

Analysis of the Renewable Energy Concept and Its Future in Bulgaria

Anton Yordanov*

Summary:

The organization and efficiency of the energy sector is a factor of crucial significance in a country's economy. Over the coming years, Bulgaria's major priorities in the energy sector will be connected with the preservation of a safe, stable, and reliable energy system, improving of the energy mix by giving preference to sustainable, environmentally friendly, and low-emission energy. Our main national objective is to ensure that the share of energy, produced from renewable energy sources (RES) reaches 16% of the total energy consumption and 10% of the total consumption in the transport sector by 2020.

The RES concept provides an opportunity of switching to a sustainable economy. However, this transition period may last quite long, and it is associated with a number of impacts on the entire society, emerging parallel to the development of the RES industry. The present study addresses the potential, advantages, drawbacks, tasks, trends, and main aspects of the RES concept development, with the purpose of using it as a platform for projecting the future of the industry in Bulgaria.

Key words: Energy, Energy politics, Energy strategy, Renewable energy resources

JEL Classification: Q42, Q48

Introduction

The quality of the energy policy of a certain country is of strategic importance for its economic and social development. The efficiency of such policy to a large extent determines the competitiveness of the national economy's individual sectors as well as the result of its overall performance. Over the last years the application of the renewable energy concept to the national energy concept has become increasingly wider. It has been used as a tool for accomplishing the goals stated in the energy strategy. The issues, related to the potential, use, and development of the concept in Bulgaria, are extremely topical with respect to their ecological, economic, and social aspects. The main issues are related to the possibility and timing for achieving competitiveness.

1. Formation and state of the renewable energy sources concept

From a historical perspective, the 1970s can be considered to be the time of the true formation of the RES concept. The main reason for this was the petrol crisis, which had been gaining force at the time, as a result of a decision, adopted by the Organization of the Petroleum Exporting Countries (OPEC). They imposed restrictions on the production and supply, and established total control over the prices. This shortly became a global energy issue for the petroleum importing countries. Achieving diversification of the energy sources and finding sources that are

* PhD student, Economics of Natural Resources Department, University of National and World Economy, e-mail: anton.y@abv.bg

Articles

additional or alternative to petrol, fossil fuels, and, following the series of nuclear accidents, also to nuclear power plants, has become a task of prime importance. A look at the world's economic history would be enough to prove the great significance of such issues and their possible impact on the national and world economy. Therefore energy safety topics have become a global issue.

At a European level, the first strategy of the present century, including issues such as environmental protection and natural resources preservation, is the Lisbon Strategy (adopted in 2000). Another initiative of similar scope was launched at the session of the European Council on 26 March, 2010, when European leaders worked out their "Europe 2020" plan: a strategy which sets three main targets. Firstly, decreasing the carbon dioxide emissions by 20% as compared to the 1990 values; secondly, cutting down energy consumption by 20%, i.e., achieving a significant increase in energy efficiency as well as a 20% RES share of the total energy consumption (European Commission, Europe 2020). As regards sustainable growth, the strategy focuses on establishing low carbon economy, which will most efficiently and reasonably utilize natural resources, will develop novel technologies and preserve the environment.

The main forms of renewable energy as per the RES concept, which are being developed and used worldwide, are the energy from biomass, the energy from the sun, hydro and wind energy as well as ocean/sea wave and tidal energy. Each of these energy sources has its specific characteristics that set the pattern for the methods and locations of their full utilization. Along with the gradual development of production technologies, their constant improvement and position establishment, RES are becoming increasingly reliable and widely used. That is why over the last years the RES sector has turned into an essential segment of the energy sector.

What is specific about the RES industry is the fact that it is based on natural phenomena that undergo incessant renewal, which, in general, makes them suitable for development. Therefore it is evident that the basic economic and natural preconditions for expanding the sector and making it a global industry are in place.

A substantial characteristic of the industry is that it produces energy with a low, as it is the case with biomass, or a zero carbon footprint, for the rest of the renewable energy sources, which constitutes a key advantage over conventional energy sources. The adoption and development of this energy concept at a global level means automatic adaptation to environmental protection and climate change related issues.

