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## **Solar power in Ukraine**

According to various estimates, proven organic fuels will last for 30-50 years. Given the so-called geological reserves, which will be explored in a timely manner, and their operation is not delayed, then, taking into account the increasing level of energy consumption, organic fuels may last for another 100-150 years. Nuclear power, which today has significantly more raw materials than organic fuel, has been dynamically developing in the world for the last 20-30 years. But today, according to many experts, it can no longer be considered a promising kind of energy because of the high risk of radioactive contamination of the environment, manifested in a series of man-made accidents.

Therefore, in the world more and more attention is paid to the use of so-called renewable energy sources - heat of the earth, wind energy, tides and tides, biogas, solar radiation, etc. Almost all these sources of energy are completely determined by the direct action of the Sun. Among these sources one of the most promising is direct transformation of solar radiation into electricity in semiconductor solar cells.

Estimates show that even in the middle latitudes for a small cottage, batteries with a power of 2 (3) kW will be enough, which can easily be placed on the roof, as it occupies an area of only 20 (30) m<sup>2</sup>. It is known that in Ukraine the average annual direct and diffused solar radiation on the horizontal surface varies from 1080 kWh / m<sup>2</sup> (in the Chernihiv region) to 1390 kWh / m<sup>2</sup> (Yevpatoria). Then, depending on the zone, such a battery will produce for the year 2200-2800 (3300-4200) kWh of electricity, which will satisfy the energy needs (without heat supply) for a family of 3-4 people.

Among other applications of solar energy, we note: in telecommunication and communication systems (repeaters, telemetry); to provide electricity for navigation lights, buoys, road signs, lighting at night; for anticorrosive protection of metal constructions and pipelines; in remote non-electrified dwellings for the supply of

household appliances; in agriculture and arid areas for the extraction and supply of water, etc.

The cost of 1kWh of electricity generated by photomodules is much higher today than for traditional energy, but it should be noted that: first, this value tends to decrease for solar power and for growth for traditional energy, and secondly, for solar energy energy can successfully compete with the traditional one in those cases where the energy consumption is relatively small, and it is expensive or completely impossible to bring electricity from the main electricity grid. In these cases, not the cost of electricity is the forefront, but the value or necessity of those functions that are carried out at the expense of electricity.

Ukraine has a highly-qualified scientific potential in this field (Institute of Semiconductor Physics and Institute of Electrodynamics of the National Academy of Sciences of Ukraine, Taras Shevchenko National University of Kyiv, Chernivtsi National University named after Y. Fedkovich, National Technical University "KPI").

After the pilot project in Rodnikov (Simferopol region, ARC) with a capacity of 2.5 MW, the construction of solar power plants in various regions of Ukraine began. For example, in January, the Vinnytsya region started to operate a solar power plant with a capacity of 35 kW, mounted on the roof of the production building of the Hnivansky tire repair factory.

In December 2011, the Austrian company Activ Solar completed construction of the last, fifth, 20-megawatt quadrant of the Perovo Solar Park in Crimea, bringing its total installed capacity to a record 100 MW.

Perovo, in the order of five quarters, has become the largest photovoltaic park in the world in terms of installed capacity. The Sarnia Canadian power plant (97 MW), the Italian Montalto di Castro (84.2 MW) and the German Finsterwalde (80.7 MW).

The other five projects in the world's largest photovoltaic parks are completed by another project in Crimea - an 80-megawatt Octotnikov power plant, built in 2011, in the Saky district of the peninsula.

In August 2012, the company "Solar Energy Plus" built and commissioned a 5.4 MW solar power station, located in Uzhgorod district of the Transcarpathian region. Photovoltaic panels will produce about 4.8 million kWh of electricity each year, sufficient to provide more than 1.3 thousand households with a monthly consumption of 300 kWh. In December 2012 in the suburban village of Ralovka, the Sambir district, the first in the Lviv region was launched a 1.1 MW solar power station. It consists of 3,888 solar cells. A solar power plant was built thanks to the Eco-Optima Ltd together with Czech investors, Energoinvest commissioned 4 quarters of the Galzhibiev Solar Power Plant in Vinnytsia Oblast. The total power of 4 queues is 1.264 MW.

In 2013, Martifer Solar (Portugal) built solar power plants with installed capacity of 4.5 MW and 7 MW in the Tomashpil and Bershad districts of Vinnytsia region for Rengy Development. Also in 2013, Helios Energy completed the construction of a land-based network solar power plant (SES) with a installed capacity of 3.993 MW in the village of Radch, Tysmenitsky district of the Ivano-Frankivsk region.

Over recent years, more than 200 SESs have been launched in various regions of Ukraine, and in general the country will soon reach an indicator of 1 GW (1000 MW) of total installed photovoltaic capacity.

#### Literature:

1. <http://iht.univ.kiev.ua/Ukraine-Solar-cells-article>
2. ["http://jkg-portal.com.ua/ua/publication/one/savchuk-sonjachna-jenergetika-v-ukrajin-nabiraje-obertv-49829"](http://jkg-portal.com.ua/ua/publication/one/savchuk-sonjachna-jenergetika-v-ukrajin-nabiraje-obertv-49829) Source: Ukraine Communal "
3. <https://prel.prom.ua/n231669-ukrayin-zagalna-potuzhnst.html>