SOLAR ENERGY AND SOLAR COLLECTORS

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Abstract: Solar energy is the most abundant permanent energy resource on earth and it is available for use in its direct (solar radiation) and indirect (wind, biomass, hydro, ocean etc.) forms Solar energy refers to a renewable energy source that is directly produced by light and solar radiation. Solar energy is radiant energy produced in the sun as a result of nuclear fusion reactions transmitted to Earth by space, energy quanta (photons) that interacts with the atmosphere and Earth's surface, so the energy produced directly by the transfer of light energy radiated of Sun. It can be used to generate electricity or heating air in buildings.

Key words: energy; solar energy; solar collectors; radiation.; photovoltaic cells.

1. INTRODUCTION

The sun emits energy at a rate of 3.8x1023 kW per second. Of this total, only a tiny fraction, approximately 1.8x1014 kW is intercepted by the earth, which is located about 150 million km from the sun. About 60% of this amount or 1.08x1014 reaches the surface of the earth. The rest is reflected back into space and absorbed by the atmosphere. Even if only 0.1% of this energy could be converted at an efficiency of only 10% it would be four times the world's total generating capacity of about 3 000 GW.

The total annual solar radiation falling on the earth is more than 7 500 times the world's total annual primary energy consumption of 450 EJ. Solar heating systems are a well known second-generation technology and generally consist of solar thermal collectors, a fluid system to move the heat from the collector to its point of usage, and a reservoir or tank for heat storage. The systems may be used to heat domestic hot water, swimming pools, or homes and businesses.

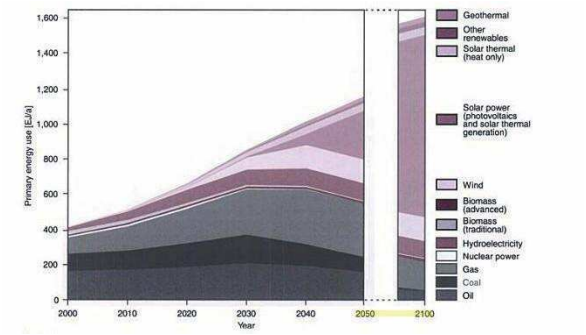
The heat can also be used for industrial process applications or as an energy input for other uses such as cooling equipment. In many warmer climates, a solar heating system can provide a very high percentage (50 to 75%) of domestic hot water In the 1980s, land photoelectric technology has progressed regularly by running a few megawatts more power by creating products with low (watches, pocket calculators, radio beacons and weather, solar pumps and refrigerators). Developments in technology and the market for photoelectric products is generally positive. Improving manufacturing methods as well as increased production volumes led to reducing costs, increasing world production of photoelectric modules from 5 MWp to 60 MWp in 1992 to 1982.

Currently 90% of world production of photoelectric modules is made in Japan, the US and Europe, especially large companies like Siemens, Sanyo, Kyocera, BP Solar and Solarex, holding 50% of the global market. The remaining 10% of world production is conducted in Brazil, India and China that are major manufacturers of photoelectric modules in developing countries

2. SOLAR COLLECTORS

Energy infrastructures - power plants, transmission lines and substations, and gas and oil pipelines - are all potentially vulnerable to adverse weather conditions or human acts.

A major contribution to this transformation can be expected to come from solar radiation, the prime energy resource. In several regions of the world the seeds of this possible transforma- tion can be seen, not only at the technological level, but also at policy levels. For example, the European Union has policies and plans to obtain 20% of its energy needs through renewable energy by 2020. The German Advisory Council on Global Change (WBGU) has conducted an analysis of energy needs and resources in the future to the years 2050 and 2100 which points to a major contribution by solar energy to global energy needs in the long term.



Transforming the global energy mix: the exemplary path to 2050/2100

Solar thermal collectors are used to heat air, water or other fluids, depending on the appli- cations, while solar photovoltaic (PV) collectors are used to convert sunlight to electricity directly. High-temperature solar thermal collectors are also used to produce electricity indi- rectly via thermodynamic cycles. Non-concentrating (or flat-plate) types of solar collectors can produce temperatures of about 100ºC or less, which is applicable for many uses such as building heating and cooling, domestic hot water and industrial process heat. Medium-temperature concentrating collectors such as parabolic troughs or parabolic dishes may be used to provide temperatures from about 100ºC to about 500ºC. Such collectors may be used for various applications from refrigeration to industrial process heat and electricity generation. Central-receiver types of solar concentrating collectors are able to produce tem- peratures as much as 1000C or even higher. Therefore, they are used to produce electrical power and as high-temperature furnaces in industrial processes. Solar thermal power plants based on these concentrating solar collectors, also known as Concentrating Solar Power or CSP is now being increasing considered and deployed by electrical utilities in the size range of 1 MW to 300 MW in many countries, including USA, Spain, India, China, Australia and South Africa. Concentrating solar collectors can achieve temperatures in the range of 200oC to 1000oC or even higher, which is ideal for generating electricity via thermodynamic power cycles. All of the present power plants based on fossil fuels and nuclear power work on the same principles. Therefore this technology takes advantage of the knowledge base relating to conventional power plants.