The adopted and globally followed sustainable development concept, and need for such development in the energy sector is of key importance for RES and their development. The major aspects of sustainable development can be divided into three main groups, namely social, ecological and economic – all of them follow RES in their development. That is why it is necessary to analyse how the RES concept affects these aspects.

There are three main pillars in the RES industry that generate employment: production of different types of RES technologies, installation of the energy generation equipment/capacity, and the maintenance of the operational assets. The administrative, legal and financial consulting services are related to each of the three areas, but, in most cases, they are of one-off character and, eventually, even in total don't account for and are not near to the capital expenses, which are material with regard to most of the RES projects. Unfortunately, Bulgaria has not managed to benefit from the first employment generating pillar, which, actually, generates the largest part of energy from RES.

It is beyond doubt that the increase in the share of RES in gross end-consumption as part of the national energy portfolio significantly improves the state of the environment by means of reduction in sulphur dioxide and nitrogen peroxide as well as decrease in the levels of dust and hard particles from traditional energy sources, which circulate in the atmosphere. At the same time, the growth of the RES sector produces a direct effect on the other major European objective in the area of energy and climate change, namely the reduction in carbon dioxide emissions.

face the global challenges and prospects of this modern market.

Today in more than 118 countries around the world energy strategies have been formulated and exist, compiling in a thorough manner all issues related to the production, markets, and the incorporation to the grid of renewable energy capacities with fixed targets to be met, unlike 2005 when the number of those countries was only 55. This large-scale initiative brought about a material increase in the share of RES in the global energy production and consumption (Figure 1).

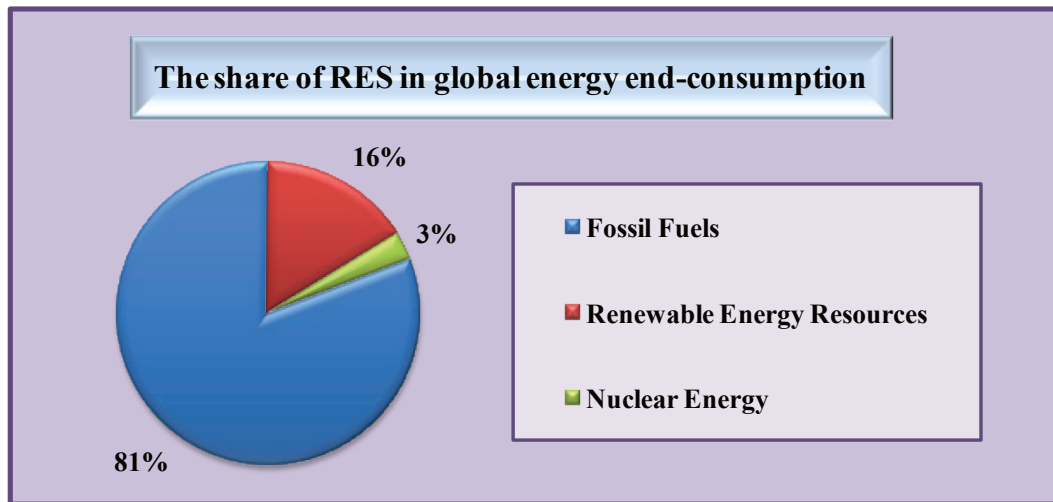


Fig. 1. The share of RES in global energy end-consumption

Source: Worldwatch Institute, *The Renewables 2011 Global Status Report*, p.17

Large-scale investments are characteristic of the RES sector. Due to its attractiveness, two-digit growth values have been registered in some countries over the last years. It was in 2010 when the values of investments in RES for the first time started outstripping investments in conventional energy. The development of the RES industry is connected with significant business opportunities, which open up to both local entrepreneurs and large-size international companies with capital and liquidity that

As can be seen from the information, provided by the National Statistical Institute (refer to table 1), the growth of the sector (RES) in Bulgaria is in line with (moving at the same speed) the growth of the sector at a global level (refer to figure 1). Statistical data with regard to the dynamics of global investments in RES production/electricity generation capacities show a constantly increasing pace of development.

