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Optimizing Energy Savings Using Battery -Less Pv Harvesting System With Grid Backup And Real Time Solar Tracking

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Abstract: **Due to the present energy crisis we are seeing a transformation to renewable energy sources like the solar energy. The disadvantage of solar energy lies in the high replacement cost of batteries and on the non- uniformity of solar availability. By using a battery-less system we directly uses the solar energy to run DC appliances. If the availability of energy is less, then the required additional energy will be taken from the grid which ensures continuous supply. Moreover the real time based solar tracking ensures better capturing of solar rays. Since we use DC appliances, we avoid multiple conversions and reduce the cost. This project finds its application in Govt. offices, schools etc which functions at the time when abundant solar energy is available.**

Index Terms — **Grid tied PV harvesting system without battery, Solar Tracking, DC Home**

I. INTRODUCTION

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The regeneration energy also called the green energy, has gained much importance nowadays. Green energy can be recycled, much like solar energy, water power, wind power, biomass energy, terrestrial heat, temperature difference of sea, sea waves, morning and evening tides, etc.. Among the non-conventional, renewable energy sources, solar energy affords great potential for conversion into electric power, able to ensure an important part of the electrical energy needs of the planet[1].The conversion principle of solar light into Electricity, called Photo-Voltaic (PV) conversion, is not very new, but the efficiency improvement of the PV conversion equipment is still one of top priorities for many academic and/or industrial research groups all over the world. Among the proposed solutions for improving the efficiency of PV conversion, we can mention solar tracking, the tracking system is verified more efficiently in generating energy than the fixed system[2].

The topic proposed in this paper refers to a single axis solar tracker system that automatically adjusts the optimum PV panel position with respect to the sun by means of a servo motor using RTC[3]. The purpose of this paper is to discuss DC distribution that has been widely applied in ships, traction
systems, and communication networks however. DC may be better than AC under certain conditions, especially if the public grid is required to provide DC voltage. While comparing AC versus DC distribution within a building, the conclusion is that DC was superior if local DC generation is present.

In this paper we have shown that grid tied solar system can be developed by omitting the energy storage device like large capacity battery bank[4]. It will not only reduce the internal losses for charging and discharging of battery bank but also at the same time a large amount of cost of the battery will be reduced. So, the system maintenance cost will be reduced also.

We have proposed a new approach to design a photovoltaic (PV) solar power system which can be operated by feeding the solar power to the grid along with the residential load. Again if there is an extra power demand for residential load along with the solar power then this system can also provide an opportunity to consume the power from the grid. The total system is controlled with the help of some the sensors and a micro controller[6]. As a whole a significant reduction in the system costs and efficient system performance can be realized.

II. GRID TIED P V SYSTEM WITHOUT BATTERY BACK UP

Energy is vital for the progress of a nation and it has to be con-served in a most efficient manner. In this paper we proposed an innovative design of a grid-tied PV system without storage device. This system is capable to feed solar energy to the utility power grid when grid power is available

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and backup the on-site load as well when the grid power is unavailable.

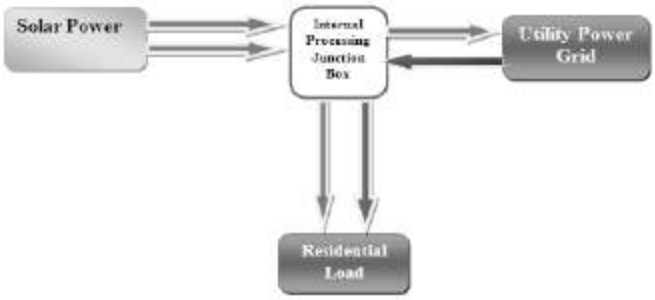

FIG 1 LAYOUT DIAGRAM OF THE PLANNED GRID-TIED PV SYSTEM.

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