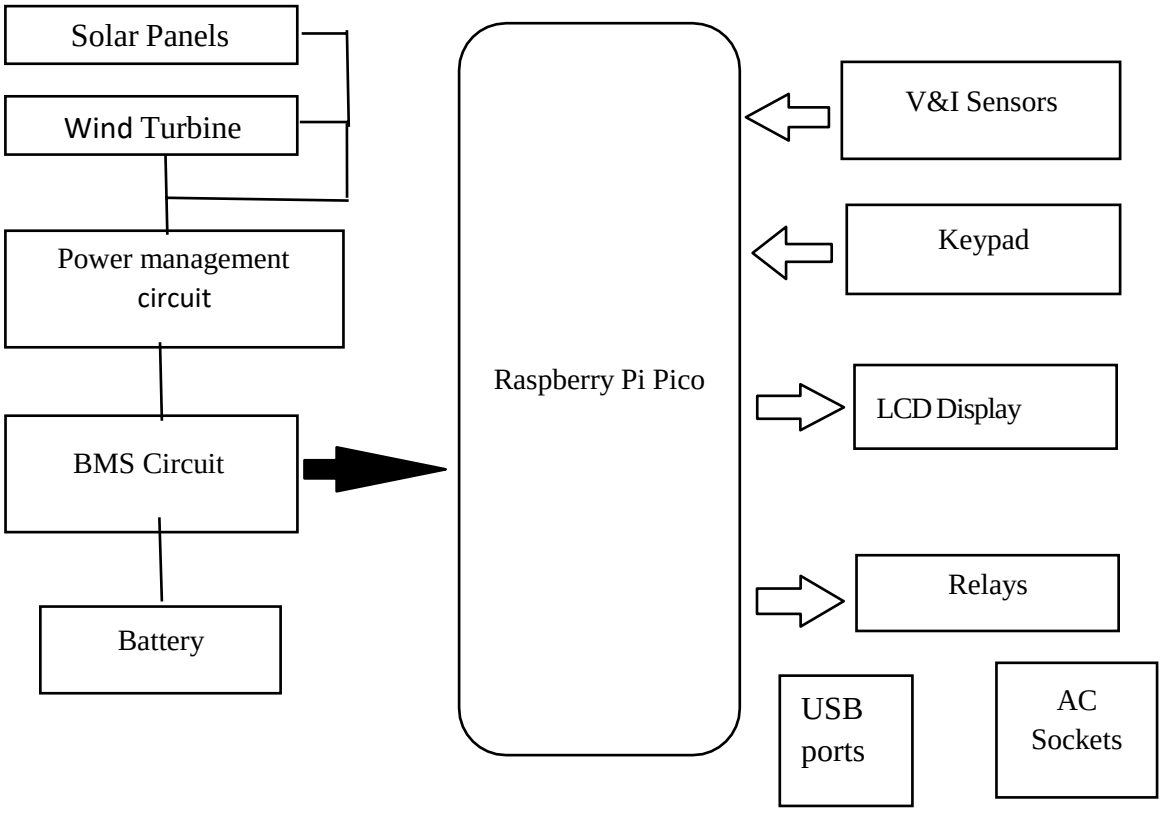

Fig 3.1Biock diagram of proposed system

We preferred the renewable energy i.e., solar and wind. From the motion and functions of this energy-based devices such as solar panels and dynamo motors we are converting the

renewable energy into electrical energy. In this design for the purpose of charging the devices we use batteries it stores the conventional energy. To retrieve this energy as a optimal and residual energy source we have employed a BMS circuitry. That is battery management system. As our project aim, we have come up with the better and efficient features to our design. By using simple components and better results.

IV. IMPLEMENTATION & WORKING

When we rely on the movement of wind to power large fans, we are using wind power. In its most basic form, kinetic energy, often known as the energy of motion, is captured by the fans' blades from the wind's movement. Rotational energy is produced as the shaft spins and is transferred to a generator. A wind turbine's generator is just a collection of magnets that rotate around a coil of wire. An electrical current is produced by the magnets rotating around the wire to supply power. Here, the generator is a 7.7-volt dynamo motor. Those who use rechargeable batteries must use a DC voltage to charge them. Here, 9 volts are generated from wind energy. This will be processed by IC.

