



INVESTMENTS IN RENEWABLE ENERGY SOURCES

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ABSTRACT

The purpose of this report is to present investment opportunities in renewable energy sources (RES) in Bulgaria. Deals with measures to promote the commissioning of photovoltaic power plants, wind farms, geothermal energy and biofuels. Special attention is paid to promote green energy production in rural areas through the Program for Rural Development 2007-2013. Emerging problems in the use of alternative energy sources and ways to overcome them. Attention is paid to the prospects for development of green energy based on the policies pursued by the European Union.

Keywords: energy, green energy, renewable energy, going green, energystategy

Fears of global warming, rising oil prices, uncertain energy supplies and the problems of climate change have led many countries around the world to rethink its energy policy. Under the plan, the European Commission's energy from renewable sources should increase to 20% of total energy consumption in 2020. Renewable energy sources (RES) are solar, wind, hydro and geothermal energy, including wave energy and tidal renewable without visible depletion in their use, and waste heat, biomass energy, including biogas and energy from industrial and municipal wastes. Electricity produced from renewable energy sources is electricity generated from facilities using only renewable energy, and the portion of electricity produced from renewable energy sources in hybrid systems, also using conventional energy sources in luding renewable electricity for filling storage systems, and excluding electricity, produced as a result of storage systems. Europe is a global leader in renewable energy sources, mainly because of the incentives that different countries promote investment in green energy. Undoubtedly among the most successful is the German model - anyone producing renewable energy can sell it on the network of subsidized price, four times higher than the market value of electricity. This price is guaranteed by the state for the first 20 years of production. Similar incentive schemes in 19 other EU countries, including Bulgaria. The introduction of renewable energy is an expensive

investment and thus reduces the country risk for investors, making the end result is a jump in 'green' energy, improving technology and reducing the cost of electricity produced from renewable sources. Thus, input subsidies are paid many times through the development of new profitable industry and the creation of a strategic base for the production of cheap and clean energy.

Because of the last few years negative processes in the global economy has seen a significant reduction of investment in the RES. In the first quarter new investments in renewable energy sources (RES) worldwide fell to its lowest level in two years because of low gas prices in the U.S. and cuts in subsidies for the sector in Europe. Investments in the sector through funding secured by assets, sale of shares and investments have decreased by 34% to 31.1 billion dollars from a record 47.1 billion dollars for the fourth quarter of 2010. Several countries, including Germany and Spain have reduced the guaranteed prices paid for electricity from renewable energy sources. UK Government has also reviewed the price subsidies. Investment in wind turbines, solar farms and other renewable energy sources in the first quarter of its lowest levels since the first quarter of 2009, when the money amounted to 20.5 billion dollars. Financing secured by assets, has fallen to 25.7 billion dollars for the three months to the end of March - from 36.6 billion dollars in the last

quarter of 2010, the largest decrease was seen in investment in wind turbines United States and solar parks in Europe. Exceptions are some of the group BRIC (Brazil, Russia, India, China). New investments in wind energy in China grew by 25% yoy in the first three months of the year to 10 billion dollars, while in Brazil the same period they have doubled to 2.1 billion dollars.

According to Eurostat data base 2005, renewable energy in Bulgaria amounts to 1 Mtoe or 9.4% of total final energy consumption, including: biomass - 70%, hydro - 24% and other renewables - 6%. Currently in our country most efficiently exploit the potential of hydro power through hydroelectric power and solid biomass, mainly down as fuel for heating in households and public buildings - **Table 1**.

Table 1. Structure of generating capacity and gross electricity production in 2009

Indicators	TPP	NPP	WPP and PSPP	Other RES	Total
Installed capacity, MW	5995	200	2947	340	11282
	53,1%	17,8%	26,1%	3,0%	100%
Available capacity, MW	5115	2000	1800	120	9035
	56,6%	22,2%	19,9%	1,3%	100%
Production, GWh	23544	15255	4054	237	43090
	54,6%	35,4%	9,4%	0,6%	100%

By the end of 2009 NEK and ESO have submitted requests to join about 12,200 MW of power generation from renewables in the grid and about 2600 MW to the distribution grid. VyaETs of them - were 83.6%, FETS - 16.2% and BioETs - 0,2%. To this point have signed

preliminary agreements for accession of new renewable energy sources with a total capacity of 1543 MW. RES-E amounts to ~ 3 billion kWh in 2008 and has a share of 6.4% in total production - **Fig. 1**.

