

## Studies the solar energy and their basic applications in Chhattisgarh

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### ABSTRACT

Naturally the sun is main source of energy in earth which drives the circulation of global wind and ocean, the cycle of water evaporation and condensation that creates rivers and lakes, and the biological cycles of photosynthesis and life. There are many types of energy found to be in our nature. Solar energy is available in abundance in most parts of the world. Solar radiation is a renewable energy resource that has been used by humanity in all ages. Energy has provides main power for capability of works. We have needs to energy for every work. So it is very important for our life. Energy has an established positive correlation with economic growth. Providing adequate, affordable and clean energy is a prerequisite for eradicating poverty and improving productivity. The aim of this report is to studies the potential of solar energy for low-carbon intensive and large-scale energy production and to provide a picture of the state of research in the most significant solar technologies.

**KEYWORDS:** - Solar energy, Cycle of water, photosynthesis, renewable energy

### INTRODUCTION

In our country rising economic activities with growing population and improving living standards have led to a steady growth in her appetite for quality and quantity of energy services. The total population of India grew up 190 million during 2001-2011. However, the demand of energy has been continuously increasing with supply. An effective energy solution should be able to address long-term issues by utilizing alternative and renewable energy sources. Certainly many types renewable sources of energy available in our nature, solar energy are clearly a promising option as it is extensively available. Such as biomass, wind, solar, hydro power, and geothermal are renewable energy sources which providing sustainable energy services based on the utilization of routinely available indigenous resources. [1]

Solar energy is energy which is created through sunlight or heat from the sun. Solar power is captured when the energy of sun is converted into electricity or used to heat air, water, or other fluids. The energy of this radiation must be captured as excited electron hole pairs in a semiconductor, a dye, or a chromophore, or as heat in a thermal storage medium. [2, 3] The solar energy incident on the earth's surface, also called as isolation which primarily depends on parameters like geographic location, earth-sun movements, tilt of the earth's rotational axis and atmospheric attenuation due to suspended particles. [4, 5] There are currently two main types of solar energy technologies: [6]

**Solar thermal:-**The solar thermal systems have convert sunlight into thermal energy (heat). Generally solar thermal systems solar energy is used for space heating or to heat water (such as in a solar hot water system). However this heat energy can be used to driving a refrigeration cycle to provide for solar based cooling. The heat can also be used to make steams, which are used to be generating electricity using steam turbines. Know recently it is very useful technology for solar systems. It is considered more efficient to build solar thermal electricity generators at large scale, typically in the tens to hundreds of megawatts.

**Solar photovoltaic (PV):-** The photovoltaic solar system directly converts the sunlight into electricity. Photovoltaic (PV) systems can be installed on rooftops, integrated into building designs and vehicles, or scaled up to megawatt scale power plants. These are more popular solar based system that can be used in different woks recently. [7] All routes for utilizing solar energy exploit the functional steps of capture, conversion, and storage. The sun's energy arrives on Earth as radiation distributed across the color spectrum from infrared to ultraviolet.

The supply and demand of energy determine the course of global development in every field of human activity. Without the energy sources nothing to do anything possible. The Sufficient supplies of clean energy are mostly linked with global stability, economic development, and quality of life. Finding energy sources to satisfy the world's growing demand is one of society's foremost challenging for the next half-century. The importance of this pervasive problem and the perplexing technical difficulty of solving it require a concerned national effort marshalling our most advanced scientific and technological capabilities.

### **OBJECTIVE OF THE STUDIES**

The main objectives of the studies solar thermal and photovoltaic program are to develop and promote the use of these technologies in order to meet the heat energy requirements in domestic, institutional and industrial sectors in India with states and also to be generating electricity in an environment friendly behavior. In this paper we highlight the uses of the photovoltaic & thermal solar system provided to households and social impact of the programmed on the beneficiaries in villages in the Chhattisgarh states.

This report provides an overview of the current usage of solar water pumps for irrigation, remote area electricity supply, crop and grain drying, green house heating, heating and cooling, micro-scale applications: along with opportunities and challenges for their usage in India in our Chhattisgarh state.

### **RESULT & DISCUSSION**

**Remote area electricity supply:** our more population of country with states lives in rural remote areas where nothing to approach road, electricity, and other common facilities. They have faces to many problems. The PV photovoltaic systems convert sun light directly to electricity. They can power an electrical appliance directly or store solar energy in a battery. A "remote" location can be several miles or as little as 50ft (15m)

from a power source. Solar energy system (SES) may be much cheaper than installing power lines and step-down transformers in applications such as lighting, water pumping and electrical fencing.

**Water pumping:** Through the water pumps we can get easily water for different works. PV systems are very cost effective for remote livestock water supply, pond aeration, and small irrigation systems. Also, PV water pumping stems may be the most cost-effective water pumping option in locations where there are no existing power lines. Although current prices for PV panels make most crop irrigation systems impractical.

