JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

SOLER ENERGY CHARGER AND AUTOFOCUSSING

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Abstract:- Glass easily transmits short wave radiation which means that it possess little Interference to incoming solar energy but it is a very poor transmitter of long wage radiation. Once the suns energy has passed through the glass windows and has been outside. Glass therefore acts as a heat trap a phenomenon which has been recognized for some time in the construction of greenhouses which can get quit warm on sunny days, even in the middle of winter this has come to be known in fact as the greenhouse effect. Solar collectors for home heating usually called flat plate collectors almost always have one or more glass covers although various plastic and transparent materials are often used instead of glass. With fuel hikes making news, solar energy is the most sought-after energy Source. Solar chargers are simple, portable and ready to use devices which can be used by anyone especially in remote areas. Going solar can solve more than one problem, right from cutting down on carbon emissions and dependence on fuels, to solving the energy crisis. This paper aims to make a simple solar charger which can be used on the go. Solar panels don't supply regulated voltage while batteries need so for charging. Hence, an external adjustable voltage regulator is used to have the desired constant voltage. A Zener diode switches on to ensure charging is cut off at the saturation point.

Keyword:- energy crisis, Zener diode, greenhouse.

I. INTRODUCTION

Gone are the days when you would look up at the Sun and curse yourself for being out on a hot sunny day. Take pride; very soon you will be a walking energy station with people asking you to help them charge their batteries with your clothes! This isn't a scene out of a Sci-Fi movie. It is the simple application of solar cells. They are the only way we can convert sunlight into electricity directly and day by day they are getting better, smaller and cheaper.

Nothing can dare challenge the sun when it comes to radiating energy. Every hour the energy available from the sun is more than what human's require for an entire year. Petrol, diesel and all these fossil fuels are nothing but sun's energy concentrated over years and years. This makes them very efficient in terms of energy per unit of the fuel. So why not tap it directly?

Solar energy isn't something new. People have used sun to dry and preserve things. Vedic literatures in India even state the use of flying machines which were powered using the sun. Come 21stcentury, we have come a long way in developing solar cells which are the devices powering our future, converting sun's energy into electricity.

Solar panels are simply solar cells lined up together in series and parallel so as get sufficient voltage and are p-n junction semiconductor devices with pure silicon wafer doped with 'n' type phosphorous on the top and 'p' type boron on the base. If the PV cell is placed in the sun, photons of light strike the electrons in the p-n junction and energize them, knocking them free of their atoms. These electrons are attracted to the positive charge in the n-type silicon and

repelled by the negative charge in the p-type silicon. Connecting wires across the junction will have a current in them. Solar energy is used to heat and cool buildings to heat water and swimming pools, to power refrigerators and to operate engines pumps and sewage treatment plants. It Power cars, ovens water stills furnaces, distillation equipment crop dryers and Powered by solar energy.

Wind is used generate electricity and mechanical power and solar-converted electricity is used both on earth and in space. Stoves and cars run on solar made methane gas power plants operate on organic trash and sewage plants produce methane gas.

The sun powered evaporation rain cycle, in combination with gravity power machines and electric turbines. Solar electrifiers convert water to clear hydrogen gas (a fuel).

P.V. CELL TECHNOLOGY:-

The PV technology is an off shoot of the evolution in semiconductor technology During 1980s. Several different base materials and doping materials were tried during early 1980's . BY mid-1980's the silicon has been adopted as material for producing PV cells by almost all the PV manufactures.

PV cells which have only silicon as the base for PN junction are called 'Homojunction' PV cells. PV cells which have two base materials (e.g. Cd Sulphide) are called hetero-Junction PV cell.

Homojunction cells with silicon base are most successful and have following three types.

1. Amorphous silicon

2. Polycrystalline silicon

3. Single crystal silicon

Amorphous silicon means non crystalline silicon. Such material is used in film process. Pure without crystals is used. There is no alignment of crystals. Crystals are scattered in random fashion. Amorphous silicon solar cells are less efficient but easy to manufacture. Efficiency of amorphous cell does not exceed 5 percent.

Polycrystalline silicon cell has many crystals in single silicon. Polycrystalline material has inter-grain boundaries with in a cell. The electrons are inhibited at these boundaries resulting in its reduction in efficiency below single-crystal silicon cells. Efficiency of polycrystalline solar cells is around 7 percent. Manufacturing Process of polycrystalline silicon cells is less complex and less costly than that of Single crystal silicon process. Due to lesser complexity, lesser cost, higher production speed, Polycrystalline silicon cells are commercially competing with single crystal silicon cells.

