Bulgaria's Energy Policy after Accession to the EU

By Atanas Georgiev and Nataliya Aleksandrova*

Overview of the Bulgarian Energy Sector

Bulgaria has a strategic location on the crossroads between the East and the West. In the period between 1945 and 1989 Bulgaria had a centrally-planned economy. After that it witnessed a transition period to market-based economy. In March 2004 the country joined the North Atlantic Treaty Organization (NATO) and since January 1st, 2007 it is a full member of the European Union. All these issues in Bulgaria's economic and political development influenced its energy policy.

Energy Strategy

In 2002 Bulgaria established its Energy Strategy that sets the basis for energy reform and reflects the country's path to the EU. The leading priority of the Strategy is to develop a competitive energy market and all priorities are related to this aim. There are several long-term goals of this strategy: to secure energy supplies, to create competition in the energy sector, to protect environment, and to position Bulgaria as a regional hub for the transit of oil, natural gas and electricity.

The current Energy Act was last revised in 2006. The main purposes of the law are: to create a legal framework for energy activities related to the change in the market model for electricity and natural gas, to encourage combined heat and power generation (co-generation) and to ensure more conditions for energy production from renewable energy sources (RES).

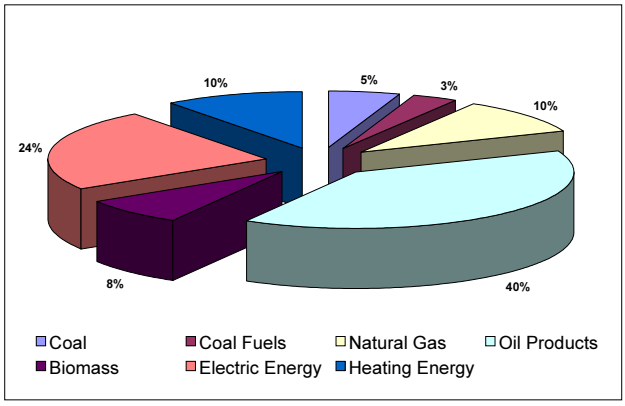

Figure 1
End Energy Consumption (2005)
Source: Bulgarian National Statistical Institute (www.nsi.bg)

Coal

More than 60% of Bulgaria's energy consumption is satisfied with imported resources, especially oil and natural gas that come mainly from Russia. About 65% of the power generated by the Bulgarian coal-fired plants is produced by the Maritza Iztok basin complex. It consists of four coal-fired plants (total capacity of 2,950 MW) which are specifically designed to use low-caloricity and high-dust content local lignite coal. The fuel used in the plants comes from the adjacent Maritsa Iztok Mines, which account for 80% of the coal produced in Bulgaria. The U.S.-based AES Corppration announced in 2006 that it will begin construction of a 670-MW coal-fired plant that will replace the existing Maritsa Istok 1 plant. This project is the largest green-field investment in Bulgaria and has a total cost of USD 1.4 billion. The plant is scheduled to be completed in 2009 and will replace the lost generating capacity from the closure of units III and IV in the Kozloduy NPP. AES has signed a 15-year power-purchase agreement with the National Electricity Company (NEK) for selling the electricity at a fixed price.

Oil and Natural Gas Supply Future

Bulgaria has a strategic location in Europe. This is the reason why there are many multinational energy projects that include the participation of Bulgaria. The construction of the NABUCCO gas pipeline is an important project not only for Europe to reduce its dependence on Russian natural gas but also for Bulgaria. The European Union and the energy ministers of Austria, Bulgaria, Hungary, Romania, and Turkey agreed to build the 3300 km NABUCCO pipeline that will guarantee the supply of about 30 billion cubic metres of gas a year from Iran to Central Europe by 2015.

Early this year (2007) Russia, Greece and Bulgaria agreed to build the Bourgas-Alexandroupolis pipeline with a capacity of 35 – 50 mln tonnes of oil annually. Its construction will start in 2008. Russia has a 51% majority stake and the rest is split between Greece and Bulgaria. In 2006 Albania, Bulgaria, and Macedonia signed a treaty concerning the AMBO (Albania, Macedonia, Bulgaria Oil) pipeline. It will carry oil from the Caspian region to the Black Sea port of Bourgas in Bulgaria and then through Macedonia to the Mediterranean port of Vlore in Albania. After years of little work, optimistic scenarios suggest the 850 kilometre-long pipeline, with a capacity of 35 million metric tonnes per year and costing USD 1.3 billion to construct, may be ready by the end of 2010.