Similarly, a 5 The solar module can produce approximately 16.5 volts at 400 mA when the photo energy is at its peak. The battery is charged by this current. Here, a step-down converter is provided by the 7805 voltage regulator IC. In other words, 12v is reduced to 5v. The batteries linked to them are charged using these voltage levels. This system's brain, the Raspberry Pi Pico, manages each component individually. The RP2040 is set up to function as a control device using the Arduino IDE and C-lang. To prevent leakage currents and overheating, a power management circuit is used. The power-saving mode on contemporary devices is shown on a 16 x 2 LCD panel. To configure the system's security so that it cannot be used by others, utilise the 4 x 3 keypad. If the password entered is incorrect, it bars the electricity from enteringUSB ports.

where the step-up transformer, which serves as an inverter, was powered by the energy conserved in the batteries. The 12 volts DC voltage is changed into 230 volts of AC power.

V. CONCLUSION & FUTURE SCOPE

Natural sources of solar energy are plentiful and inexhaustible. To meet our daily needs, this energy must be captured. The cell phone and laptop are charged using solar-powered chargers in the proposed system. The major problem with solar energy is the variability in sun irradiance, which leads to the output voltage being uncontrolled. To get around this difficulty,

voltage regulators are used. The battery stores the captured solar energy, which is then used to power various loads. The battery's charging status is shown on an LCD using a Raspberry Pi Pico. The proposed solution is not portable due to the lead acid battery's weight and size. The proposed solution is not portable due to the lead acid battery's weight and size. The solar panel is also heavy and non-portable. To lower the size of the gadget, a different technique might be employed to create the solar panel. The wind turbine produced more electricity than a single solar panel more efficiently, yielding the maximum return on investment.

VI. RESULTS

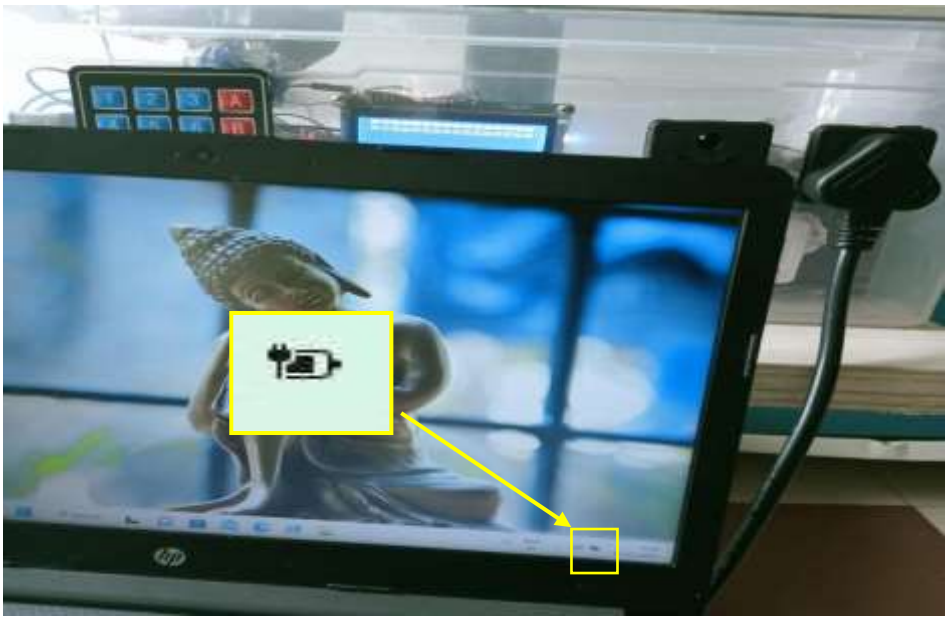

Fig 6.1 Laptop charging through AC sockets

Fig 6.2 mobile charging picture

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