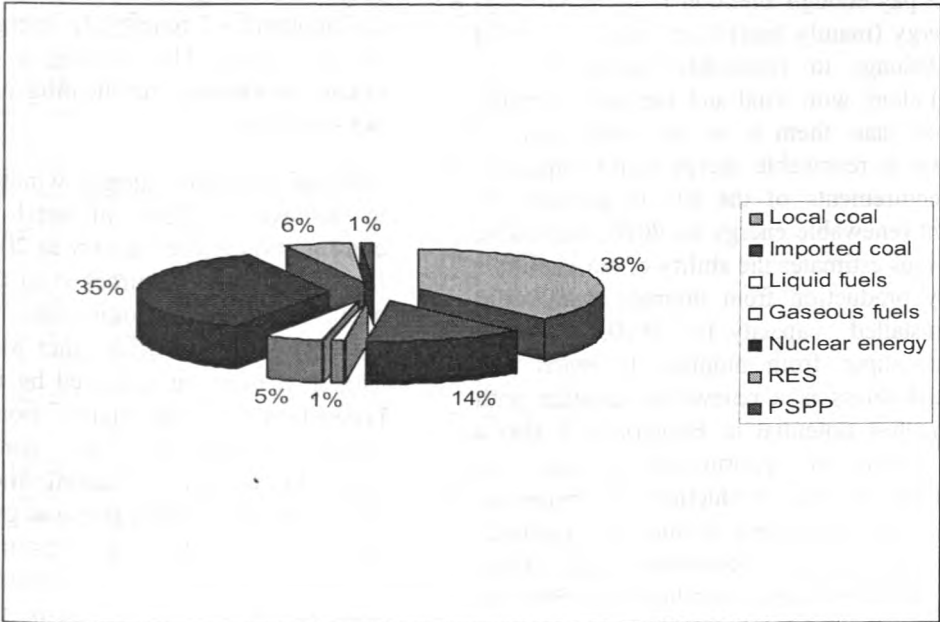


Fig. 1 Structure of power in 2008. by fuel (based on MWh)

Over 95% of it is produced by hydropower. All other renewables represent less than 5% in electricity renewable energy and about 0.3

percent in total production. We should not overlook the fact that the HPP is highly dependent on hydrological conditions. In years with greater rainfall electricity generated by hydropower exceeds 4, 0.5 billion kWh. As a percentage of total final energy consumption, hydropower production ranged between 2.3% and 3.5% (Economics of low-carbon energy). With rapidly develop the production of electricity from wind and solar plants and solar energy, which is mainly to cover the needs of hot water in the household. The first wind farms in Bulgaria are constructed and installed in 2004 and have a total capacity of 2,4 MW. In the following years their installed capacity increased repeatedly - about 25% annually. In 2020 it is expected installed capacity and generated electricity from such plants has increased significantly, with 30% of electricity from you to produce from VyaETs. Bulgaria currently installed power systems for the direct use of energy from geothermal sources is estimated at 94, .5 MWt, and the annual energy consumption - 380 GWh / year. Most of this energy is used for swimming pools, bathing and balneology. Other smaller facilities are used for construction of heating systems including heat pumps, and some of the sources used for direct heating of greenhouses with very low load factor. In Bulgaria has so far not pay enough attention to the production of energy (mainly heat) from biomass, which also belongs to renewable energy sources (RES) along with wind and sun and it's much cheaper than them. It is the wider use of biomass as renewable energy could help meet the requirements of the EC to produce 16 percent renewable energy by 2020, According to various estimates the ability of our country's energy production from biomass is 500-800 MW installed capacity. In 2020, expected power output from biomass to reach 871 GWh. Biomass is a renewable resource with the greatest potential in Bulgaria and also a wide variety of opportunities to use - as feedstock for the production of briquettes, pellets, etc., solid fuels as fuel for combined heat and power generation and direct combustion for heating and hot water from the population.

