

# Prospects of the Ukraine's energy sector development with renewable energy sources

Yurii Fedak

1. Department of Power Engineering and Control Systems, National University "Lviv Polytechnic", UKRAINE, Lviv, Stepan Bandera street, 12, E-mail: y.fedak@gaz.net.ua

*Abstract - Renewable energy sources have a great potential for development, because they do not require the cost of fuel and do not harm the environment. In Ukraine, there is one of the highest green tariffs for the renewable energy in Europe, it allows us to build industrial solar and wind power plants.*

Keywords – Renewable energy, alternative sources, prospects, solar power plants, solar energy.

## Introduction

Alternative energy sources relate to electricity generating installations using renewable energy sources (RES), such as solar energy, are the most powerful source of energy on Earth.

In the last decade, a number of countries have widely implemented energy facilities that use renewable energy sources [1-2].

The main factors contributing to the use of RES:

- the exhaustion of organic (natural gas, oil, coal) and nuclear fuel stocks and the constant rising of their price;
- the reduction of harmful and greenhouse gas emissions into the environment and reduction of the influence on the global climate of the Earth;
- the continuous improvement of power generation technologies with the using of RES, reducing the cost of electricity, making it competitive compared to traditional energy sources;
- the increasing the reliability of electricity supply to consumers in the area of construction of new sources, reducing the technological costs of electricity for transmission in electricity networks;
- new jobs and additional revenues to the budgets of different levels;
- a number of factors of state incentives in the use of RES, which makes investment projects attractive to investors.

## Main Material

Energy facilities with the use of renewable energy increasolar power plants the energy independence of the state.

The main document defining the RES development in Ukraine is the National Renewable Energy Action Plan for the period up to 2030. According to the Plan, the power of wind farms and solar plants should be at 2000 MW in each direction.

The technically achievable potential for each renewable energy source in Ukraine (according to the data of the Institute of Renewable Energy of the National Academy of Sciences of Ukraine) is given in Table 1.

At the beginning of 2018 the power of wind power stations was 1200 MW (without the AR of Crimea), and solar power stations - 760 MW (without the AR of Crimea), and their part in electricity production was 2.5%.

An analysis of the work of solar power plants in Ukraine shows a rather high level of insolation, practically throughout the whole territory of Ukraine.

The number of hours of use of the rated power of solar power plants varies from 960 to 1300 hours per year. So, it is possible to build industrial solar power stations of various capacities. The average payback period for the construction of solar power plants is 6-7 years.

Table 1 - Renewable Energy Potential in Ukraine

Areas of development of renewable energy sources	Annual technically achievable energy potential		Annual volumes of replacement of natural gas
	<i>billion kWh</i>	<i>million tons of fuel</i>	<i>billion m3</i>
<b>Wind power</b>	41,7	21,0	18,26
<b>Solar power</b>	28,8	6,0	5,22
<b>Geothermal energy</b>	105,1	12,0	10,43
<b>Hydropower</b>	27,7	10,0	8,70
<b>Bioenergy</b>	162,8	20,0	17,4
<b>Energy of the environment</b>	154,7	18,0	15,65
<b>Total</b>	<b>520,8</b>	<b>87,0</b>	<b>75,66</b>

The construction of the solar power plants requires significant land plots, an average of 2.0 hectare per 1 MW of power solar power plants with a plain terrain. Taking into account the value of constantly growing land, for the construction of solar power plants it is expedient to use land unsuitable for agricultural production, first of all land dumps of industrial enterprisolar power plants.

There is a problem of precisely predicting the load of the solar power plants and ensuring the claimed load by the solar power plant.

Solar power plants are among the most important objects for Ukrainian energy, which are attractive for investment in construction.

The solar power plants include:

- Fields of solar modules from poly-, mono-crystalline elements, unit capacity of the module from 270 W to 340 W.

Solar modules are fixed on metal structures made of galvanized steel.

The electricity generated by the solar modules is converted from the direct current into an alternating current of 0.4 kV or 0.8 kV by the inverters. An alternating current of 0.8 kV is transmitted to a power transformer of appropriate power. The power transformer is connected by a cable or air line to the substation of the UES of Ukraine.

### Conclusion

Ukraine is one of the fastest growing enterprises in renewable energy sources and has an extraordinary potential for research, as it is possible to attract a large number of specialists and attract private investors. However, the green tariff is decreasing from year to year so it is necessary to use this opportunity to get the most out of the results.

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