



# Model City Powered by Solar Energy



**Mohana Ranga Rao. Raavi**

Assistant Professor, Department of ECE, Eluru College of Engineering, Eluru, India.

## ABSTRACT

*The main aim of this paper is to motivate the people especially in gated communities to use the renewable energy source like solar energy. For this in this paper I am describing the advantages and the effective way of utilizing the Solar energy which is a low cost proto type using which one can Generate, Transmit and can also track the load and the billed amount wherever the user is using the GSM technology.*

**KEYWORDS:** Solar Energy, GSM Module, Renewable Energy Source, Load

*Copyright © 2016 International Journal for Modern Trends in Science and Technology  
All rights reserved.*

## I. INTRODUCTION

Worldwide interest in the deployment Natural resources, called renewable resources, are replaced by natural processes and forces persistent in the natural environment. There are intermittent and reoccurring renewable, and recyclable materials, which are utilized during a cycle across a certain amount of time, and can be harnessed for any number of cycles. The production of goods and services by manufacturing products in economic systems creates many types of waste during production and after the consumer has made use of it. The material is then either incinerated, buried in a landfill or recycled for reuse. Recycling turns materials of value that would otherwise become waste into valuable resources again [3] [8].

The production of goods and services by manufacturing products in economic systems creates many types of waste during production and after the consumer has made use of it. The material is then either incinerated, buried in a landfill or recycled for reuse. Recycling turns materials of value that would otherwise become waste into valuable resources again. The potential wave energy on coastlines can provide

1/5 of world demand. Hydroelectric power can supply 1/3 of our total energy global needs. Geothermal energy can provide 1.5 more times the energy we need. There is enough wind to power the planet 30 times over, wind power could power all of humanity's needs alone. Solar currently supplies only 0.1% of our world energy needs, but there is enough out there to power humanity's needs 4,000 times over, the entire global projected energy demand by 2050.

But in contrast with non-renewable energy source this is a natural energy [1] [5] source in limited supply. While these energy sources may be plentiful, they cannot be produced at all or as quickly as they are consumed. In addition to these resources being limited, not only the burning but also the extraction of these energy sources has dire consequences to our environment.

Harnessing of non polluting renewable energy resources to control green house gases is receiving impetus from the government of India. The solar mission, which is part of the National Action

Plan on Climate Change has been set up to promote the development and use of solar energy in for power generation and other uses with the ultimate objective of making solar

energy [2] [4] competitive with fossil-based energy options. The solar photovoltaic device systems for power generation had been deployed in the various parts in the country for electrification where the grid connectivity is either not feasible or not cost effective as also some times in conjunction with diesel based generating stations in isolated places and communication transmitters at remote locations. With the downward trend in the cost of solar energy and appreciation for the need for development of solar power, solar power projects have recently been implemented. A significant part of the large potential of solar energy in the country could be developed by promoting grid connected solar photovoltaic power systems of varying sizes as per the need and affordability coupled with ensuring adequate return on investment.

**II. SOLAR ENERGY POWER PLANT**

Solar energy is the most abundant and easily available renewable resource, and has been harnessed by humans since ancient times. In one year, the Sun delivers more than 10,000 times the energy that humans currently use, and almost twice the amount of energy that will ever be obtained from all of the planet's non-renewable resources.

Solar power is the conversion of sunlight into electricity, either directly using photovoltaics (PV), or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Photovoltaics convert light into electric current using the photoelectric effect. There are many domestic applications of solar power including solar cookers, solar stills, solar water heating, solar heating and air conditioning [8] [6].

In this paper a model city is designed to utilize the energy from solar power plant. As the main important drawback of electricity is

- storing the energy.
- And at the distribution level stealing the power which creates great loss to power firms.
- It took lot of time to know where the fault is occurred.