Overall photovoltaic market is still in its infancy - in the EU only 0.4 percent of total

electricity comes from PV in 2009. Production of electricity from solar power is undergoing a rapid development in recent years. By 2020, construction of such facilities in the country is projected to grow by 6% annually. The planned average output is between 1250 kWh to 1550 kWh kWp of installed annually. Data input (GWh) of individual technologies to generate electricity from renewable sources and their installed capacity by 2020 are presented in **Table 2** (Energy Strategy of Bulgaria for 2020).

Bulgaria is pursuing a purposeful policy of creating a national scheme of support mechanisms for development of RES under Directive 2009/28 to promote renewable energy sources. It sets the overall framework for sector development in the EU, including EU-wide target to increase the share of renewables to 20% in total final energy consumption by 2020. In connection with these requirements for producers of electricity from renewable energy sources are provided:

- priority and free network connection
- guaranteed purchase of electricity produced.
- Guaranteed returns through preferential prices of electricity produced.
- Simplified credit.
- Simplified administrative procedures.

Outside the system of preferential pricing, other mechanisms to encourage the development of renewable energy in practice do not apply. The utilization of renewable energy production for heating and cooling is not supported.

National mandatory target, which Bulgaria has to achieve is 16% of total final energy consumption in the country in 2020 to be from renewable energy sources such as the country gets the lowest additional increase (6.6 percent) compared with other Member States. This goal must be achieved by increasing the production of electricity from renewable energy sources in final consumption of renewable energy for heating and cooling and consumption of renewable energy in transport. Sectoral targets that only consumption of RES in the transport sector is a must - 10-percent share of renewables in transport consumption by 2020.

Table 2. Estimation of total contribution (installed capacity and gross electricity) of each technology for power generation in Bulgaria by YOU to achieve the goals by 2020.

1 Tehnology	2005		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020	
1	2		3		4		5		6		7		8		9		10		11		12	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
WPP (incl. PSPP)	2078	4336	2190	3340	2220	3441	2240	3472	2260	3503	2280	3534	2300	3565	2450	3798	2480	3844	2515	3898	2549	3951
Geothermal power	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar power	0	0	16	20	46	58	83	104	181	260	220	263	233	292	248	372	265	397	283	424	303	454
Plants using energy from tides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind energy	8	5	370	629	451	734	631	1009	820	1340	984	1672	1033	1756	1085	1952	1139	2050	1196	2152	1256	2260
Power from biomass	0	0	10	56	22	122	36	199	102	559	109	656	209	1150	146	800	144	793	149	817	158	871
Solid biomass	0	0	9	52	16	90	19	107	62	341	65	387	121	666	89	490	86	473	89	489	93	514
Biogas	0	0	1	3	6	31	17	92	40	217	45	269	88	484	57	311	58	320	60	328	65	357
Bioliquids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2086	4341	2586	4045	2739	4355	2990	4784	3363	5662	3593	6125	3775	6763	3929	6922	4028	7084	4143	7291	4266	7536

To stimulate the production of electricity from renewable each year the State Energy and Water Regulatory Commission (regulator) determines preferential prices for sale of electricity. The Law on Renewable Energy (effective 05/03/2011) shall be transposed into national legislation the provisions of Directive 2009/28 / EC of the European Parliament and the Council of 23 April 2009 to promote the

use of ROI. According to Article 8 paragraph 1 of the preceding provisions of Zebina within one month from the date of entry into force of the law regulator determined and announced preferential prices for purchasing electricity generated from RES:

Type	Price
	lv./MWh
Micro HPP with installed capacity of 200 kW	227,43
Wind power up to 2250 hors	191,00
Photovoltaic power up to 30 kWp	576,50
Power from biomass (wood waste up) up to 5 MBt	255,51

Terms of the mandatory purchase of electricity are:

- for electricity generated from geothermal and solar energy - lease term 25 years;
- for electricity generated by hydropower plants with installed capacity of 10 MW - lease term 15 years;
- for electricity produced from other renewable energy sources - lease term of 15 years.

