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Storing Electricity Using Renewable Energy

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Abstract: *Using solar Light to generate electricity and storing it in large batteries and then using it at night time so that we can save the electricity consumed by natural Recourse like Coal.Using solar panels to use the sunlight for the electricity, but sunlight energy can only be used at day time so We can store the electricity in large batteries so at night time when sunlight is not there, we can use the stored light.*

Keywords: Solar, Panel, Electricity, Storage, Battery, Renewable, Energy.

I. INTRODUCTION

The electricity we use which comes from the thermal power Plant is mostly Generated by the Combustion of coal and using the heat energy to convert it into electric energy and the travelled to our homes. Coal a Fossil Fuel is Natural Recourse and will get Extent after some Years and Electricity is the basic need now days. So, to use the electricity for long time by renewable terms we are working on a project of Storing the Electricity Generated by Solar. For the project Materials Required will be Batteries to store Electricity small Solar Panels to capture the sunlight and convert it intoelectricity. We will first make a base to execute the project on small scale, we will attach Solar panels with The Batteries ByWires So That the Electricity converted by Solar Panels Will be stored in the batteries and Provide the Switch to the batteries so that the stored energy is not use directly, So when the electric energy is stored in batteries we will connect the batteries to Lights. Make A Model of a Building or Street Light Attach the Panels to it and connect the solar panels to batteries so that the converted electricity will be stored in the batteries and when the batteries are charged by the Solar Panels, we will turn on the Lighting of the Building, without using the MSCEB Light.

II. MATERIALS AND METHODS

2.1) Solar Panels

Solar radiation may be converted directly into electricity by solar cells (photovoltaic cells). In such cells, a small electric voltage is generated when light strikes the junction between a metal and a semiconductor (such as silicon) or the junction between two different semiconductors. The power generated by a single photovoltaic cell is typically only about two watts. By connecting large numbers of individual cells together, however, as in solar-panel arrays, hundreds or even thousands of kilowatts of electric power can be generated in a solar electric plant or in a large household array. The energy efficiency of most present-day photovoltaic cells is only about 15 to 20 percent, and, since the intensity of solar radiation is low to begin with, large and costly assemblies of such cells are required to produce even moderate amounts of power.

Small photovoltaic cells that operate on sunlight or artificial light have found major use in low-power applications—as power sources for calculators and watches, for example. Larger units have been used to provide power for water pumps and communications systems in remote areas and for weather and communications satellites. Classic crystalline silicon panels and emerging technologies using thin-film solar cells, including building-integrated photovoltaics, can be installed by homeowners and businesses on their rooftops to replace or augment the conventional electric supply.

2.2) Wires

A wire is a flexible strand of metal. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number or cross-sectional area. ires are used to bear mechanical loads, often in the form of wire rope. In electricity and telecommunications signals, a "wire" can refer to an electrical cable, which can contain a "solid core" of a single wire or separate strands in stranded or braided forms.

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Usually cylindrical in geometry, wire can also be made in square, hexagonal, flattened rectangular, or other cross-sections, either for decorative purposes, or for technical purposes such as high-efficiency voice coils in loudspeakers. Edge-wound coil springs, such as the Slinky toy, are made of special flattened wire.They will be used to transfer the converted electric energy to the batteries.

2.3) Lithium-Ion Batteries

A lithium-ion or Li-ion battery is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. It is the predominant battery type used in portable consumer electronics and electric vehicles. It also sees significant use for grid-scale energy storage and military and aerospace applications. Compared to other rechargeable battery technologies, Li-ion batteries have high energy densities, low self-discharge, and no memory effect (although a small memory effect reported in LFP cells has been traced to poorly made cells).

Chemistry, performance, cost and safety characteristics vary across types of lithium-ion batteries. Most commercial Li-ion cells use intercalation compounds as the active materials. The anode or negative electrode is usually graphite, although silicon-carbon is also being increasingly used. Cells can be manufactured to prioritize either energy or power density.[10] Handheld electronics mostly use lithium polymer batteries (with a polymer gel as electrolyte), a lithium cobalt oxide (LiCo.cathode material, and a graphite anode, which together offer a high energy density. Lithium iron phosphate (LiFePO). lithium manganese oxide (LiMn2O4 spinel, or Li2MnO3-based lithium rich layered materials, LMR-NMC), and lithium nickel manganese cobalt oxide (LiNiMnCoO2 or NMC) may offer longer lives and may have better rate capability.