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Electricity Market

Generally the distribution sector in Bulgaria has been in a decline for the past 15 years. The government has already privatized seven power distribution companies, selling them to the Czech Republic's CEZ, Germany's E.ON, and Austria's EVN in 2005 for a total of EUR 693 million. In 2006, Bulgaria's Privatization Agency (PA) signed a draft contract to sell the 1,260 MW Varna TPP to the Czech energy corporation CEZ for $250 million. CEZ has also agreed to invest an additional $140 million in the power plant. The new owners will make additional investments in the energy sector of the country. The privatization of power plants is one of the priorities in the Energy Strategy, but the current government has decided to change its policy toward a CEZ-like model. The rest of the state property in the country's energy sector will be gathered in a holding corporation, which will be listed on the Sofia Stock Exchange and possibly some of the leading international stock exchanges. Thus the state will keep control over the sector, but will be able to bring fresh funds and more transparency as well.

Bulgaria expects to fully liberalize its electricity market by July 1st, 2007, adhering to EU standards. It is expected that after contracting large and smaller industrial electricity consumers, electricity traders will offer tempting prices for households as well – initially in the large cities, where consumers use more electricity and are able to use advanced services as electronic payment and bill presentment. However, a large part of household consumers will most likely stay with their current providers (the EDCs), as they will not have the information and courage to undertake such a change.

Currently a debate for opening a Bulgarian electricity exchange is going on among national experts. Most of them agree that the current model with bilateral contracts should be upgraded to an exchange-based model, which will bring more transparency on energy prices (which are currently secret) and will support price-setting of balancing energy and sunk costs. Opponents of the idea consider the exchanges in the neighbouring Romania and Slovenia to be sufficient for the future regional electricity market and think that Bulgaria has lost its chance to become the Southeast European energy exchange.

Nuclear Energy in Bulgaria and EU Perspectives
Overview of the NPP Electricity Production in Bulgaria

Bulgaria has developed its nuclear energy sector since 1966, when a contract was signed between the country and the USSR for cooperation in constructing a nuclear power plant (NPP). A site near the Danube River town of Kozloduy was selected and the construction started on April 6, 1970. The first two units of the plant were commissioned in 1974 and 1975 and before they were finished, the construction of units III and IV was started in 1973. They were finished in 1980 and 1982 respectively. All four reactors are of the type VVER-440 (440 MW each). In 1988 and in 1993 the two newest units of the plant were finished. These are of the type VVER-1000/B-230 and are have a capacity of 1000 MW each. Currently the first four units are idle (I & II – since 2002 and III & IV since the end of 2006) in accordance with the EU acquisition obligations of Bulgaria. The 6 units are operated by the state-owned company Kozloduy NPP plc.

In 2006 Kozloduy NPP produced 42.66% of Bulgaria's total electric energy generation (net energy amounting 18,130,174 MWh). Most of the energy is sold to the state-owned transmission operator NEK at regulated prices but part of the production is sold via bilateral contracts to eligible customers and electricity traders in the liberalized segment of the market. The generation capacity of Bulgaria in 2006 allowed NEK to export a record volume of electric energy (about 7.8 billion KWh) and thus to satisfy the electricity deficit in the region of Southeast Europe, which amounts to about 10 billion KWh. With the closure of units I-IV not only Bulgaria, but the whole region loses one of its cheapest, cleanest and safest sources of energy.

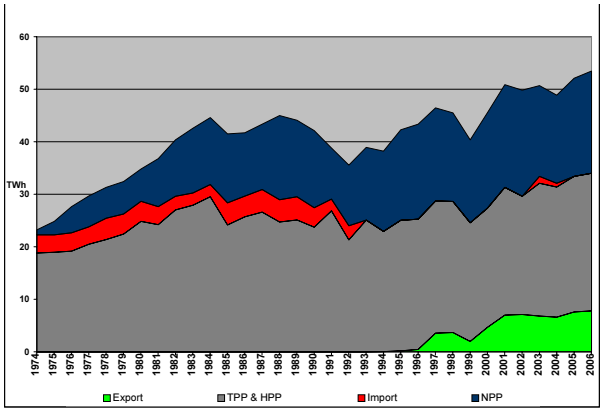

Figure 2
Kozloduy NPP's Stake in Bulgaria's Energy Generation

Source: NPP Kozloduy (www.kznpp.org)

