

Green Energy- An Alternative Source for Sustainable Development

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ABSTRACT

Solar energy is one of the greatest assets human kind has ever got. It's free of cost and available abundantly over the earth surface. Today peoples are looking for alternate source of energy which can fulfill our demands and can satisfy our day to day needs. In developing countries like India we need energy to cope up with industrial requirement and increasing population. Still many parts of India electricity is just a word known to them. So what can do to overcome such demands and needs? Every day, the sun radiates an enormous amount of energy—called solar energy. It radiates more energy in one day than the sphere uses in one year. This energy comes from within the sun itself. Lack of awareness regarding solar implementation and our government policies made our people unaware of the fact that solar can be a great part of our energy resources and can fulfill the demands of any developing countries. This paper summarizes the government policies and ongoing scenario of solar PV off grid and on grid systems and proposed liter lamp which can be implemented commercially as well as at our homes. And what are the benefits of installing a solar plant.

General Terms

Government Policies, Risk and Challenges.

Keywords

Solar PV cell, on grid off grid, policies.

1. INTRODUCTION

Energy cannot be destroyed it can be transformed form one body to another. Sun being the major part of the energy a human being can make use of. What's amazing is free of cost and available abundantly. With India's population which is growing with 1.4%, which is about 17 million people are added in our country every year. And Indian economy growing with high rate India needs more energy supply. 78%of our energy comes from fossil fuels, 19 %from renewable and 2.6% from nuclear. Out of 19% traditional biomass consists of 9% whereas solar energy only consists of 0.24% as shown in figure 1. So why India lacks in making use of this energy. With about 300 clear sunny days India has abundant solar potential. Daily average solar energy incident over India varies 4 to 7 kwh/m².MNRE ministry of new and renewable energy and Maharashtra energy development agency MEDA are helping in development of solar awareness and introducing new policies for on grid and off grid systems.

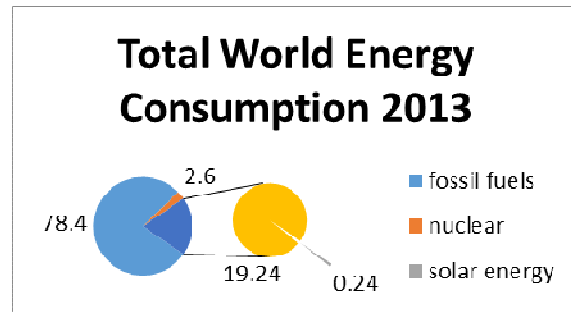


Figure 1: Total World Energy Consumption [12]

LONG TERM FUTURE OF SOLAR POWER: solar power could contribute to an increasing part of the total energy consumption is estimated for the long term in future. With appropriate policies both in developed and developing countries, EPIA and Greenpeace have devised in a joint scenario, that in 2030 as shown in figure 2, photovoltaic could produce enough energy to supply electricity to 3, 7 million people globally. The majority of them will be located in remote areas where there is no access to the electricity grid [1].

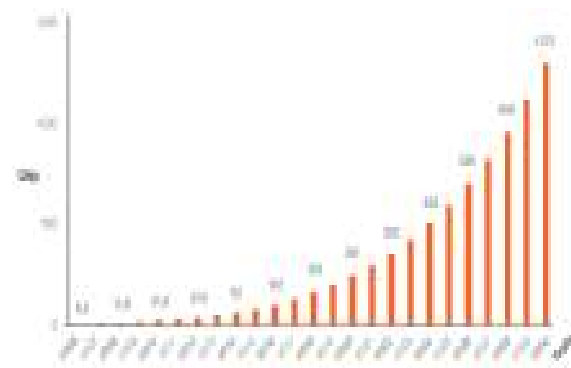


Figure 2: Global Cumulative Capacity up to 2030 - Advanced scenario [1]

Table 1: Renewable Energy Current Capacity And Potential The End Of March, 2009

Sr. No.	Alternative Energy	Current capacity(MW)	Potential(MW)
1	Wind power	10242.5	45195
2	Bio Power	703.3	16881
3	Bagasse co-generation	1048.73	5000

4	Small Hydropower(up to 25)	2429.67	15000
5	Energy Recovery From waste	92.97	2700
6	Solar photovoltaic power	2.12	-
7	Biomass / cogeneration	170.78	-
8	Biomass gasifies	105.46	-

Solar PV Cell: Solar energy can broadly be divided in two main categories is the solar photovoltaic PV and solar thermal. Solar PV uses sunlight to generate electricity and solar thermal uses heat of sunlight for heating or power generation. Solar PV is the combination of photos a particle representing quantum of light or other electromagnetic radiation having energy proportional to the radiation frequency and voltaic or volt a unit of measuring the electricity at a given point. Adding together the photovoltaic is a device capable of producing a voltage when exposed to radiant energy especially light.it works on the photoelectric phenomenon in which electron are emitted from matters after absorption of energy from visible light. Electrons gain energy from incoming photons and are emitted when this absorbed energy exceeds the work function of the material. Electric field associated with a semiconductor P-N junction can form and electric current and deliver power to an external load. Thus a specially build semi-conductor junction can function as SOLAR cell converting natural sunlight into electricity [11].

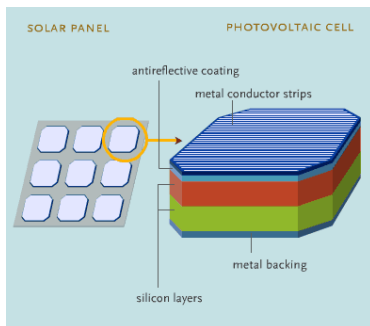


Figure 3: Solar PV Cell [6]

On Grid and Off Grid System: System which is not using any grid for transferring or receiving energy is termed as off grid. And it requires that the solar panels are able to produce electricity. Most homes have higher electricity demand in the evening or at night, so off-grid systems usually use either a battery to store energy produced during the day, a backup source of energy like a generator, or both. Off-grid systems are complex and less flexible than grid-tied systems and it is suitable for remote location and places where utility no utility grid supply [13][14].

