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GLOBAL PROSPECTS FOR THE DEVELOPMENT OF SOLAR ENERGY

Introduction. The solar energy has many benefits and these are almost uncountable. Some of these are under mentioned. It is the source of energy which is in huge quantity and there is no point of scarcity because all the systems on the earth are inter-dependent. Every living creature is dependent on the light and energy of the sun. Plants cannot grow without the sun light and human and animals cannot survive without the plants and the sun light. The solar energy is not like other sources of energy which is harmful to the atmosphere and living creatures. It is environment friendly and solar cells do not release any remnants in the air. Solar cells are very cheap and therefore solar energy is the cheapest energy and requires no maintenance cost for the long time. The solar energy is self-sufficient for the household and for some other activities and does not require any dependence on other resources [2].

The purpose of this work is to analyze and process data related to the development of alternative types of energy, to reveal the significance of using solar energy in the world, to show the benefits of using solar panels, and to show the prospects for the development of industry.

Basic material. Speaking about solar energy it is necessary first of all to mention that it is a *renewable* energy source, unlike fossil fuels (coal, oil, gas), which are not being restored. According to NASA, for about 6.5 billion years, the inhabitants of the Earth have nothing to worry about – about as much as the Sun will warm our planet with its rays until it explodes [2].

The solar energy is characterized by *abundance*. The potential of the solar energy is huge: the surface of the Earth is irradiated with 120 thousand terawatts of the sunlight, which is 20 thousand times higher than the world demands for it.

Moreover, to other advantages of solar energy, it is *available* in every point of the world – not only in the equatorial zone of the Earth, but also in the northern latitudes. For example, Germany currently occupies the first place in the world in the use of the solar energy and has its maximum potential [1, p. 13].

Ecological cleanliness is the most valuable characteristics of the solar energy. The production, transportation, installation and use of solar power plants are practically not accompanied by harmful emissions into the atmosphere. Even if they are present in an insignificant measure, then compared to traditional sources of energy this is almost zero impact on the environment [4].

Due to the fact that in systems on the solar resource there are no moving nodes, as in generators, the generation of electricity is *noiseless*.

Moving to solar panels as an autonomous energy source, owners of frequent houses receive tangible savings. It is also important that maintenance of solar-powered power systems is characterized by *low operating costs* – it is only necessary to clean solar cells several times a year, and the manufacturer's warranty on them is usually 20-25 years [4].

The solar energy has a *wide range of applications*; it is the generation of electricity in regions where there is no connection to a centralized power supply system, and desalination of water in Africa, and even the supply of energy to satellites in the near-earth orbit. Not in vain, the solar energy is recently called «folk» – this name reflects the simplicity of its integration into the electricity supply system at home, both in the case of photoelectric and thermal elements.

Innovative technologies in the production of solar cells are becoming more sophisticated – thin-film modules are introduced directly into the building materials during the construction stage. Japanese concern Sharp – the leader in the production of solar panels, recently has introduced an innovative system of transparent storage elements for window glazing. Modern achievements in the field of nanotechnology and quantum physics allow us to talk about a possible increase in the power of solar panels in 3 times [1, p. 76].

The solar energy still takes a small share in the structure of the world electricity production, but its role has been growing rapidly. At the same time, recently it has been spreading not only due to various measures of state support, but also because of the visible results of its implementation – the technological maturity of the industry and in some cases of economic competitiveness.

Since science today has no devices working on the energy of the sun in its pure form, it needs to be transformed into another type. For this purpose, devices such as solar panels and collectors were created. Batteries will convert the solar energy to electricity. And the collector produces the thermal energy. There are also hybrid models that combine these two types.

The main ways of transforming the energy of the sun are photoelectric, geothermal, thermos-air, solar balloon power plants [3, p. 96].

Portable power sources are designed to receive electricity in the absence of electrical networks. Such portable batteries with the possibility of charging from the solar panel are popular among tourists, holidaymakers and so on. As an example there is a hub which can be called exotic. It can be found among tourists in the composition of the original kitchens. It concentrates light with a parabolic mirror on a container with a coolant [5, p. 113].

Transport is still an exotic field of application. But there are racing competitions in Australia on solar cars. However, in recent years the designers have managed to increase the speed of such vehicles to 80 km/h and also test the aircraft on solar panels with the flight of the planet.

Alternative types of energy, which include solar, are most likely to evolve in technologically advanced countries. This is the United States, Spain, Saudi Arabia, Israel and other countries where there are a lot of sunny days in the year. The solar power is also developing in Russia and the CIS countries, but the pace we have is much slower because of climatic conditions and lower incomes of the population. The largest markets in terms of annual growth were China (34.5 GW), USA (14.7 GW) and Japan (8.6 GW) last year. In 24 states, the installed power of photovoltaics exceeds 1 GW, while in the 16th it is 500 MW (See Fig. 1).

TABLE 1: TOP 10 COUNTRIES FOR INSTALLATIONS AND TOTAL INSTALLED CAPACITY IN 2016							
TOP 10 COUNTRIES IN 2016 FOR ANNUAL INSTALLED CAPACITY				TOP 10 COUNTRIES IN 2016 FOR CUMULATIVE INSTALLED CAPACITY			
1		China	34,5 GW	1		China	78,1 GW
2		USA	14,7 GW	2		Japan	42,8 GW
3		Japan	8,6 GW	3		Germany	41,2 GW
4		India	4 GW	4		USA	40,3 GW
5		UK	2 GW	5		Italy	19,3 GW
6		Germany	1,5 GW	6		UK	11,6 GW
7		Korea	0,9 GW	7		India	9 GW
8		Australia	0,8 GW	8		France	7,1 GW
9		Philippines	0,8 GW	9		Australia	5,9 GW
10		Chile	0,7 GW	10		Spain	5,5 GW

Fig. 1. The world leaders in solar energy in terms of its size and growth in 2016 in gigawatts

Globally, photovoltaic solar energy generated 1.8% of electricity (approximately 375 billion kilowatt hours) in 2016, in Europe its share is 4%. In the context of countries, the highest share of photovoltaics in Honduras, in three other countries solar power plants produce more than 7% of electricity. In China, despite world leadership and record growth, the generation of solar-based generation is still below 2% of electricity consumption. According to the installed capacity of solar power stations per capita (more than 0.5 kilowatt) Germany leads.

In the territory of the former Soviet Union, the climate for solar installations is best suited to the climate in Ukraine and the republics of Central Asia. However, the debate about development is more than real. That is, the potential of using the solar energy has not yet been achieved. If we talk about the share of solar energy in the market of Russia and CIS countries, it does not exceed 1%. Plans include the construction of several solar power plants. Therefore, the situation can still be fixed.

Conclusion. With the growing trend of resource saving and production of energy the solar energy system has been developing rapidly. Researchers and scientists are manufacturing new and new systems to get maximum results and

efficiency from the solar based energy systems. Developing countries are keenly observing new sectors where solar energy systems could be used. The companies involved in solar energy sector are developing home based application. These applications are full or partially dependent on the solar energy. These systems include heating systems and power supply of homes. The power supply needed for home require medium power consumption so large solar panels are sufficient to fulfill energy needs for small homes.

All these data allow us to conclude that many countries of the world are trying to maximize the usage of solar energy. This is relevant because energy consumption is constantly increasing and resources are limited. In addition, the traditional energy sector is heavily polluting the environment. Therefore, alternative energy is the future. And the energy of the sun is one of its key directions.

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