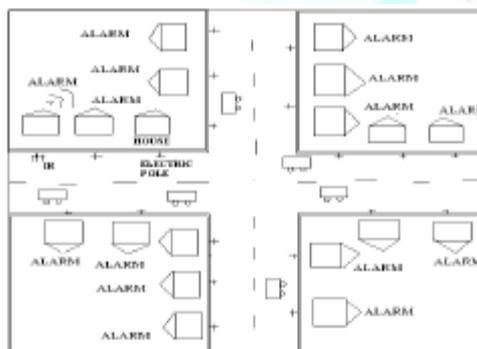
These drawbacks can be fulfilled in this paper by providing proper solutions by the generation of electricity using solar energy. But when intensity of light is less the process is affected but by using LDR's when intensity of light is less then also we can supply the electricity to house that is also explained.

The first 1 MWP solar park was built by Arco Solar at Lugo near Hesperia, California at the end of 1982, followed in 1984 by a 5.6 MWP installation in Carrizo Plain. Both have since been decommissioned, though Carrizo Plain is the site for several large plants now being constructed or planned. There was then a pause before a substantial volume of solar parks were constructed initially stimulated by the 2004 revisions to the feed-in tariffs in Germany.

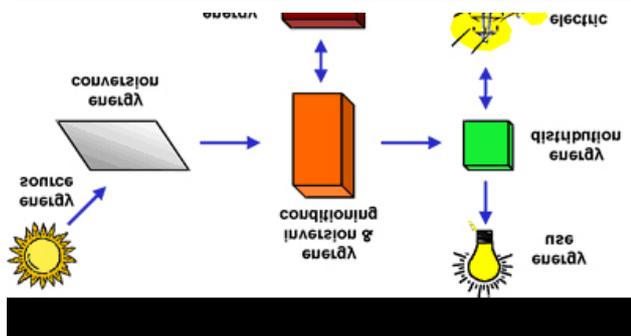
Several hundred installations over 1 MWP have been since been installed in Germany, of which more than 50 are over 10 MWP.[5] With its introduction of feed-in tariffs in 2008, Spain became briefly the largest market, with some 60 solar parks over 10MW, but these incentives have since been withdrawn. The USA, Italy, China France, Canada, and India,[12] amongst others, are now also becoming major markets as shown on the list of photovoltaic power stations.

**III. MODEL CITY**

The Model city developed is as shown in Fig(1)



The electricity generated by the solar power plant is supplied to the consumers through the electrical utility grid as shown in fig(2)



The main intend of model city planning is overcome the electrical storage problem of the electricity, to evade shoplifting of electricity and to furnish the power during the cloudy and night times.

#### IV. ADVANTAGES OF SOLAR ENERGY

- Sunlight is free and infinitely renewable.
- Unlike conventional fossil fuel and nuclear power, solar power produces no polluting emissions, including those that cause global warming.
- With no moving parts, solar panels are silent, easy to operate, and rarely need maintenance
- Solar power can slash utility bills for both residential and commercial consumers. By installing solar panels on its enormous roof, Hawaii's Mauna Lani Bay Hotel began saving enough on energy bills to pay for the investment in just five years
- Solar panels can help utilities avoid brownouts and blackouts. When demand for electricity is high, utilities can use the panels to generate extra energy rather than fire up expensive and polluting "peak" power plants that otherwise lie dormant.
- Many solar panel manufacturers are based in the United States, employing more than 27,000 Americans in high-earning, high-tech jobs. This domestic industry helps reduce our dependence on foreign oil, coal and natural gas.
- analysts and industry experts expect the cost of solar power to fall below retail electricity rates in much of the country between 2013 and 2018.

The benefits of solar electricity

- Cut your electricity bills: sunlight is free, so once you've paid for the initial installation your electricity costs will be reduced. Get paid for the electricity you generate: the government's Feed-In Tariffs pay you for

theelectricity you generate, even if you use it.

- Sell electricity back to the grid: if your system is producing more electricity than you need, or when you can't use it, you can sell the surplus back to the grid.
- Cut your carbon footprint: solar electricity is green, renewables energy and doesn't release any harmful carbon dioxide] or other pollutants. A typical home solar PV system could save over a tonne of carbon dioxide per year – that's more than 30 tonnes over its lifetime.

