

MAKING RENEWABLES MORE EFFECTIVE

S. Pakanych

Faculty of Electric Power Engineering and Automatics,

National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”

At present, electric energy is used by everyone, and with time our electricity needs are increasing. We have learned to obtain energy from coal, oil, gas and nuclear fuel, but every year there are less and less deposits of traditional energy sources available. The problem of energy source shortage is growing and we have to find another way to produce electric energy.

Nowadays we are able to generate electricity from renewable energy sources, that is from sun's heat, water, and wind, but these resources are not as efficient as non-renewable energy sources, and also have some other drawbacks. For example,

wind power plants are too noisy and occupy a lot of space. Today's technology of solar panels is very expensive and complicated. In addition, solar power plants require specific location and a lot of maintenance. So, we have to make renewable sources of energy more effective and affordable.

One of the ways to increase the efficiency of solar power plants is to combine the classical technology of steam turbines with harnessing solar energy. The technology of concentrating solar energy comes in a variety of combinations of solar mirrors that reflect solar energy, which is then transformed into thermal and electrical power. In general, there are 4 main kinds of concentrated solar power technology:

1) parabolic trough, or U-shaped parabolic reflector that concentrates sunlight onto a receiver positioned along the focal line of the trough;

2) solar power tower, which is equipped with tracking mirrors that focus sun's rays on the central receiver atop the tower;

3) parabolic dish, which consists of the receiver mounted at the focal point of the mirrored dish that tracks the sun across the sky;

4) linear Fresnel reflector, made of a number of long thin mirrors to capture the available sunlight and concentrate it onto a fixed absorber located at a common focal point of the reflectors [1].

Let us consider the operation of a parabolic trough. Having mirror reflectors of parabolic shape it focuses the heat from the sun's rays on a tube with a liquid of high thermal conductivity. The liquid in the tube is heated to 400 degrees Celsius and is sent to heat exchangers, where it provides the production of superheated steam and then electricity [4]. This concentrated solar power plant makes it possible to make energy cheaper and in contrast to solar panels of the same capacity it occupies a smaller area. These technologies are best suited for such regions as USA and Africa.

The efficiency of solar power plants has been recently considered by US scientists. Michigan State University research engineers have recently pioneered the development of a transparent luminescent solar concentrator that can be placed on a window to create solar energy without disrupting the view [5]. This material is a thin glass that can be used on many flat surfaces such as windows of buildings, cars,

electronic devices, telephones etc. It absorbs sunlight and converts it into energy. The advantage of this technology compared with conventional solar panels is its price. In combination with conventional photovoltaic panels, this technology can significantly improve the efficiency of solar energy. Further developments in this area will allow reducing the use of fossil fuels and, as a result, the pollution of the atmosphere.

Another type of renewable energy sources are geothermal sources. Its essence lies in the extraction of hot water heated by the core of our planet, using it to heat the buildings and converting its thermal energy into electricity. Thermal power plants work on warm underground waters with depths of up to 5 km [2]. Many countries are already using this technology, including the USA, Japan, and Italy. Its biggest advantage is its cheapness, and the cities lying near the geothermal stations receive heat almost free of charge. However, this source is not very efficient although it is very cheap and the technology for obtaining electric energy from the heat underground is relatively simple.

One more solution to the problem of renewables being less effective than fossil and nuclear fuels is to make use of biofuels, which are fuels produced directly or indirectly from some organic material called biomass, which includes plant materials and animal waste. It is completely decomposed by microorganisms and therefore relatively harmless to the environment. Such liquid biofuels as ethanol and biodiesel can be used in some vehicles and industrial processes [3]. Compared with traditional sources such as gas and oil, biofuels are less efficient in terms of electricity generation but it is quite possible to produce high-quality and relatively environmentally friendly biofuels for running automobiles.

In conclusion, there are a lot of areas to conduct further research to find new sources of energy and increase power generation efficiency. Some of the methods of making renewables more productive and affordable are already familiar to us. Yet, this issue still remains very relevant since at present the amount of traditional sources of energy is gradually decreasing, and we must solve this problem until it is too late.

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