The NPP Belene Project

In order to balance the Bulgarian energy system, in 2002 the Bulgarian government decided to restart the halted project for a second nuclear power plant in Bulgaria, at another town down the Danube River – Belene. The Belene NPP will have two 1000-MW units of a modernized type VVER-1000. Currently a strategic investor is to be selected to provide financing for 49% of the project, the remaining 51% being property of the state-owned NEK. It has not been announced whether the new plant will be financed with power-purchase agreements and for what amounts as well as who will be the 49% strategic investor in this project. The total amount of the two new units may reach about 4 billion EUR.

EU's Nuclear Energy Policy and its Implications for the Bulgarian Nuclear Sector

In January 2007 the European Commission announced its Strategic Energy Review. In the nuclear part of the review, the EC encouraged EU members to decide for themselves whether or not to use nuclear energy, but mentioned as well the benefits of nuclear plants:

- saving CO_2, SO_2, NO_X, and other harmful emissions;
- higher relative security of supply (in comparison to natural gas and oil);
- price of nuclear generation is lower than that of coal and natural gas generation.

The new turn in Europe and in the world as a whole in respect of nuclear energy follows a 20-year "ice-age" with almost no development and almost no new nuclear projects after the Chernobyl incident. Now safety is priority number one all over the world and nuclear energy has proven to be one of the most promising solutions for the future. Bulgaria and neighbouring Romania, as the two newest members of the European Union, are among the first ones on the "Nuclear Renaissance" track. With two new units planned in Bulgaria and two more in Romania, Europe's energy balance will be supported with an additional 4000 MW of clean, emissions-free, cheap and secure generation.

Renewables in Bulgaria and Related Opportunities

Current Usage of Renewable Energy in Bulgaria

Renewable energy generation is very popular in Bulgaria with the country's accession to the EU and the adopted measures for supporting green energy. The Bulgarian government has decided to target an 11% share of RES in total electricity generation of the country by 2010, but some administrative obstacles are slowing down investments. Currently there are projects for more than 600 MW of wind generation capacity, but only two major projects have started – one for 100 MW on the Balkans Mountain and one for 60 MW on the Black Sea coast. The State Energy and Water Regulatory Commission (SERWC) expects RES capacities to reach about 1500 MW in 2010. Another booming sub-sector is small hydro power plants (with capacity under 10 MW). Currently there are 28 such plants and more are planned. The potential for biomass applications is also considerable, both for electricity/heating and biofuels production. Solar and geothermal sources in Bulgaria are not strong enough to be used for electricity generation, but the heating potential is very good. Regretfully, it is still undeveloped. Heat pumps will also become popular as they can be used for almost every home or commercial building.

The Price of Renewable Energy

Because of Bulgaria's obligations to the EU to support renewable energy, preferential minimum prices are set for electricity from RES. For wind generators under 10 MW the price is 120 BGN (61.36 EUR) per MWh. If the generators are using new equipment (produced after 01.01.2006), the price is higher: 175 BGN (89.48 EUR) per MWh for plants generating in less than 2250 hours per year and 156 BGN (79.76 EUR) per MWh for plants working more than 2250 hours per year. The small hydro power plants (with capacity under 10 MW) have a price of 85.19 BGN (43.56 EUR) per MWh. All the prices mentioned are defined by the SEWRC and are without VAT (20%). For comparison, the prices of the large generation plants in Bulgaria are without VAT. See Table 1.

Negative Externalities of Conventional and Renewable Generation

Conventional generation is from 2 to 10 times cheaper than renewable generation, but often the conventional energy prices do not include negative externalities such as pollution (CO_2, SO_2, NO_X, Mercury, dust, etc.), they use imported primary energy sources, which affects the trade balance, and their prices are volatile as they depend on the fuel used.

There is a negative externality of renewable energy as well – especially from volatile sources as wind and solar energy. Wind and solar power can not be predicted, which means that the electric energy system becomes more unstable. Another aspect, which will affect electricity prices in general, is the needed upgrade of the electric grids (both distribution and transmission) in order to provide capacity for the new generators. The investments will have to be transferred to end consumers, which means prices will go higher in general.

