Trakia Journal of Sciences, Vol. 11, Suppl. 1, pp 349-353, 2013

Available online at:
http://www.uni-sz.bg

ISSN 1313-7069 (print)
ISSN 1313-3551 (online)

ENERGY MANAGEMENT – PROBLEMS AND DECISIONS

V. Grigorova*

Economic Research Institute at the Bulgarian Academy of Sciences, Sofia, Bulgaria

ABSTRACT
The aim of the paper is to be revealed on the base of the conventional analysis the problems, linked with the business management in the energy sector as for example, the inequilibrium between: conventional and alternative energy sources (green energy); generation and consumption of energy; available energy capacity and volume of energy production; availability of national energy resources and need of them; energy prices and the purchasing power of the energy consumers. As well, they are considered the problems of: market liberalization and diversification, energy and carbon intensity, energy efficiency and sustainable development. As a result of the study, based on the method of empirical analysis in branch and countries aspect, there are given a lot of outcomes and recommendations for the problems decision and energy management improvement in the country.

Key words: liberalization, diversification, energy density, cogeneration, carbon intensity, energy efficiency, green energy, sustainable development

JEL: Q 42, Q 48, Q 50

INTRODUCTION

In the end of 2012 and especially in the beginning of 2013 the Bulgarian energy sector fold in a collapse as a result of the irrational management decisions, corruption, problems of the energy market liberalization, technological energy losses, environment pollution, etc. As well, a lot of energy problems are linked with the: old energy equipment, technique and infrastructure; insufficient relative share of the cogeneration (it takes about 50 percent of the total energy generation); high rate of the electricity consumption in the households; high investment costs about so called green technologies, which are strongly increasing the price of electricity; low share of the households gasification; insufficient rate of the energy sources diversification - by now there is only one supplier (Russia) of the gas and oil in Bulgaria; irrational management measures in energy sector and high energy density, i.e. non effective use of the energy and energy resources in the branches and households, etc.

***Correspondence to**: *Doz. Dr. Vesselina Grigorova, Economic Research Institute at the Bulgarian Academy of Sciences, ул. Аксаков 3, София 1040, България, Тел.: 359 2 810 40 35 Факс: 359 2 988 21 08 е-майл: vess.nedeltcheva@iki.bas.bg*

Problems and decisions

European Commission has suggested a new strategy about energy savings aimed to development of productions, linked with high innovations and low energy costs. In this context the energy marketing and management has to follow the EC-27 energy policy priorities, targeted to:

- improvement of the energy infrastructure;
- increase the quality and varieties of the energy services;
- diversification of the energy resources and supplies;
- higher competition on the national energy market;

- sustainable development of the energy sector and the Bulgarian economy, etc.

In 2007 the European Commission recommended a paper, titled "Energy Policy for Europe", that is directed to radical changes in energy sector in order to be reached the long-term targets of the Community and higher degree of adequacy of the national energy decisions. Linked with the paper "Energy Policy for Europe" are the 3-years "Action Plans", that the member countries have to introduce (1). As well, European Commission accepted two main programs: "Intelligent Energy for Europe" and "Energy Management" – the first one is proposing a financial help for improvement the policy of energy efficiency and renewable energy sources, and the second one – for improvement the decisions, concerning the management of the energy sector.

Linked with the "Action Plan" of the European Commission, it is introduced the Bulgarian "Energy Efficiency Action Plan" aimed at decreasing the green emissions by the diminishing of energy density, improvement of energy efficiency, wider use of renewable energy sources, etc. As well, it is presented the National Plan for Development of the country during the period 2007-2013 and Operative Programs targeted to creation of the information systems about the state of energy efficiency in the industry and in the rest branches of economy. Every year there are prepared reports with assessments for the applied measures and information about them is given to the Agency of energy efficiency (2).

During the next years in the energy management has to pay more attention to the investments directed to: wider application of the more effective and innovative renewable energy technologies, that are factors in diminishing of the green emission effect and increasing the energy efficiency; decreasing the carbon emissions in the transport by the use of bio fuels, in construction – by the higher quality of the buildings and their energy isolation and in all sectors of the economy.