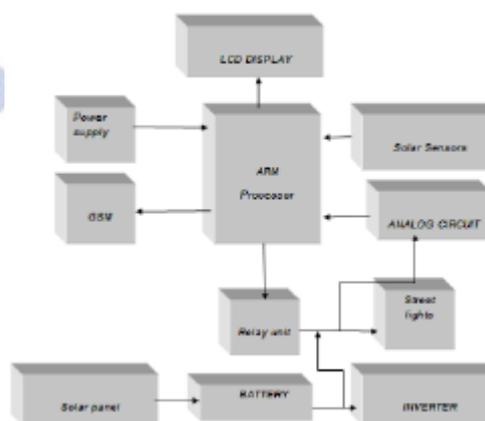
#### V. IMPLEMENTATION

The major components of this project are LPC2148 Microcontroller, LDR Sensor, GSM Unit, Solar Panel, Analog Circuitry, Inverter Circuitry, LCD Unit, Relay and Driver Unit.

Now a days the energy saving is become to significant part of the economy. The street lights should be maintain to turn ON and OFF at the right time.

For the consideration of energy saving automatic street light controlling concept has developed. The power supply for this entire unit is done by using Solar Panel. From this we fed into battery. By means of battery we can generate required voltage for the blocks. Here we are using inverter, which is used to convert dc to ac voltage. The LDR Sensor is used when light intensity increases, the street lights has to go to "OFF" state otherwise when light intensity decreases, the street light has to go to "ON" state.

The Analog Board Unit is used for decreasing the voltage and current levels coming from Electric Bulb. The GSM Unit is used to send messages to the authorized persons through Mobile and LCD Unit is used for displaying the message.



The method includes the following facilities:

- Power Generation
- Power Distribution
- Automatic Street Lights ON and OFF
- Automated Billing
- Power theft Identification
- GSM Based Day To Day usage Calculation

## VI. CONCLUSION

Renewable energy is considered a viable solution to the energy challenges of Nigeria especially in the rural areas of the country and to the restrictions posed by the rising cost of conventional or traditional energy. Our effort is to show the Effectiveness of Solar energy utilization. I hope our effort is valuable and easy to implement.

## REFERENCES

- [1] World Bank. The Welfare Impact of Rural Electrification: A Reassessment of the Cost and Benefits: An IEG impact evaluation,[Online]. Available: <http://www.worldbank.org/ieg>, 2008, ch.5, pp. 39–52.
- [2] Global Network on Energy for Sustainable Development (GNESD). Reaching the Millennium development Goals and Beyond: Access to Modern Forms of Energy as a pre-requisite [Online]. 2007, ch.1, pp.1–5. M. Kaplan. Chronic Neuro-Immune Diseases: Toxins in Burning Candles, Candle Wicks and Incense, in Melissa Kaplan's Chronic Neuroimmune Diseases Information on CFS, 2007
- [3] United Nations. The Energy Challenge for Achieving the Millennium Development Goals. New York, 2005. [Online]. pp. 15–49. Available:
- [4] R. Cabraal, D. Barnes and S. Agarwal. Productive Uses of Energy for Rural Development. Annual Review of Environment and Resources, 2005, vol. 30, pp. 117–144.
- [5] J. Arne, “Connective power: solar electrification and social change in Kenya,” World Development Report, 2007, vol. 35. no. 1. pp. 144–162.
- [6] F. Ahammed and D. A. Taufiq. Case study application of solar PV on rural development in Bangladesh, Journal of Rural and Community Development, 2008, Available: [www.jrcd.ca](http://www.jrcd.ca) vol. 3, pp. 93–103.
- [7] K. D. Ouwens, “Poverty alleviation and energy supply,” position paper presented at the Poverty Alleviation and Energy Supply Meeting, September 13, 2006.