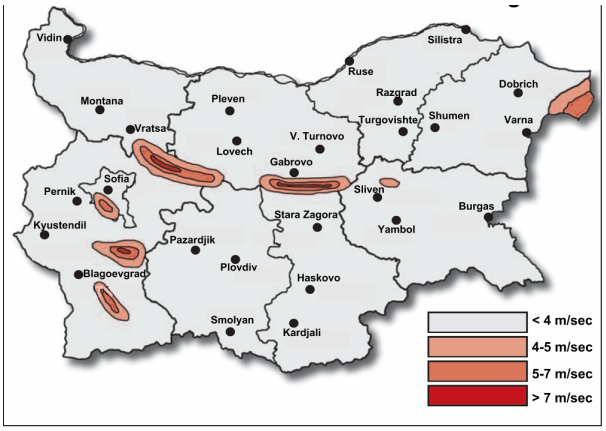

Figure 3
Suitable Zones for Wind Generation in Bulgaria

Source: Bulgarian Energy Efficiency Agency (www.seea.government.bg)

The Bulgarian and the EU's RES policy

Carbon emissions, pollution and security of energy supply push the RES sector forward. This is why the Bulgarian govern-

Power Plant	Price in BGN/EUR per MWh	Price for Availability in BGN/EUR per MWh
Kozloduy NPP	14.27 / 7.30	22.03 / 11.26
Bobov Dol TPP	55.26 / 28.25	10.68 / 5.46
Maritza 3 TPP	57.28 / 29.29	13.01 / 6.65
District Heating Russe TPP	55.39 / 14.97	7.79 / 3.98
Varna TPP	45.82 / 23.43	7.94 / 4.06
Maritza East 2 TPP	33.24 / 17.00	By contract

Table 1

Regulated Prices for Conventional Energy Generation

Source: State Energy and Water Regulatory Commission (www.dker.bg)

ment has promised to update the Energy Strategy of the country in order to reflect the latest policy changes of the European Union. It has also prepared a law for Encouraging the Use of Renewable and Alternative Energy Sources, which will define the form and purpose of the state support for this sector. Supportive measures are provided in the Energy Act and the Energy Efficiency Act as well.

Energy Efficiency Policy in Bulgaria

Current Situation with the Energy Consumption in the Country

As stated earlier, Bulgaria is highly energy dependent. An important role in Bulgaria's competitiveness on the EU market is its energy intensity and energy-efficient production. Although the consumption of final energy by industry has been reduced by 60% since 1990, industry is still the most energy-consuming sector. Industry's share of energy consumption is significantly higher than the EU-27 average of 28%. Transport accounts for a 26% of final energy consumption. Final consumption in 2004 was 44% lower than in 1990. Oil and electricity have the highest shares of final energy consumed.

The average growth of consumption annually is 1-2%. The pessimistic prognosis is that the GDP growth per year will be 4-5% and energy consumption growth 1.7% – with absolute growth of more than 30% by 2020. Energy growth is most significant in the household and services sector. Industry has stabilized its energy consumption growth recently due to many investments made in new environment-friendly technologies, but there is still a high potential for energy efficiency projects.

Energy Efficiency Policy

One of the main activities in the Bulgarian energy strategy is the rational use of energy resources. The projects for natural gas transit through Bulgaria are part of the energy policy to diversify the energy mix and supply. New generation capacities are planned but first of all energy efficiency measures are needed because one saved MW of energy is cheaper than building a new one in generation. Energy efficiency policy in Bulgaria is focused on two areas – lowering energy intensity and using RES. The Energy Efficiency Act from 2004 is based on the energy strategy of Bulgaria, the EU legal framework, the Kyoto Protocol, etc. Some of the main measures in Bulgaria are: introduction of the obligation for energy management; regulation of the possibility for the introduction of energy efficient services; requirements on labeling and stamping; tax reliefs, etc.