Table 1. *Carbon emissions per a head in the Central and East European Countries*

(in tons)

Years / Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2008/ 2000
EC- 27	8,5	8,7	8,6	8,7	8,7	8,6	8,6	8,4	8,2	96,5
Bulgaria	6,2	6,5	6,2	6,9	6,8	6,9	7,2	7,7	7,5	121,0
Poland	8,3	8,3	8,0	8,3	8,3	8,4	8,7	8,6	8,5	102,4
Romania	4,2	4,5	4,9	5,1	5,2	4,9	5,1	5,1	4,8	114,3
Slovak Republic	7,6	7,9	7,6	7,8	7,8	7,7	7,5	7,2	7,4	97,4
Slovenia	7,6	8,1	8,1	8,0	8,2	8,3	8,4	8,4	8,9	117,1
Hungary	5,7	5,9	5,8	6,1	5,9	6,0	5,9	5,8	5,6	98,2
Czech	12,4	12,6	12,2	12,2	12,3	12,2	12,3	12,2	11,6	93,5

Source: European Environment Agency

Regarding carbon emissions (tons carbon emissions equivalent) per a head in the Central and East European countries **(Table 1)** in the beginning of the considered period (2000) the ranking of the countries is as follows: Czech, Poland, Slovenia, Slovak Republic, Bulgaria, but in 2008 it is Czech, Slovenia, Poland, Bulgaria and so on. According to the indexes of dynamics 2008/2000 the results for Bulgaria are also not satisfactory – the country is on the first place in increasing the pollution (121.0), following by Slovenia (117.1) and Romania (114.3). It is observed slow diminishing of the index in Czech, Slovak Republic, Hungary, respectively 93.5, 97.4, 98.2. Thus, in comparison with 2000 year, in 2008 our country is more polluted with green emissions and especially with carbon emissions in spite of the undertaken measures for ecological and sustainable development of the economy. A great positive impact have had the market mechanisms and recommendations shown in the Trade emissions scheme.

Speaking about the energy density in Bulgaria, in 2000 it is 7.3 times higher than the EC-27 and in 2008 – 5.6 times, i.e. the state of our country in this indicator is worse than in the other Central and East European countries. The forecast data draw almost the same tendency.

Table 2. *Final energy density in the Central and East European Countries (final energy consumption/gross domestic product)*

(Index)

Years / Countries	**2015/2010**	**2020/2015**	**2025/2020**	**2030/2025**	**2030/2010**
EC- 27	101,3	100,6	100,0	99,7	101,6
Bulgaria	102,0	98,6	101,6	101,1	103,3
Poland	101,7	99,6	100,3	101,0	102,6
Romania	102,7	102,7	101,1	100,7	107,4
Slovak Republic	99,3	100,9	98,7	98,8	97,7
Slovenia	101,6	99,9	97,9	98,6	97,9
Hungary	100,2	100,1	99,1	98,5	97,9
Czech	104,1	99,8	99,1	99,1	101,9

Source: EU Energy Trends to 2030, Directorate General for Energy, EC, 2009.

Energy density will decrease in Slovak Republic, Hungary and Slovenia **(Table 2).** Diminishing and after that slowly increase of this indicator is predicted for Romania, Bulgaria, Poland, Czech. Index 2030/2010 of Romania is 107.4 and it is comparatively the highest one among considered countries, following by Bulgaria (103.3), that means the economy of the both countries will not be enough energy efficiency during this period. They are needed radical measures to improve the energy density. A great meaning for that purpose has the decrement of the final energy density in the industry as the most energy intensity sector in economy by decreasing the structural share of the high energy intensity technologies and products, rational energy management, etc.

The measures for higher energy efficiency are as follows:

- technological – implementation of high technological and energy saving innovations;
- administrative-organizational – alleviation of the administrative, regulative and license procedures. As well, improvement the work of the national energy regulator and an establishment of the common European energy regulator, i.e. an Agency for cooperation of the national energy regulators in the framework of the EC-27, which functions will be as of a consultative body to the European Commission;
- ecological - a great meaning about the ecology in the country has had the development of clear energy technologies, for example in the transport – using the renewable energy sources and especially – bio-ethanol and biodiesel, etc.;
- foreign policy measures – preparation of the common energy strategy and inter connective infrastructure, ensuring more safety energy links and supplies;
- managerial – introducing in each energy producer the principles and good European practices for corporative management, improving the structure of the energy production mix, development of the information technologies and high qualified managerial staff. (3)

The process of the Bulgarian energy market liberalisation began several years ago and it has to continue, because the liberalisation and development of the energy infrastructure in the country are the main preconditions for the larger investments in the sector. The State Commission for energy and water regulation is acting as an independent body and one of its targets is providing a liberalisation of the energy market in the country. The prices in the energy sector will continue increasing due to the high prices of the energy resources, great losses of energy in the process of its transformation, high taxes for export, transmission and transformation of energy, etc. It is necessary to be improved the structure of products and services in order to be lowed the energy costs and enhanced the supplies. However the energy prices in our country do not stimulate the restructuring of the sector and improvement of the investment portfolio (4).

A great meaning for energy efficiency has had the activity of the Energy System Operator that is ensuring: a safety of the energy system; nonstop procurement of electricity and high quality of the supplied energy; balance between generation and consumption of electricity; common coordinative collaboration with the electricity systems of the Balkan countries and member countries of European Union through advanced information-communication technologies.

