Inverter Based on Internet of Things

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ABSTRACT: ***There are two types of sources for electrical power generation. One is traditional, while the other is non-conventional. Today to produce most of electrical power conventional sources including coal, gas, nuclear power generators. They are used in order to produce electricity; some conventional sources pollute the atmosphere. And because of its adverse radiation effect on the human race, nuclear energy is not preferable. Within a few years, conventional sources would not be adequate to satisfy mankind's energy needs. Thus, non-conventional energy sources such as solar, wind, etc. can produce some of the electrical power. In most households today, inverters and routers are commonly found. Through this work, we discuss the introduction of a smart inverter, i.e. a solar charged inverter that uses Wi-Fi technology to communicate with the user in two ways, informing the user of both the inverter's battery voltage and the runtime of the loads that the user chooses to run.***

KEYWORDS: ***Battery, Inverter, Power, Electric Power, Solar***

INTRODUCTION

Power failure plays an important role in the electrical system in everyone's normal livelihood. Nowadays Huge demand & supply will suffer when it is not matched in a power system. Generating the power without running cost, maintenance and technical knowledge solar power generation is the best way in this paper to enhance the power reliability to customers with the use of PV-battery systems [1]. There are various types of operations available in this system: technique used is stage conversion to improve the working efficiency of the system & to make the system cost efficient, reduce size as well as weight of the system. PV systems have increased dramatically, with energy storage, a solar PV system becomes a stable source of energy & it can be transmitted at the request, which results in performance improving & the value of solar PV systems [2].

With the rapid rise in industrialization and urbanization, energy demand has risen. More fossil fuels are required for greater energy demand. Increased demand for fossil fuels contributes to the depletion of natural resources and also leads to increased emissions. It has come time to turn over to clean energy sources. In nature, they are tidy and plentiful. Increasing the efficiency of renewable energy sources is a major issue [3]. In order to make the device intelligent, a power electronics inverter system should have a digital design, robust software facilities and a two-way communication capability. Usually, the device consists of reliable, robust and proficient silicon-based hardware that can be managed by an adaptable software environment through the incorporation of an integrated performance monitoring control structure. Power electronics technology can be used to create a smart or intelligent interface. Therefore, a power electronics interface system such as a smart inverter system is needed to achieve reliability effectively with the power output.

The incorporation of energy storage into a utility-scale solar PV system provides numerous options. In particular, it is possible to incorporate energy storage into the ac or dc side of solar PV power conversion systems that may consist of several conversions. This paper introduces a new single-stage solar converter called Reconfigurable Solar Converter (RSC). Using power conversion method to conduct various modes of operation such as solar voltage is safe and battery is upper low level and second one is no solar voltage but battery is upper low level is the basic principle of the RSC [4].

LITERATURE REVIEW

Worldwide sun oriented photovoltaic limit has developed from around five giga watts in 2005 to roughly 306.5 giga watts in 2016. In that year, total sun-oriented PV facilities in Germany alone reached 41.3 giga watts somewhere in the range. The private sun-oriented PV showcase in the United States is estimated to be worth about 4.7 billion U.S. dollars by 2016. Advances in solar vitality remain one of the most intensively supported renewable sources. The most fundamental factor needed to fuel an economy has been the industrial revolution in power. Every part of society is heavily dependent on power for its smooth running, such as factories, homes and the government itself. The growth of the population, however, has led to an increased demand for electricity[4]. Pollution is now at an all-time high due to traditional energy sources. Hence, it is time we use renewable energy sources in order to reduce pressure on power grids. Focusing on the idea of producing electricity using renewable energies and storing energy in an effective way to reduce the burden on power grids is therefore extremely necessary [5].

During emergencies like floods, hurricanes, equipment breakdown, etc., which lead to long power cuts, energy storage is useful. A power shortage and consequential power cuts have also resulted from the population explosion. But the inverter is supposed to be much smarter than it is now with ever - technical advances. One way to do it is to allow the customer to remotely track its status. In order to charge its battery, a smart inverter must use renewable energy, be adaptive and able to send and receive messages easily, and exchange data with the user. There is also scope for retrofitting the current inverters to make them more user-friendly by showing the voltage of the battery and also providing details on the run-time of its loads when using the battery, which will also enable the customer to make judicious use of the available energy.

The growing demand for energy and the emissions caused by the rapid depletion of fossil fuels has now given way to the use of renewable sources to meet the demands of energy. Among renewable energy sources, solar energy, which generates electricity using PV (photovoltaic) modules, is of high interest. The need for more efficient use of renewable energy sources and solar energy appears to be one of the needs of the day for smart inverters. Solar energy can be used to charge the batteries during the daytime, and when solar energy is not available, the stored energy in the battery can be used [6].

Residential houses have been integrated with a WAN system whose nodes have aggregated and provided the energy consumption data of various appliances in the house to the consumer for review. In the report, the authors found a critical situation in which the consumer should be conscious of his or her energy use, i.e. in the case of a power loss, and agreed that the inverter has a limited resource in the form of a battery to meet energy needs. Therefore, the authors showed the user how long the user would use the current battery voltage to operate their loads. Smart inverters are generally inverters which are charged with the help of solar energy & perform solar tracking. A stepper motor is used to perform the solar tracking using an algorithm. However smart inverters can also be looked upon as inverters with bidirectional communication with the user & other person in the system. The work explored the possibility by introducing interaction between the user & the inverter with the help of IoT [1].

A smart inverter designed with a microcontroller which makes a smart home was proposed. In this work, a bi-level PV based micro grid design was proposed for nominal power home applications. Power failure plays an important role in the electrical system in everyone's normal livelihood. Nowadays Huge demand & supply will suffer when it is not matched in a power system. Generating the power without running cost, maintenance and technical knowledge solar power generation is the best way in this paper to enhance the power reliability to customers with the use of PV-battery systems. There are various types of operations available in this system: technique used is stage conversion to improve the working efficiency of the system & to make the system cost efficient, reduce size as well as weight of the system [7].

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CONCLUSION & DISCUSSION

IoT based Smart controlled inverter is being designed by using an existing inverter with two directional communications with the user by power management system. Based on the priorities, anyone can control loads wirelessly at the time during power cut, At same time system can observe the load current of the inverter. This prototype design provides a deep insight into working of a self-reliable & sufficient system for controlling & monitoring loads using existing load current. The solar energy system requires only first stage investment in solar panels & the smart controlled inverter system is developed at cost efficient. The user generates enough energy for oneself & uses it accordingly with an environment friendly system. Hence in the work, Eco-friendly IoT based smart controlled inverter is designed to control the various combinations of load in the Industry or home on user choice basis intellectually through Wi-Fi.

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