II. MANUFACTURE OF SOLAR PANEL MODULE

A typical PV cell starts as high-grade silicon to which a minute amount of arsenic has been added large single cylindrical single crystal is grown from a melt by glow of a seed crystal held on quartz rod, seed crystal is then sliced, bonded, wheel flooded with water.

After some surface preparation of the slab heated about 1100C, In a boron tricolored and nitrogen atmosphere. This treatment produces a thin surface layer of boron diffused 'P' type silicon over an 'N' type silicon wafer cleaning of the surface and the attachments of suitable leads to the base material and to the surface layer completes the cell. Silicon cell don't require the high-quality poly silicon having the resistivity of the 1000 cm, with 1-2 cm resistivity is more than enough for solar cells. Intrinsic semiconductor such as silicon or germanium is used.

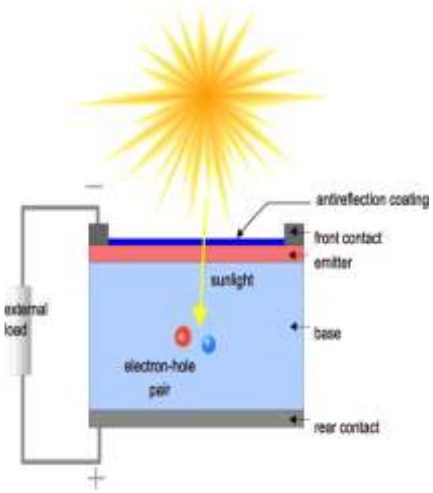
Normally silicon is preferred for solar cells. This silicon moved trivalent element Such as aluminum and boron 'P' type is formed then silicon then doped with pentavalent. To get 'N' type materials in PN junction.

The 'N' type semiconductor is played after the glass ion. It is in top portion Thickness of the 0.2 cm. Approximately which is bottom of the 'N' type when sunlight. Fulls on them the covalent bonds break down and become ion the holes are collected in other terminal from each cell and electrons are collected in other terminal from each terminal.

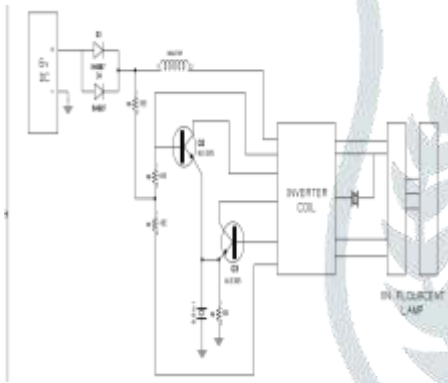
Base material of 'P' type formed by adding boron doping. A layer of 'N' type material is formed by changed the doping to phosphorus.

When photons from the sun absorbed by the cell, they create free electrons with higher energy. Once the free electrons are created there must be on electric field to induce the higher energy, electrons to flow out of the semi conduction to do the useful work. The electric field is provided by a junction of 'P' and 'N' type materials.

When sun light penetrates the junction electron hole pairs are formed at the junction. Elective filed at the junction. Electric field at the junction prevents the holes and electrons from recombining. This hole electron pair will have short life. In a period of about a Millionth of a second, the electron will move right back into the hole in the crystal that it Came from this process is called recombination of holes and electrons with the result that We can now use the P.V. cell as a source of energy.



Solar cells have come a long way from bulky 6% efficient chunks to thin films with as much as 30% efficiency. They are selling like hot cakes today given their necessity and utility. And the reason being they are faithful good chaps unlike oil which will soon be more precious to us than diamonds and the black monster: coal which has polluted the air, hand in cuff with the other fossil fuels.



We need to understand solar panels to understand their applications. Today, we have mono-crystalline, polycrystalline and amorphous thin film panels. Mono-crystalline are so far the most efficient, given that they have the maximum silicon in a unit area so more current for the same number of photons. They are made from a single silicon crystal as a continuous lattice. While for the polycrystalline panels, molten silicon is poured into molds and separate boundaries can be seen due to this. Lesser quantity of silicon in a unit area means lesser efficiency of production of electricity. Amorphous thin film panels are layers of silicon on a glass surface and are the least expensive. Hence, they are used in applications where you can do away with efficiency for lowering the costs.