Table 1 reflects the dynamics of the RES share over a period of eight years.

Articles

As seen from the 2004-2008 period, there is a certain volatility and stability at the same time in the sector. Although the economic cycle is on the rise, there is a high investment activity and a relatively easy access to financing, the lack of growth can be explained by an unclear vision of the sector. And, on the contrary, following our accession to the EU and the eventually expressed clear international determination and development policy, an annual growth of 2 per cent has been achieved. The growth from 2008 to 2012 is especially revealing.

consumption is preserved, it is more than likely for demand to slow down or even to cease for a long period of time.

The formation of the price of eco/green energy has become a factor playing a key role in the development of the whole RES industry. The tendencies show that, parallel to the advancement of the technologies for energy generation, the price has been going down by the year. It is difficult to fix a certain percentage of annual reduction because there is no approved methodology and the process includes all different types of RES

Table. 1. RES share in gross end energy consumption in Bulgaria

RES share in gross end energy consumption in Bulgaria				
2004	2006	2008	2010	2012
9.6%	9.6%	9.8%	13.8	16.3%

Source: National Statistical Institute

On the other hand, the fast growth of the sector has acutely raised issues related to the methodology and the strategy of its management. In case of the lack of these concomitant components, it is possible that we see a chaotic and ineffective, therefore unsustainable growth not only at an international, but also at a national level.

2. Price formation and achieving competitiveness

For Bulgaria the curve of demand for ecologically-friendly energy marks the accomplishment of the targets with regard to production of such energy, which are 16% by 2020 for our country, as set by the European Europe 2020 Strategy. According to data provided by the National Statistical Institute (refer to table 1), in 2012 Bulgaria already had a RES share of 16.2% of gross end energy consumption. Therefore, if demand is identified with the state, we cannot expect an increase by 2020. On the contrary, if the present tendency of a RES growth equal to a 1% - 2% increase in the RES share of gross end energy

that are used. Data shows that the cheapest RES generated energy is that produced by water and wind, which is 20 to 40 per cent on average more expensive than energy from conventional energy sources and the price of energy from the sun shows the least but most stable reduction (it is 100 to 400% more expensive than the energy generated by "traditional" sources) (State Commission for Energy and Water Regulation).

There are two basic RES price models in the EU. Germany, Bulgaria and most EU countries use the first one. The first one depends on production expenditures and the government changes the prices every year, because of technological and organizational improvement criteria. The rapidly changing conditions require flexible measures. That is why the first one is suitable to the occasion. The second price model is the scheme of green certificates. It is in use in several EU countries – Sweden, Italy, Romania etc. They both lead to incentive in "green energy" production.

The price of "green energy" will not be set by demand and supply, .i.e. the market principles until the implementation

of European Commission directives is completed in 2020, or earlier in case the targets are reached ahead of schedule, if there are no subsequent targets, or up to the moment when the production costs/price goes down or becomes equal to the price of conventional energy not only in terms of prime cost, but also price offered to the end-users. Until this stage is reached, the price of eco energy will be under the jurisdiction of the state, the State Commission for Energy and Water Regulation in particular. After this stage the possible price formation economic model can be regarded as a combination of the following factors:

1. Need for and demand level of the ecologically-friendly energy in Bulgaria and the neighboring countries. Whether the energy policies of our neighboring countries will result in successful implementation of the green energy targets in accordance with the "Europe 2020" strategy is of prime importance;
2. Price levels of the individual types of eco energy. As regards this factor, not only the energy policy for the different RES plays a key role, but also the increase in the production capacity of energy generation technologies;
3. Prices of conventional energy. It is important to note that the main determinants here are carbon quotas and their price, ecological requirements and last but not least, the prices of coal and petrol on the international market;
4. The weight of non-pricing determinants, mainly in terms of the society's attitude/disposition and formation of consumers' preferences;
5. Dynamics of the competitiveness and concentration in the sector;
6. Opportunities of optimizing the structure of costs;
7. Content of both European energy policy and national policy after implementation of the current one in 2020;

