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"SOLAR PHOTOVOLTAIC SYSTEM"

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ABSTRACT

A building analyses program is a modelling and simulation tool that determines the thermodynamic behaviour of a building structure. It helps to detect the influence of materials architectural features and air conditional systems during a buildings designs as well as in an existing building improvement in terms of climate control.

This paper reports on the futuristic advance in power transmission through microwaves. Sun is a limitless source of energy. A space power satellite (sps)orbiting round the earth traps solar energy and generates electric power using photovoltaic cells of sizable area.

I. INTRODUCTION

Photovoltaics offer consumers the ability to generate electricity in a clean, quiet and reliable way. Photovoltaics systems arecomprised of photovoltaics cells, devices that convert light energy directly into electricity. Because the source of light is usually the sun, they are often called solar cells. The world photovoltaics comes from "photo," meaning light, and "voltaic," which refers to producing electricity. Therefore, the photovoltaics process is "producing electricity directly from sunlight." Photovoltaics are often referred to as PV. When application require larger amounts of electricity and are located away from existing power lines, photovoltaics systems can in many cases offer the list expensive, most viable option.

In use today on street lights, gate openers and other low power tasks, photovoltaics are gaining popularity in taxes and around the world as their price declines and efficiency increases.

1.1 Objective

- The main objective of our project is to reduce more electricity consumptions.
- This also saving electricity more than other appliances.
- This is an Eco-Friendly.To create enabling environment for penetration of solar technology throughout the country missions targets was revised in 2015.
- To use present systems as demonstration units for visitors from community, industry groups and clients of solar energy products supplier and istallers.

1.2Problems Definitions

- If you are planning to buy a photovoltaic solar power system , you are supposed to start with increasing energy efficiency of your home or office.
- Achieving energy efficiency means reducing electrical consumption and your monthly electricity bills respectively.
- Electricity generated by a PV systems is still more expensive than electricity supplied from

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- utility grid unless you live in a remote region.

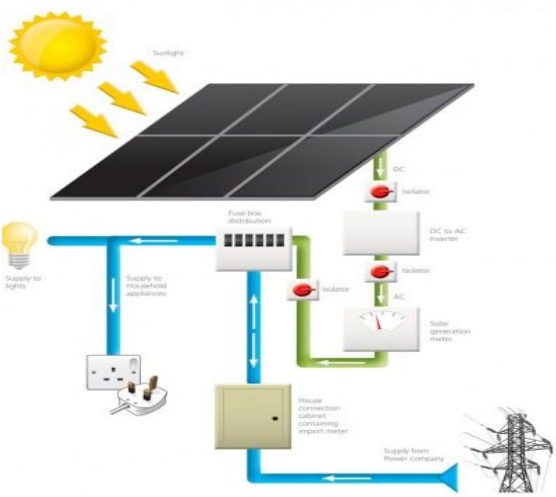
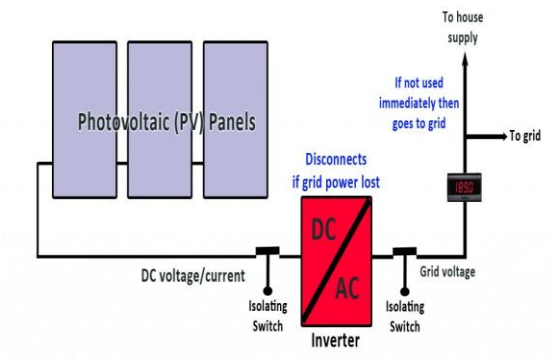


fig no (1)

1. Block Diagram



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2. Proposed Plan

How to Store Energy from Solar PV Systems?

Solar energy becomes more affordable year by year. Large-scale solar farms are now being installed for less than $1 per watt of capacity ($1 million per megawatt), and in some cases energy is being produced for less than 3 cents per kilowatt-hour ($30/MWh). However, solar PV systems still have one key challenge to overcome - delivering energy on demand. A conventional grid-tied PV system produces energy when available, but cannot meet nighttime consumption or sudden peaks in demand by itself. This is the main reason why natural gas is still a key source of energy. Hydroelectricity is the only renewable energy source that can match the fast response of natural gas turbines, but it is highly demanding in terms of site conditions. In addition, environmental permits for hydroelectric power plants can be difficult to obtain, since these projects involve flooding large extensions of land after the dam is built.

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1) Batteries

Using batteries to store surplus energy from solar panels in nothing new. However, this was normally accomplished with lead-acid batteries, which suffer from a poor round-trip efficiency and a short service life. However, lithium-ion batteries are emerging as a cost-effective option, while offering a superior round-trip energy storage efficiency and a longer service life than lead-acid batteries. Another key advantage of lithium-ion batteries it that they can tolerate more depth of discharge than their lead-acid counterparts, allowing for more compact battery banks.

