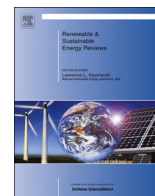




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Economical mechanisms for renewable energy stimulation in Ukraine

T. Kurbatova^{a,*}, I. Sotnyk^a, H. Khlyap^b^a Department of Economics and Business Administration, Sumy State University, 2, Rimsky-Korsakov street, UA-40007 Sumy, Ukraine^b TU Kaiserslautern, Gottlieb-Daimler-Strasse, D-67657 Kaiserslautern, Germany

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ABSTRACT

The paper reports main problems of stimulating development of renewable energy in Ukraine. The authors consider presented state mechanisms for maintenance of the green energy where the most effective tariff is the feed-in tariff (functions in Ukraine from 2009). The changes in the active laws and the results of effect of the regulation policy on the development of renewable energy are described. The principal challenges of the law regulation relative to the renewable energy projects as well as proposals for improving the present policy are also discussed.

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1. Introduction

The necessity of enlarging the part of renewable energy in the energy balance of Ukraine is caused by the negative trends in the fuel and energy complex of the country, in particular, by the absence of the supply diversification from the various origins of the fuel.

Despite the fact that the Ukraine is one of the most powerful electricity exporters in Europe (9.745 billion kWh were exported

in 2012 [1]), the country faced with increased risk threatening its own energy security [2]. Some reasons are as follows: (1) the economy of the state is one of the most energy-consuming systems in the world. Specific consumption of electrical energy relative to the GDP is 2.5 times larger than the average consumption in the world [3]; (2) the energy losses under transportation are 2 times higher than for the states – members of Organization for Economic Co-operation and Development [4]; (3) during 2010–2012 Ukraine had difficulties with supplies of natural gas from the Russian Federation because of enormous price for 1000 m³ (more than 400 USD/1000 m³) [1,5].

The in-country attempts to begin the supplies diversification for Ukraine or to start the mining operations by itself were

* Corresponding author.

E-mail address: together@ukr.net (T. Kurbatova).

unsuccessful. Nevertheless, the first import of the natural gas from Germany made it possible to reduce the price for 1000 m³ down to 390 USD [1].

The new contracts on the shale gas mining operations signed by the Government of Ukraine (Shell, Chevron) were unambiguously accepted in the society due to higher ecological risks under mining operations. The shale gas mining operations can reduce the green energy demand.

The negative role is also played by the high depreciation of energy plants of Ukraine [6,7]. The high depreciation of the nuclear reactors is very important; the modernization and replacement of the old-fashioned equipment in 2025–2035 years will require sufficient investments, about 170 billion EUR up to 2030 [8]. Besides that, the future renewable energy will reduce the negative effect on the environment and contribute to eliminating possible climate changes.

So, the development of the renewable energy resources seems to be very important for overcoming the energy crisis in Ukraine.

2. Potential of the renewable energy in Ukraine

As reports the Energy Strategy of Ukraine (ESU) [9], total annual technically achievable energy potential of the renewable energy in Ukraine is about 98 million tonnes of oil equivalent (TOE) or 540 billion kWh (32.4% of the total energy consumption in Ukraine in 2030 as forecasting according to the basic scenario, Table 1).

At the same time, the economically achievable renewable energy potential is 35.53 million TOE/year (Table 2).

As it is seen from Table 2, the forecasting share of the energy production using the renewable energy in 2010 should be 1.8% (according to the basic scenario of ESU). However, this value was

Table 1
Energy potential of renewable energy in Ukraine [9].

Directions of developing renewable energy	Annual technically achievable energy potential (per year)		Part of the total energy consumption in 2030 (forecast), %
	billion kWh/year	million TOE/year	
Wind energy	79.8	28.0	9.25
Solar energy	38.2	6.0	1.98
Small hydroenergy	8.6	3.0	0.99
Bioenergy	178	31.0	10.24
Geothermal heat energy	97.6	12.0	3.96
Energy stored in environment	146.3	18.0	5.95
Total	548.5	98.0	32.4

Table 2
Forecast about development of the renewable energy in Ukraine [9].

Directions of developing renewable energy	Development of renewable energy million TOE/year					
	2010		2020		2030	
	%	%	%	%	%	%
Wind energy	0.21	0.1	0.53	0.22	0.7	0.23
Solar energy	0.03	0.02	0.28	0.12	1.1	0.4
Small hydroenergy	0.52	0.3	0.85	0.34	1.13	0.4
Bioenergy	2.7	1.3	6.3	2.57	9.2	3.04
Geothermal heat energy	0.08	0.004	0.19	0.08	0.7	0.23
Energy stored in environment	0.3	0.1	3.9	1.6	22.7	7.4
Total	3.84	1.8	12.05	4.93	35.53	11.7

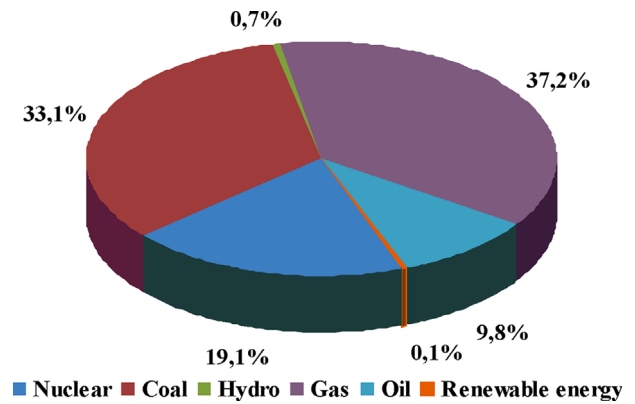


Fig. 1. Primary energy resources in Ukraine, 2011 (%) [1].

about 0.1% at the end of 2010. At the end of 2011 the share of renewable energy in the general balance of primary energy resources of Ukraine was about 0.14% (Fig. 1) [1].

As is shown in Fig. 1, the natural gas is the most usable energy resource (37.2% in 2011), the coal share was 31.1%, the nuclear power plants supplied 19.1% of the primary energy production, and the share of the renewable energy was negligible.

These data indicate very low level of use of renewable energy in Ukraine. In European states in 2011 the share of renewable energy was 47.6% in Sweden, 23.5% in Denmark, 30.9% in Austria, 13.3% in France, 12.3% in Germany, 10.3% in Poland, and 3.8% in United Kingdom [10].

3. Law base and state institutions governing of the renewable energy sector

The state institutions governing the sector of renewable energy in Ukraine are as follows: Parliament of Ukraine, Government of Ukraine, National Electricity Regulatory Commission of Ukraine and State Agency on Energy Efficiency & Energy Saving of Ukraine (Table 3).

Nowadays the main laws governing the sector and the market of green energy in Ukraine are as follows: Law of Ukraine “On Electric Power Industry” [11], Law of Ukraine “On Alternative Sources of Energy” [12], Law of Ukraine “On Energy Saving” [13], and Law of Ukraine “On Alternative Fuels” [14]. The priority in defining of future trends in development of alternative energy up to 2030 is given to Energy Strategy of Ukraine envisaging the accelerating development of the sector and maximum energy supplies from the own energy resources. The State Target Economic Program for energy efficiency and development of energy production from renewable energy sources and alternative types of fuel for 2010–2015 provides financial support of high effective development of the renewable energy in Ukraine [15].

4. Economical mechanisms of stimulating green energy development

There are some positive examples of the state support for the development of renewable energy in Ukraine. The main economical mechanisms are the following:

- encouragement of energy production with the feed-in tariff (see Section 4.1);
- tax and custom facilities (see Section 4.2);
- preferred treatment of connection to the electrical network (see Section 4.3);

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