Indicator	Bulgaria	EU-27
Energy per capita (kgoe/cap)	2,425	3,689
Energy intensity (toe/MEUR '00)	1,142	185
Energy import dependency %	48.0	50.1
CO_2 Emissions (Mt)	44	4,004
CO_2 intensity (tCO2/toe)	2.3	2.2
CO_2 per capita (kg/cap)	5,671	8,180

Table 2

Key Energy Indicators (2004)

Source: The European Commission

Financing Energy Efficiency

There are several opportunities for financing energy efficiency measures in Bulgaria: third-party financing; concession-type financing by a third party; using risk capital funds as alternatives of bank loans; selling reduced number of greenhouse gases using the flexible mechanisms of the Kyoto Protocol, etc. Some of the schemes are:

The Kozloduy International Decommissioning Support Fund: a joint initiative between the Bulgarian Energy Efficiency Agency, the EBRD, and the European Commission. It finances and co-finances selected projects for two main purposes: decommissioning of units 1-4 of the Kozloduy nuclear power plant and addresseing issues in the energy sector related to the closure of units 1-4 by demonstrating ways to reform and modernize both the supply and the demand side of energy use in Bulgaria.

The Energy Efficiency Fund (EEF): the equity capital of the EEF amounting USD 10 million has been allocated by the UN Global Environmental Facility with support from the World Bank. The Bulgarian government participates with funds from the state budget in the amount of EUR 1.5 million, and the Austrian Government made a donation in the amount of EUR 1.5 million. The EEF grants credits and credit guarantees for energy efficiency investment projects.

The Municipal Energy Efficiency Program (MEEP): funded by the Sofia Mission of USAID. The program aims to establish sustainable mechanisms for long-term commercial financing of energy efficiency projects in Bulgaria. The main financial tool for program implementation is the Development Credit Authority (DCA) Guarantee Mechanism.

Efficiency measures, stimulating RES, and nuclear energy are at the base of the common energy policy today. The success of this policy depends on the success of all EU member states. Bulgaria is already a part of the EU and is on the right track to uphold its significant place on the European energy market.

Alfa Fellowship Program

Alfa-Bank and CDS International are pleased to announce a call for applications for the Alfa Fellowship Program's 2008-09 Fellows. Now entering its sixth round, the Alfa Fellowship Program is a professional-level exchange designed to foster a new generation of American leaders and decision-makers with meaningful professional experience in Russia.

The Alfa Fellowship begins with language training in the U.S. followed by an intensive language course in Moscow. In October, Alfa Fellows will attend a two-week seminar program with key Russian government, public, and private sector officials to discuss current issues facing Russia. Fellows then undertake individualized professional assignments at leading Russian organizations including private companies, media outlets, think tanks, NGOs, and government institutions.

Eligible candidates must have a graduate degree and professional experience in business, economics, journalism, law, government, or public policy. Russian language proficiency is preferred. The Fellowship includes monthly stipends, related travel costs, housing, and insurance.

Promoting Understanding of Russia

Applications must be received by CDS International no later than December 15, 2007.

Program information and application forms can be downloaded from the CDS website at: www.cdsintl.org/fromusa/alfa.htm

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Announcement

1st Joint IAEE/MEEA Session at ASSA Meeting

New Orleans, Louisiana, USA - January 4, 2008

Hilton Riverside Hotel, Meeting Room TBA – 2:30pm

Oil and Energy Issues

Presider: Serdar Sayan, TOBB University of Economics and Technology

Mohamed Abdelaziz, Georgios Chortareas and Andrea Cipollini, University of Essex - *Stock Prices, Exchange Rates, and Oil: Evidence from Oil Exporting Countries in the Middle East*

Shawkat Hammoudeh, Drexel University - *Do Oil-Rich GCC Countries Finance US Current Account Deficit?*

Joyce M. Dargay, University of Leeds, Dermot Gately, New York University, and Hillard G. Huntington, Stanford University - *Determinants of World Oil Demand, 1971-2006*

Peter Hartley and Ken Medlock, Department of Economics and James A. Baker III Institute for Public Policy, Rice University - *Empirical Evidence on the Operational Efficiency of National Oil Companies*

Nathan Balke, Southern Methodist University, Stephen Brown, Federal Reserve Bank of Dallas and Mine K. Yücel, Federal Reserve Bank of Dallas - *Globalization and Oil Prices: Demand versus Supply Shocks*

Discussants: **Riza Demirer**, Southern Illinois University-Edwardsville
Hadi Salehi Esfahani, University of Illinois at Urbana-Champaign
Gokhan Ozertan, Bogazici University
Ahmet Faruk Aysan, Bogazici University
Mehmet Serkan Tosun, University of Nevada, Reno

The meeting is part of the Allied Social Science Association meetings (ASSA).

For complete program information please visit http://www.vanderbilt.edu/AEA/Annual_Meeting/index.htm Also watch for the USAEE/IAEE Cocktail Party.