Figure 3 shows the On Grid solar system. Solar on grid solar system consist of tied/synced with existing utility grid. Using special type of inverter known as grid inverter. It feeds the excess generated power into grid and takes back power in case

of high demand. There is no wastage of power. No back up battery is needed.

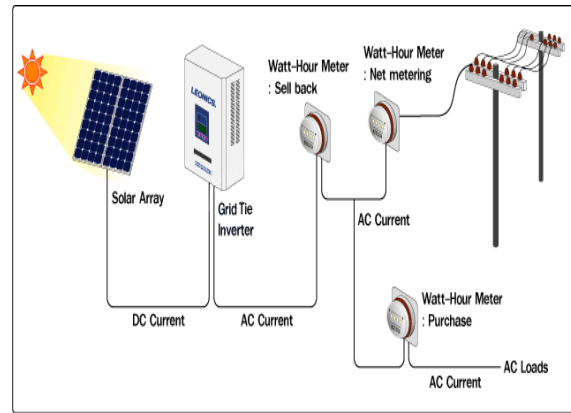


Figure 4: On Grid Solar System [6]

System which is not using any grid for transferring or receiving energy is termed as off grid. Off Grid solar system is as shown in figure 4. It requires that the solar panels are able to produce electricity. Most homes have higher electricity demand in the evening or at night, so off-grid systems usually use either a battery to store energy produced during the day, a backup source of energy like a generator, or both. Off-grid systems are complex and less flexible than grid-tied systems and it is suitable for remote location and places where utility no utility grid supply [15].

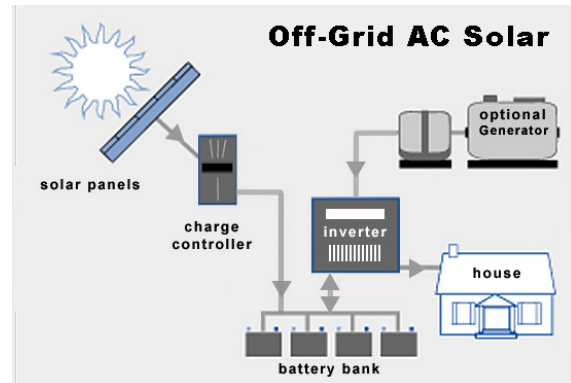


Figure 5: Off Grid Solar System [15]

2. LITERATURE REVIEW

In paper [1] they have explained the capacity of renewable energy sources in India and renewable energy installations. They have described the areas of India where more insolation of sunlight is available. Solar Power plants is installed in that place. Conventional and positive scenario for penetration of RES is also described in this paper.

In paper [10] researchers have developed boat for inland navigation of developing countries to minimize cost and reduce fossil fuel dependency. If the distance and travelers changes then PV cell, battery and engine specification change according to condition. Proposed boat is based on low cost, simple design, efficient and reliable so developed boat is good option for pollution free navigation system.

3. GOVERNMENT POLICIES

Government policies: For the public support and to promote the renewable energy government introduces many policies from center as well from states.

The Jawaharlal Nehru National Solar Mission (JNNSM) was launched on the 11th January, 2010 by the honorable Prime Minister. The Mission has the ambitious target to deploy 40000 MW of solar rooftop by 2022 which has been aimed at reducing the cost of power generation in the country through long term policy, aggressive R&D; and in-house production of raw materials, components and its products. This mission will make India a strong country in solar energy production. Maharashtra state policy has set a target, amongst other, for deploying of grid connected solar power capacity of 7500MW and center policies for farmers, for agriculture support growth.

Risk and Challenges: When it comes to installation of solar power source there are innumerable risks and challenges to come up with. Main is the policy barrier. It consists of 63% of the problem in installation of the solar power source. Due to inadequate knowledge and improper study of the policies many individual fail to make or understand these policies. Another factors causing solar energy to introduce in our society is the lack of infrastructure. In cities with flat systems and inadequate place it is very difficult to install the solar system for individual purposes. Rural areas are more feasible for installation of solar system. Other factors are the solar radiation data unavailability. In many places in Indian people are unaware of the radiation it gets from the sun. Sun's radiation factor plays an important role in establishing solar power system in any area. Unavailability of technology and new equipment's it's also one of the barriers in implementing solar power system.

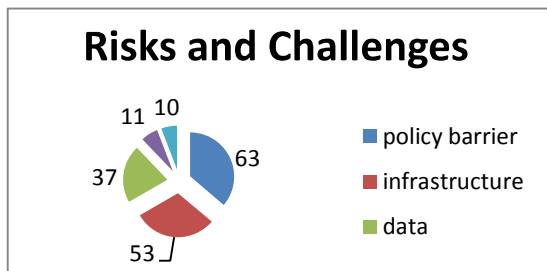


Figure 6: Risk and Challenges of Solar System [12]

4. CONCLUSION

With increasingly high demands and depletion of other fossil fuels we have to turn to the renewable source to fulfill these demands. Developing country like India with its ever growing population and industrialization and to fulfill the overall requirements of all we have to set up solar power systems in place of conventional sources. Awareness about the return of investment and tax exemptions can be benefited by installation of solar. Though the initial investment is high but it guarantees the long terms return and its further steps in sustainable development of India and its economy. Indian governments are now promoting various polices over renewable resources. By overcoming various barriers and

risks we can make India one of the most powerful nations in utilization of solar power.

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