Installing solar panels is easy and efficient in terms of costs. Furthermore, they are useful in situations where local networks do not work, such as in space, for example. Unlike oil and coal reserves, solar energy is available in all parts of the planet, not concentrated in one hand. Therefore, the "harvest" solar energy can be done almost anywhere.

Solar energy generating units are compact and flexible in design, which means it can be installed in almost any space, without having to worry that you have to build special locations. Initially, solar panels cost much, but free energy generation, over the years, leading to a highly effective global cost. In addition, solar panels means less maintenance and monitoring.

Solar cells only works during the day, and their efficiency is reduced during the dreary days and cloudy . For this reason , the

system must be developed and efficiently with one system and energy storage .

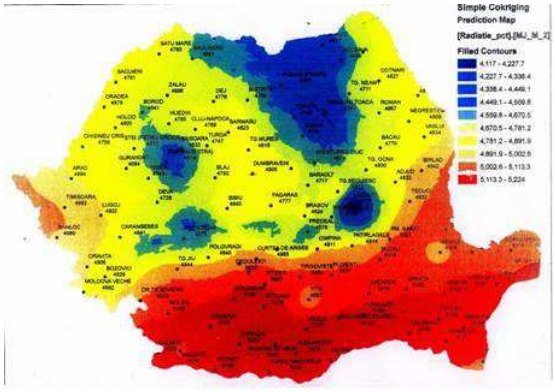
Pollution can cause adverse effects on the efficiency of solar panels. Efficiency can be reduced, the solar cells are unsuitable for certain areas. Although almost any location receives sunlight, not every location is feasible for solar panels.

Creating large installations for solar energy is costly and difficult in terms of finding the location.

Solar energy is a concentrated energy such as fossil fuels. Therefore , its use in automobiles or other mechanized forms is difficult, considering the energy result .

The decision for such a system depends on the needs and possibilities of each individual , of where you are and especially the money that you have. An investment is useful but expensive and in no case is one that works wonders.

Meteorological records show that solar potential in Romania is remarkable values. Also, in most developed countries in Europe (even in the potentially lower than in Romania solar) electricity production based on successful energy sunlight , especially in small photovoltaic framed construction , fully connected to the network.



The distribution of solar radiation in Romania

In Romania, solar energy is used to produce heat for hot water consumption during the warm period .

In many places there are already solar homes . Photoelectric energy production depends on the location and sun exposure to temperature , so the geographic location , season and time of day : maximum output is at noon (solar time) with clear skies . The highest value recorded is about 1000 W / m² (value, called).

This means that for an installation of 20 m² , it can get a daily production of around 2.8 KWV or 5-8 kWh , which could cover housing needs of four.

Given the geographical and meteorological conditions , it was found that the average energy varies between 2.8 kWh / m² per day in northern France and 5.2 kWh / m² per day in the south (annual average).

3. CONCLUSIONS

Solar energy is a renewable resource in the true sense. Will not disappear unless the sun will cease to burn, in which case there will be no life on our planet. Solar panels do not produce any pollution during operation, unlike nuclear reactors and heating systems. While the first causes problems of nuclear waste disposal, finally produce harmful smoke and ash. The production of solar energy by solar panels or other means utilizing solar energy is devoid of noise, unlike other methods.

Solar energy is available in huge quantities , is inexhaustible (at least for a few billion years) and is ecological . Solar power means not polluting and have no harmful effects on the atmosphere, and given that degradation of Earth reaches a level becoming higher , this problem begins to be taken into account more and more people.

And it shows. In case of electricity through photovoltaic panels , solar energy percentage of total generation worldwide has increased from 0.04 % in 2004 to over 0.3 % and is projected to exceed 0.4 % by the end of 2010.

Solar energy capture technology is still in its infancy and expensive. The price of an WATT now through photovoltaic cells, is 6-7 times higher than that of its production in plants. Therefore the initial investment in a production system by capturing sunlight energy is high, even if depreciation occurs in

time, the systems are generally very reliable and can operate 10-25 years without major maintenance costs .

In addition, solar panels have a very low amount of energy produced when we report to their size: to cover the needs of a home solar panels are needed tens of square meters.

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