The new energy strategy of our country (2008) and the shifts in the energy sector require fulfilling until 2020 the European targets (so called "20/20/20") and solving the Bulgarian energy specific problems as the dependence of the country on income of resources; the difficulties in diminishing the harmful green emissions; the high energy density and low energy efficiency, etc. (5). The accent in the energy strategy is put on ensuring 16 percent share of the renewable energy in the total final energy consumption. The generation of energy from renewable sources has provided the enhancement of the energy prices due to the high investment costs (6).

Consequently, the proposals for improvement the management in the Bulgarian energy sector are as follows:

- stimulating the energy generation from renewable sources at lower prices;
- establishing of Centre for distribution of natural gas – the first one on the Balkans;
- solving the problems with the waste storage from a nuclear fuel in the country;
- ensuring the participation of the country in establishment of Energy Society in South-East Europe and European Union;
- determining a better regulatory framework about the electricity from renewable energy sources;
- solving the problem with storage of the solar energy – in Bulgaria there are not well developed technologies for that purpose, that is why it is suggested applying of the pump storage technology or using special concentrators of the energy generation from the sunshine, which technology is chipper and the energy could be storaged longer time;
- increasing the investment in advanced innovations as for example, so called virtual "gas tub", that is helping to be diminished the

investment costs and creating more flexible and mobile system of gas supply. Analogically about the technology of the liquid gas transmission;

- distinguishing of the priorities in the energy mix – up to 2010 as priorities in the renewable energy sources portfolio have been determined the water resources and biomass, but after 2015 – wind and solar energy. Priorities in the conventional fuels in Bulgaria until 2010 have been the coals and after 2015 – the natural gas. The structure of investments has to follow namely these structural tendencies. A great meaning in the energy mix has got the natural gas of low pressure and the respective investments for its development (7).

As a result of the energy efficiency measures and rational price policy it is expected increasing the demand of energy. The rational energy management has to encourage finding and using of more and more national energy resources and their diversification as well as developing more efficiency energy infrastructure, green energy technologies, green investments, etc. (8).

Outcomes and recommendations

The tendencies in the energy management in Bulgaria are: decreasing the energy share of conventional sources and enlarging the one of alternative sources; decreasing the energy density and harmful green emissions, implementing low energy intensity technologies, etc.

Regarding the natural gas market it is also necessary accelerating the liberalization by giving the right of the large gas consumers to get directly in contract relationships with the companies abroad. For that purpose a great meaning has had using different sell prices for the different categories consumers as well as investing in gas infrastructure of low pressure in order to be developed the household gasification in the country. The European Gas Directive is recommending the development of the cogeneration and interconnectors together with the diversification of the natural gas sources (9).

So that, in the context of the Bulgarian and European energy targets and priorities it is quite necessary the development of the energy management in Bulgaria, which is helping to improve the regulatory regimes, determine the priorities in the structural investment policy, decrease the dependence on the energy resources income and in this way, enlarge the energy safety of the country (10). These developments are preconditions of reaching the European strategy targets and diminishing the losses of energy in the process of its generation, transmission, transformation and consumption; participating in the European programs, funds and studies in order to be improved the state of energy sector by implementation of rational management and effective energy policy for sustainable development of the economy (11).

REFERENCES

1. Todorova, Sn. First National Action Plan of Energy Efficiency and National Indicative Target of Energy Savings. Paper of International Conference: Clever use of the energy and water, Sofia, June 2010.
2. Naidenov, Kr. The New Philosophy of the Low of Energy Efficiency and the Control Functions of the Agency of Energy Efficiency. Paper of International Conference: Clever use of the energy and water, Sofia, June 2010.
3. Grigorova, V. Effective Energy Consumption – Branch and Countries Analysis , Publ. House Avangard Prima, *monograph*, Sofia, 2011.
4. Grigorova, V. Structural Orientation of the Industry in Bulgaria, Publ. House Roll Company, *monograph*, Sofia, 2005.
5. Conception on Energy Strategy of Bulgaria to 2020, *consultative document*, July 2008.
6. Grigorova, V. Structural Changes and Investment in Energy Sector of Bulgaria, Publ. House Avangard Prima, *monograph*, Sofia, 2009.
7. Grigorova, V. Foreign Direct Investments, Publ. House Roll Company, *monograph*, Sofia, 2007.
8. World Energy Outlook. International Energy Agency (IEA), 2011.
9. Grigorova, V. Development of the Bulgarian Energy Sector, in: *A Place, a Time and an Opportunity for Growth – Bulgarian Scholars in NIAS*, Publ. House Faber, *joint monograph in English*, Veliko Turnovo, 2011.
10. Policy Reforms for Energy Efficiency Investments. Economic Commission for Europe, United Nations, 2010.
11. Tracking Progress towards Kyoto and 2020 Targets in Europe, Environmental Agency (EEA), Report N7/2010.