

Goryunova, E.G., Tarasova, E.S.
Solar Energy in Russia

National Research Tomsk Polytechnic University.

*"Shine always,
shining everywhere.
until the last days before the end.*

*to Shine – and no nails!
The motto of my sun!"
(Vladimir Mayakovsky).*

Many poems of Vladimir Mayakovsky are famous for the amazing metaphors. The author managed to create a more figurative works only with this simple reception. For example, in the work "an Extraordinary adventure that was Vladimir Mayakovsky summer at the dacha ", which was written by the poet in the summer of 1920, the main character is the sun that the poet embodied as a living being. The author thought that the sun, every day traveling through the sky by one and the same route, is a slacker who simply have nothing to do.

In fact, moving away from literary epic, the Sun is the primary and main energy source for our planet. It warms the whole Earth, drives the river and gives the power to the wind. About 60 years ago for the first time the energy of solar radiation was converted into electricity by using semiconductor photovoltaic cells, which later received the name of solar cells (cells or solar).

The solar cell industry is rapidly developing in different directions: from built-in calculators to big panels on the roofs of cars and buildings. Currently there are increasingly large solar photovoltaic systems operating on highly concentrated solar radiation as an energy to actuate the thermal and other equipment (steam, gas turbine, thermoelectric and others).

The photoelectric effect

Energy conversion in photovoltaic converters is based on the photoelectric effect. Simply photoelectric effect is ejection of electrons from an emitting light substance. The first solar cell based on external photoelectric effect was produced by Alexander Stoletov. In 1888 he managed not only to get the photoelectric effect, but also to explain its origin. Photoelectric effect is the emission of electrons substance (usually metal) under the action of electromagnetic radiation.

The practical application in Russia

Certainly almost everyone has calculators that run on solar cells, they don't need electric batteries. As long as there is sufficient lighting, they can work for a very long time. Here are the most basic and obvious example of application of solar energy. Of course there are larger solar panels – on road signs indicating emergency telephone numbers, even at stops, as the source of light. Although these panels are not as widespread as calculators on solar energy, it is easy to see them.

Roughly, 10 companies in Russia are involved in production of solar collectors that are used to produce heat. The Ministry of Fuel and Energy estimated the total area of all solar collectors in 1994 as 100,000 m². In most cases, these installations work in the south of the country and only during the warm seasons of the year. Beside the commercial solar collectors, it is a common practice in the countryside of Russia to use showers that use water heated by the sun. Even the use of these primitive devices throughout the country eliminates the need to burn millions of tons of coal, oil, and gas to heat water.

For example, in the eve of the winter Olympics in Sochi it was decided to install solar modules on the Olympic venues: large ice arena, railway station "Olympic Park" and other.

In the end, the radiant energy of the Sun is used by the biosphere since the emergence of life on the planet. It is known that in just one second the sun produces so much energy that it

will last for 500 000 years on Earth. In fact the Earth gets enough light to provide the world with electricity for years to come in one hour.

However, solar power is one of the most material-intensive forms of energy production. The large-scale use of solar energy, also getting photovoltaic cells, entails a huge increase in the demand for materials, labour resources, raw materials extraction, enrichment, materials and so on.

Yet electric energy, born by sunlight, is much more expensive than obtained by conventional methods. However scientists don't stop and we hope that the experiments conducted in pilot plants and stations, will help to solve not only technical, but also economic problems.

References:

1. «Нетрадиционные источники и методы преобразования энергии»: учебное пособие для вузов / Н.Н. Баранов;
2. «Нетрадиционные и возобновляемые источники энергии»: учебное пособие / Ю.Д. Сибикин, М.Ю. Сибикин;
3. «Нетрадиционные и возобновляемые источники энергии»: учебное пособие / Р.В. Городов, В.Е. Губин, А.С. Матвеев;
4. http://www.physbook.ru/index.php/%CE%EF%FB%F2_%D1%F2%EE%EB%E5%F2%EE%E2%E0_%C0.%C3.
5. <http://www.testpilot.ru/espace/bibl/tm/1981/kes.html>.
6. <http://www.nt-ekoklimat.ru/products/solarpowerenergy>.
7. <http://ru.wikipedia.org/wiki/%D4%EE%EA%EE%ED>.

Gozhin, A.G., Yevseeva, A.M.

Future nowadays

National Research Tomsk Polytechnic University.

In everyday life we don't think about the future, but the future is now. How our world looked like twenty years ago? Only some people had mobile phones with monochrome screens, there was a tiny heavy TV without high-speed internet, YouTube and google. Now can you imagine what will happen in the next twenty years? Technologies are moving faster than we imagine.

One of the modern technologies that have changed the computer world greatly is virtual reality. Virtual reality can be characterized by two main devices – Oculus Rift and OMNI. Oculus Rift is a new virtual reality (VR) headset designed specifically for video games that will change the way you think about gaming forever. With an incredibly wide field of view, high resolution display, and ultra-low latency head tracking, the Rift provides a truly immersive experience that allows you to step inside your favorite game and explore new worlds like never before.

The Oculus Rift creates a stereoscopic 3D view with excellent depth, scale, and parallax. Unlike 3D on television or in a movie, this is achieved by presenting unique and parallel images for each eye. This is the same way your eyes perceive images in the real world, creating a much more natural and comfortable experience. The Oculus Rift provides an approximately 100° field of view, stretching the virtual world beyond your peripheral vision. Your view of the game is no longer boxed in on a screen and is only limited by what your eyes