2.4) Led Lights

LED stands for light emitting diode. LED lighting products produce light up to 90% more efficiently than incandescent light bulbs. An electrical current pass through a microchip, which illuminates the tiny light sources we call LEDs and the result is visible light. This will be used in the Model of the building to test that the stored electric energy by solar is actually working or not.

III. COST ANALYSIS

Literature Review:

Adding solar energy storage to your home will cost somewhere between $9,000 and $12,000. Solar energy storage costs have been declining each year as battery technology improves and more people adopt it. But that doesn't mean that solar storage doesn't still cost a pretty penny. Luckily, there are some states that offer rebates and incentives (Subside)specifically for solar energy storage, like California's SGIP Program, that help soften the blow of upfront costs. Not only that, solar batteries are eligible for the 30% federal solar tax credit, as well.

Calculation for Solar Panels:

Explanation of how many kW required for a house used in Project:

House in Project consumes 2000 kWh of electricity monthly, and you want to use 320-watt solar panels, then the solar requirement of your home is 2000kWh/120kWh = 16.16kW of solar panels.

So, if you want to use 320-watt solar panels, the total no. of solar panels required to power the home = 16,160 watts / 320 watts = 50.5 Say 51 Solar panels.

The benefits of solar energy storage:

Solar energy storage systems are becoming more popular every year and it's no surprise why - following are just a few of the benefits of installing solar-plus-storage:

IV. BACKUP POWER

Despite what many people believe, solar panels will not power your home during a power outage. In order to keep your lights on when the grid goes down, you need to pair your solar system with a solar battery. This is why energy storage

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is most popular in places like California, where widespread power blackouts are commonplace. As an added bonus, solar batteries are a much quieter backup power Reduce spacing.

Energy Independence

Having solar energy storage means you're less reliant on the utility grid. We already know that means that you'll be protected when the grid power goes out, but it also means that you'll be less beholden to the utility all around.

For one thing, solar energy storage protects you from the electric rate increases that are almost guaranteed to happen every year. A battery lets you pull electricity from it instead of taking power from the grid and paying expensive rates.

Also, you know exactly where your power is coming from. With a utility, the energy can be generated from foreign gas and oil. You can rest assured that your home is powered with solar energy made right on your roof!

Electric bill savings

In many places, a solar battery won't give you extra utility bill savings because of a utility rate structure called net metering. With full retail net metering, your utility will pay you the full retail rate of electricity for any excess solar energy that your home doesn't use. Essentially, you use the utility as your "financial battery".

However, not all utilities offer full retail net metering, and instead they purchase excess solar electricity at a lower price. This is where solar energy storage can provide extra utility bill savings. Instead of sending your excess electricity to the grid and getting paid a low rate, you store it for later and get the full retail value out of it.

Solar storage is also helpful if your utility uses Time-of-Use rates to charge higher electric prices during peak demand hours. You can use the electricity stored in your battery during these peak hours and avoid paying the expensive rates set by your utility.

Reducing your carbon footprint

Many utility companies in the U.S. still create most of their power using dirty fossil fuels. This means that for every kilowatt-hour of electricity you use from your utility, you're probably contributing to the burning of fossil fuels.With solar energy storage systems, however, you use all of the electricity your solar energy system produces, maximizing the amount of renewable energy your home runs on. Using a clean energy source like solar cuts back on carbon emissions and makes for a happier and healthier planet.

V. OBJECTIVES OF RESEARCH

Most homeowners choose to store their solar energy by using a solar battery. technically, you can store solar energy through mechanical or thermal energy storage, like pumped hydro systems or molten salt energy storage technologies, but these storage options require a lot of space, materials, and moving parts. Overall, not the most practical way to store energy for a home.

Solar batteries, on the other hand, are a great way to store residential solar energy. The most common type of battery used for solar energy storage are lithium-ion batteries. Lithium-ion batteries last longer, require less maintenance, and take up less space than other solar energy storage solutions on the market, like lead-acid batteries.

Lithium-ion batteries are able to store solar energy through a series of chemical reactions, where lithium ions are moved through an electrolyte solution within the battery. So, when solar panels send electricity to the battery storage system a chemical reaction occurs that moves lithium ions and releases electrons in an electrolyte solution within the battery, which stores the energy.

VI. CONCLUSION

Solar energy is a clean, pollution free and renewable source of energy. Development of this source of energy requires an accurate detailed long-term knowledge of the potential taking into account seasonal variations. So the Solar energy can be used to convert heat into electric energy and store it for the further use.By this we can save the burning of Fossil Fuels which is Leading to More Pollution that are used to generate electricity.

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