**Building-integrated photovoltaic:** these are more useful technology for remote areas. Clearly Building-integrated photovoltaic's (BIPVs) are a promising option for households in remote, mountainous, and rural areas with no access to the electric grid, as arrays of PV panels are mounted on the roof or the external walls of buildings [8]. By these techniques we have supply electricity for houses, and other uses. Zero energy solar houses, where energy required by the house hold appliances is generated by the solar panels at the same premises, could be another option. The surplus energy can be using for improving the electricity supply in case of the energy generated at such houses exceeds the total house hold energy consumption.[9]

**Crop and grain drying:** our country is famous for agriculture. Specially Chhattisgarh are known as "bowl of rice". Therefore solar dryers are vey applicable for agriculture. The use of solar dryers in agriculture can prove to be extremely efficient due to the low manufacturing and operating cost. The grain and fruit are protected by solar dryers. The dryers have fast dry and more uniformly produce a better quality product than open-air methods.

**Green house heating:** The solar green houses solar energy which are using for both heating and lighting. Solar green house equipments with thermal mass can be applicable for collecting and storing solar heat energy. The green house can also be insulated to retain this heat for use during the night and on cloudy days. In other then the fossil fuels are using for heating. The technology will be reducing the use of fossil fuels for heating. A gas or oil heater may serve as a backup heater or to increase carbon dioxide levels inside the green house in order to induce higher plant growth.

**Heating and cooling:** Heating and cooling process have need more increasing in life. Generally private and govt. sectors both are using this technology. Recently technologies like flat plate and evacuated tube solar heating and cooling is currently being used in multiple applications. Like first solar water heating systems for commercial/residential use and secondary heating of swimming pools, and solar air heating systems.

**Micro-scale applications:** Micro scale techniques are form of nanotechnology. In present time nanotechnology has changes the all over world. Many researchers are concentrated on the nanotech. On an even smaller level, an integrated micro power generation solution would eliminate the need to plug low power systems in to the AC mains for primary power or for battery recharging or replacement and disposal.

Applications to date include contact and motion sensors for building applications, as well as calculators, PDAs, and wristwatches. [10]

**Potential & Achievements of Renewable Energy (RE) in Chhattisgarh state**

S.N.	Sector	Approx. potential in (MW)	Potential Harnessed (MW)	Achieved %
1.	<b>Solar PV Grid</b>	<b>20 MW per Sq. KM</b>	<b>4</b>	<b>--</b>
2.	<b>Solar PV Roof Top</b>	<b>500</b>	<b>14</b>	<b>2.8%</b>
3.	Small Hydro (up to 25MW)	1000	20	2.0%
4.	Biomass	1000	249	25%
5.	Waste to Energy (U & I)	30	--	--
6.	Geothermal	50 - 500 Grid	--	--
7.	Wind	300	0	--

**Benefit in Rural Area (RA)**

Electrification of 1439 remote UE villages & hamlets through SPV PP of total capacity 3500 KW benefiting 58000 families and 9,500 nos of street light points. (The rest 406 UE Villages are being electrified)

- Electrification of 1137 tribal hostels.
- Electrification of 306 health centers.
  - Electrification of 209 Remote Police Stations/ Camp.
- Installation of 265 SPV Pumps for drinking water Supply in remote villages.
- Installation of 232 SPV Pumps for irrigation in far flung locations from grid.

**Benefit in Urban Area (UA)**

- Roof top SPV Power Plant of total 13.6 MW capacities in 1089 locations.
  - Solar Water Heating Systems of total 12 lakh LPD capacities in 2500 locations.
  - Raipur and Bilaspur City of state selected as **solar city** Project of MNRE. Target is to reduce energy consumption up to 10% (from base year 2011) in next 10 years through Energy Efficiency & Renewable Energy installation.

## IMPORTANCE OF SOLAR ENERGY

Generally the source of renewable energy and solar energy has the provide potential energy services with almost zero emission. The solar energy is abundant and no other source in renewable energy is like solar energy. Every technology has its own advantages and disadvantages. Solar energy system is a Non-polluting technology, which means that it does not release green house gases. Its technology requires Low-maintenance because of lack of moving parts. It is more useful for providing electricity in remote rural areas where these requires very high. As the solar isolation and atmospheric conditions vary significantly from place to place, efficiency of solar energy also differs accordingly.

## CONCLUSION

Global demand for energy will more than double by mid-century and more than triple by the century's end. Meeting this demand is society's foremost challenge for achieving vibrant technological progress, economic growth, and political stability over the next 50 years. The Sun is the champion of energy sources. It delivers more energy to Earth in an hour than we use in a year from fossil, nuclear, and all renewable sources combined. Its energy supply is inexhaustible in human terms, and its use is harmless to our environment and climate. Despite the Sun's immense capacity, we derive less than 0.1% of our primary energy from sunlight.

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