Solar panels are useful in broad daylight, but we need energy when the Sun isn't shining above our rooftops. That's why we need solar chargers which will store energy in rechargeable batteries. This project aims to make a solar charger using a voltage regulator IC to charge a Lead Acid Battery with the constant output voltage obtained through this IC LM324 (Details explained later). Today there are many more options like a SOLAR CHARGER IC LT3652. This is an IC with embedded MPPT (Maximum Power Point Tracking) algorithm. MPPT simply means the IC gets the maximum possible power from the solar panel by sampling its output and applying the proper load resistance. This small chip simplifies life given its ease of use and maximum efficiency is always ensured.

Even 15% efficient solar panels installed across the world's wastelands can produce enough clean energy to sustain mankind for a year.

Yet new technology is continuously being developed though solar energy generation is still in its infancy. The concept of SOLAR FARMING is new and catching up fast in investors. India is a tropical country and can soon become the Saudi Arabia of solar energy. With Concentrated Photo Voltaic (CPV: which increase efficiency by concentrating large amount of sunlight on the solar cells using mirrors) coming up in India, we are definitely headed towards a cleaner future.

Reducing dependence on fossil fuels and cutting down on our carbon emissions is one of the most important aspects of solar energy. Another crucial point is it can make any country, especially tropical ones like India, self-sufficient in energy. With ambitious project like the National Solar missions aiming at producing 20GW (India's energy consumption 2012: 100GW out of which 1GW was Solar energy) by 2020 is a big step toward progress. Rural areas are now lit up with solar lamps. Solar parks are also an emerging trend with Charanka Solar Park, Gujarat producing 20MW of energy. Government is also taking initiatives to encourage people to make use of the sun by subsidizing electricity bills for consumers using the solar panels. So, if you make more energy than you use, you will end up in a profit without even burning a calorie!

Going Solar is exciting but some challenges also need to be addressed. Space constraints, weather constraints and expensive technology involved do hinder the process. But with increase in production and development of technology, prices will fall, demands increase and we will be living in a cleaner, safer environment, making the energy we need. Renewable sources of energy alone can ensure sustainable development. Economic growth can also be ensured by energy reaching to each and every household in turn increasing the productivity of industries and standard of living of people. It is a bright future we have ahead of us; the only thing is we need to focus the glare rather than evading it.

III. Circuit

The solar panel receives the solar energy from sunlight. And they convert the solar energy into electrical energy and given 0.5 V for each cell. And electrical energy is passed to control circuit through diode. The 324IC 3rd pin is connected to variable resistor. The variable resistor is used to send signal

wherever of high voltage receives (ie.6V) they paired to battery charged the voltage and given to inverter circuit. Inverter circuit convert D.C. to A.C and given to appliances.

IV. Conclusion

Power Conditioning and Distribution in solar energy Power System include solar panel Converters, which convert solar energy into electrical energy voltage from solar panel and battery to inverter circuit subsystem requirements. Which are switched at solar energy, have better efficiency, reduced size, weight. A control unit can supply a stable the input voltage of battery. An output voltage with the power supplies voltage varying along with the supply of the power and can maintain a constant voltage conversion of output usage.

V. References

1. Bosshard, P. (2006). An Assessment of Solar Energy Conversion Technologies and Research Opportunities. Standford university. Retrieved from Stanford.edu.
2. Desideri, U., Zapparelli, F., & Garroni, E. (2013). Comparative analysis of concentratingsolar power and photovoltaic technologies: Technical and environmental evaluations.Science Direct, 765-784.
3. K. Bodis et al. (2019), "Solar photovoltaic electricity generation: A lifeline for the European coal regions in transition, Sustainability, Vol. 11, Issue 13, pp. 3703, https://doi.org/10.3390/su11133703.
4. Kelly, G. and S. Mahesh (2017), Standards in the solar photovoltaic value chain in relation to international trade, International Centre for Trade and Sustainable Development (ICTSD), Geneva, Switzerland.
5. KIC InnoEnergy (2015), Future renewable energy costs: solar photovoltaics. How technology innovation is anticipated to reduce the cost of energy from European photovoltaic installations, KIC InnoEnergy.