2) Hot Water Tanks

Water and space heating are among the highest energy expenses in US households and commercial buildings, especially when resistance-based heating is used. However, water is also a viable medium to store surplus energy from solar PV systems in the form of heat. The concept is very similar to using batteries, with the difference that energy is used to power a water heater instead, and water is stored in an insulated tank. The concept is viable with a resistance heater, but better results can be achieved with a heat pump:

- Resistance heaters have a coefficient of performance of 1, Which means you must supply 1 Kwh of electricity to obtain 1 Kwh of heat (3412BTU).
- Air-sours heat pumps have a COP of around 2.5, requiring only 0.4 Kwh of electricity to deliver 1 Kwh of heat.

3) Ice Tanks

The basic principle of energy storage with ice tanks is just like for hot water tanks, with the difference that this approach is for space cooling and refrigeration. Many commercial brand of chillers can be equipped with add-on ice tanks, so they can freeze water when a solar PV system belonging to the same building in generating surplus electricity, or when power grid demand is low and energy is cheap. The ice can then be melted for space cooling and refrigeration during high-demand hours.

Another advantage of this approach is that peak cooling load on the chiller is reduced when it is partly met by melting ice, allowing chiller plants to be sized smaller. Assume a building that operates for 10 hours a day requires a cooling output of 200 tons: the conventional approach would be to use a 200-ton chiller, but it is also possible to use a 150-ton chiller with an ice tank that holds 500 ton-hours of cooling.

The concept of ice storage was applied successfully in downtown Chicago, reducing electricity demand by 30 megawatts. This does not only reduce demand charges for businesses, but also unburdens the power grid and reduces transmission losses.

4) Hydrogen Tanks

An electrolysis generator is a device that separates water into hydrogen and oxygen when supplied with electricity. Surplus energy from solar PV systems can also be used to power such a device, and the two elements are then stored separately.

When energy is needed, hydrogen and oxygen can react in a fuel cell, where they are combined back into water while producing heat and electricity. A hydrogen fuel cell is around 40% efficient when only the electric output

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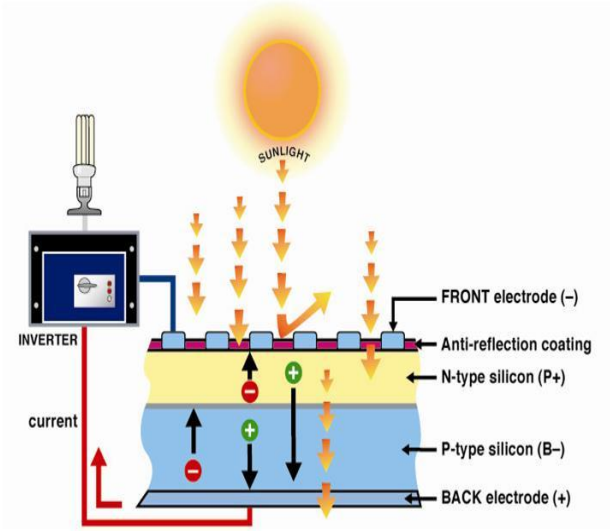
is used, but efficiency climbs above 90% when the heat output is also used. Therefore, hydrogen fuel cells are well suited for buildings where heat and electricity are used simultaneously, such as hotels.

III. WORKING



Solar PV systems use cells to convert sunlight into electricity. The PV cell consists of one or two layers of a semi conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers causing electricity to flow. The greater the intensity of the light, the greater the flow of electricity.
PV cells are referred to in terms of the amount of energy they generate in full sunlight; known as kilowatt peak or kWp.

Applications

- Water pumping for the purpose of drinking or for irrigation during the sunshine house.
- Village power.
- Street light.
- Transmission and communication tower.
- Residential colonies and apartments general lighting.

IV. CONCLUSION

The main advantage of concentrating solar power systems is the ability to provide power using solar heat storage at night and during bad weather.
Otherwise, solar PV system are much cheaper, can be built in any size required, and also perform in regions that do not enjoy sunshine.
Beside, photovoltaics offer more possibilities of use and have less stringent maintenance demands.

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REFERENCE

[1]. Khan,N., Mariun, Z., Saleem, N., Abas, N. "Fossil Fuels, New Energy Sources and the Great Energy Crisis". Renewable and sustainable energy Rev (2007), doi:10.1016\j.rser.2007.11.011

[2]. http://www.wave-energy-centre.org

[3]. German advisory council on global change ,2003 (http:// www.wbgu.de)

[4]. http://soladat.uoregon.edu\solarpositioncalculatorhtml