The fundamental issues related to the development tendencies in the RES sector in Bulgaria are: when to be developed and how much/many to be used; they are mostly determined by the speed and implementation of production advancements/innovations and the increase in the efficiency ratio of production technologies. The difference in the price of equipment for production of 1 KW electricity between RES and traditional sources, is several times (manifold) to several percent, depending on the type of RES. However, technological development shows that the price of ecological energy will keep decreasing, mainly precisely due to technology. History shows us that the human development depends on the level of innovations, new technologies and the way we use natural resources (Kula, 1992, p.23).

3. Tendencies of development of the RES industry

Strategic planning of the RES concept is of prime importance, because by means of its consecutive and regular implementation, future expenses can be saved with regard to healthcare, the lack of energy sources overcome and the environment improved.

Whether the RES concept will provide a successful and rational solution to meeting the future energy needs depends on the development and influence of a number of objective tendencies and opportunities, which form a wide range of serious and global challenges. The most important of them are:

- Tendencies with regard to public trust in RES in the different countries (especially the developed countries that play a leading role in the formation of global politics such as those part of the Group of Twenty: G-20) ;
- Tendencies, related to the quality of environment, natural resources, especially the non-renewable energy sources and the climate;

Articles

- Tendencies connected with global energy consumption;
- Opportunities for acquiring and improving RES technologies;
- Opportunities for reducing the prices of the RES- generated eco energy.

In Europe the development tendencies show that there is a real possibility that we exceed the initially set minimal goals as regards the 20% RES share of gross end energy consumption by 2020. The EU Energy Roadmap 2050 reads that the share of RES will be increasing steadily according to all scenarios and will reach a minimum of 55% of gross end energy consumption by 2050 (Oettinger, Günther, 2012, p.8). Taking into account the broad time span from the final implementation of the Europe 2020 strategy, which is expected to reach a share of ecologically-friendly energy of at least 20%, to the finalization of EU Energy Roadmap 2050, which projects a share of 55% of RES, we can arrive at the conclusion that within the thirty-year period it would be quite realistic to reshape and transform the energy system. Considering the fact that Bulgaria is an EU member state, we can expect that a policy of certain support for RES will be followed in our country in the future as well.

Conclusion

In view of the social and economic conditions and low income/living standard of the population in Bulgaria compared to that of most EU countries, from a mass consumer's perspective, irrespective of whether it is an industrial one or an individual household, price will be a crucial factor in the support for RES. Moreover, when comparing the price of energy from RES to that of energy from traditional sources. Unlike many EU countries with high income levels, where major factors for winning public trust for the sector is its contribution to improving the state of the climate and environment, in Bulgaria for the next few years the most crucial factors will be

exactly the price of energy. Only by means of its reduction, the existing and typical of the initial development phase lack of trust in the industry has to prove its economic viability. There are few measures which can improve the sector development:

- To increase adequate funding of small business by RES projects. Including not only private, but also different operational program opportunities;
- To organize educational programs and information campaigns about RES advantages for the environment;
- To ensure long-term legal stability;
- To ensure more transparency and objectivity about the role of RES for energy sustainability.

In order to achieve competitiveness, it is necessary for the sector to develop quickly its potential. Of course, the long-term policy and the advancement of technologies remain factors of strategic importance for the realization of this objective and the future of the RES concept in Bulgaria.

References

- Kula, Erhun, 1992. Economics of Natural Resources and Environment, First edition, London: Chapman and Hall.
- Oettinger, Günther, 2012. "Energy roadmap 2050", European Commission.
- European Commission, Europe 2020.
- National Action Plan for Energy from Renewable Sources, 2012
- Worldwatch Institute, The Renewables 2011 Global Status Report
<http://www.worldwatch.org/>
- National Statistical Institute
<http://www.nsi.bg/>
- State Commission for Energy and Water Regulation
<http://www.dker.bg/>