Stimulate green energy production in rural areas through development programs in rural areas 2007-2013 can be done through measure 311 "Diversification of agricultural activities and measure 312" Support for the creation and development of microenterprises. At measure 311 to subsidize particular: production of renewable energy, bio-fuels from biomass, biogas, biogas CHP. Financial assistance for projects for the production and sale of renewable energy sources amounted to 80% of eligible expenses, but not more than equivalent of 200,000 euros (Programme for Rural Development 2007-2013). Can apply micro - sole traders or legal entities employing up to 10 people. It does not require long life of the applicant company. Under this measure, even newly candidates an advantage in the evaluation

process. Financial assistance for projects for the production and sale of renewable energy sources amounted to 80% of eligible expenses, but not more than equivalent of 200,000 euros.

In recent months, a number of conferences and debates with representatives from different countries on the place and the future of renewable energy sector in Bulgaria. Discussions accompanied the adoption of the new Law on Renewable Energy (Zebina), which entered into force on 3 May this year. The main issues facing investors in the sector are related to:

1. Uncertainty of prices
Prices at which buys energy from renewable sources (ROI) is determined by the State Energy and Water Regulatory Commission (regulator). Under the law they will be fixed once a year, the first tariff will become clearer in early June - one month after entry into force of the law. This keeps methodology, which till now largely set prices.

Prices for green energy will be calculated based on investment costs the same formula used in the past five years. The only novelty was the removal of the limit of 5%, which can change the purchase price each year. Definitely in favor of investors, however, that once fixed price will not change over time, which for

various renewable energy sources is 12 to 20 years.

2. Lack of certainty and predictability

Concerns of business are that no bank will not finance anything without knowing in advance on what charges will be paid to it upon completion of construction by requiring price at which they will buy energy from you to be fixed on Act 15.

By law, regulator sets a price at the end of June and it works a year. Investment in photovoltaic power as can be achieved within a particular year. The price is fixed and not changed during this period, so investors will be able to make certain estimates and calculations. It is believed that the biggest problem in the new law is the lack of predictability about the development of the tariff over time. This is not true, because first it will be fixed and the second - current methodology for determining its remains.

Facials are some concerns that the law contrary to the directive because the concept of advance payments (amounting to 50 000 and 25 000 respectively Euro installed megawatt) does not match the requirements of Directive 2009/28. But the truth is another - the directive is quite abstract and never contains a prohibition on advance payments to manufacturers to network operators.

3. RES sector is discriminated against

The lack of advances in conventional power plants is an occasion to speak of discrimination against other renewables projects, but we must not forget that they have many advantages over conventional energy. These are guaranteed buying discount benefits of joining, etc.

4. The presence of speculators

The reason for the gap between stated and realistic projects are exactly the speculators who have no intention and feasibility of renewable energy projects and their main goal is to resell them at their initial stage.

5. Cumbersome administrative procedures

6. Problems connecting to the grid of NEC
In order for Bulgaria to attract the maximum extent possible investments in renewable energy is needed:

have a clear strategy for the sector, developed and adopted by all stakeholders - government, business, environmental organizations.

- require a public administration that responds clearly and unambiguously to the questions when, how and what facilities will be Bulgaria, and what are the regions where they are expected to be located;
- to clear charges for buying and pricing to enable financial institutions and investors to assess their risks;
- MEET NEC and create necessary conditions for such investments, developing a clear strategy for the adequate development of energy infrastructure in Bulgaria.

Energy is one of the traditional sectors of our economy. It stems from 20 years of the last twentieth century. Since then and until today, energy production is traditional for our economy, although overall the country has no large quantities of raw materials for its production.

In the modern energy scale of the problem of interaction between it and the environment yields extremely sharp character. To deepen the contradiction between growing demands for energy and the limited stocks of conventional and nuclear fuels on our planet. What causes the greatest concern, however, is environmental pollution. There is no doubt that energy is its largest polluter. Particularly high proportion in this regard lies with the processes associated with the burning of traditional fuels-coal, oil, gas. Therefore the most important direction for going green energy production is related to the use of renewable energy sources - RES. The use of renewable energy sources is a major factor for the transition to low carbon economies, to ensure security of energy supply, development of new high-tech industries and provide etc."Green growth" and "green jobs.

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