CENTER FOR THE STUDY OF DEMOCRACY

BULGARIA:

NATIONAL ENERGY SECURITY INDICATORS AND POLICY CHALLENGES

Country factsheet

BULGARIA'S ENERGY SECURITY COMPONENTS:

- **Availability of resources**: As Bulgaria is a net importer and poor in energy resources (with the exception of coal), the national energy strategy must ensure the sustainable development of unconventional energy sources in combination with the transition of the economy into a more efficient model for energy production and use. The rapid and unbalanced development of renewable energy sources in 2011-2013, the moratorium on fracking issued in 2012, and the ignorance of local oil and gas production are among the main weaknesses negatively influencing the availability of resources in Bulgaria over the last five years. If they are managed and governed properly, the production capacity of nuclear and hydro-electricity, the availability of coal, as well as the potential for unconventional energy sources are among the strengths of this country. Launched in April of 2015 by the national government, the commencement of the procedure for oil and natural gas exploration rights in two blocks located in Bulgaria's Black Sea continental shelf (Block 1-14 "Silistar" and Block 1-22 "Teres") is one of the few positive developments in this direction. This initiative is seen as a contribution to the country's efforts to reduce its dependence on imports and develop its own domestic oil and gas reserves.

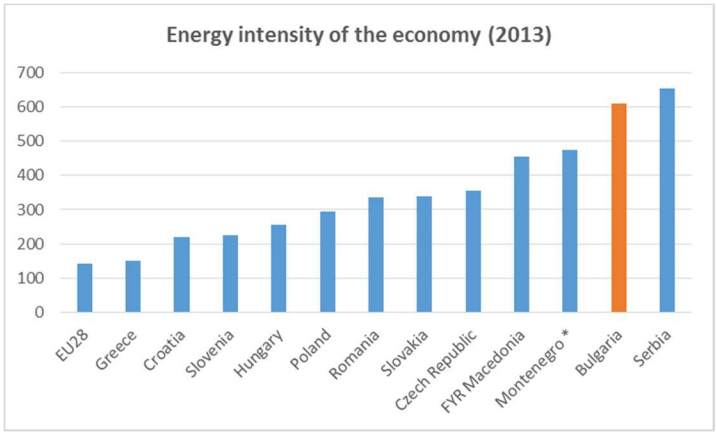
Energy resources net import statistics

- **Reliability**: Considering the country's political corruption, lack of administrative managing capacity within public entities, and severely constrained financial resources and poor governance of public funds, including those of the EU, the only measures for improving Bulgaria's accountability are to reduce the energy intensity of the economy, while at the same time increase the energy efficiency of the business, public, and residential sectors. A vital contribution would be the investments in new and ongoing large infrastructure projects in the energy sector to be governed by clear and transparent procedures and fact-based analyses, synchronized with EU priorities. If sustainable, the national position on the "South Stream" pipeline project, the freezing of the "Belene" NPP project, and the re-negotiation of long-term contracts for the purchase of electricity on fixed prices, combined with the two privatized "Maritsa East" TPPs, could mark a shift in the right direction. The existence and strict implementation of a long-term national energy strategy is a decisive condition for improving the level of reliability.

SELDI.net Southeast European Leadership for Development and Integrity

The publication is supported by a grant from the 2014 Alumni Engagement Innovation Fund, United States Department of State
The publication is funded by the European Union. The views expressed in this publication do not necessarily reflect the views of the European Commission

- **Environmental sustainability**: The country's transition to low-carbon growth is not yet a reality and requires complex interdisciplinary policies following two major trends - reducing the energy intensity of the economy, and improving the energy efficiency of the residential sector. Compared to both the EU28 average (141.6[1]) and its neighboring countries, Bulgaria (610,6) is still lagging far behind in terms of energy intensity in 2013, despite the positive decreasing trend over the last fifteen years. The very low level of energy efficiency in the residential sector can be attributed to the outdated building stock and the use of high energy consumption appliances. When it comes to the policy options for improved environmental sustainability, the boom of renewable energy sources of 2011-2013 has negatively influenced both the public opinion and the decision making in Bulgaria.



*Source: EUROSTAT Energy intensity of the economy [tsdec360]; * Montenegro data for 2012*

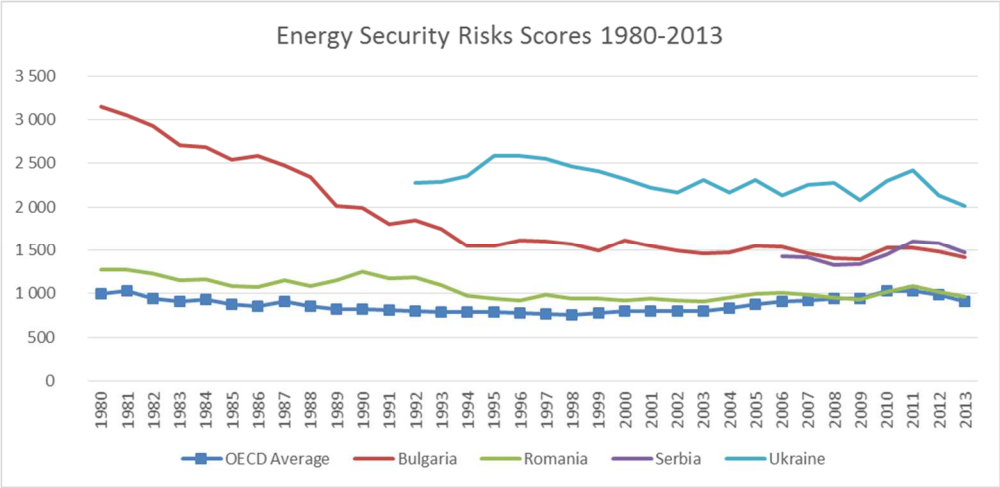
- **Affordability**: Largely due to the high level of energy poverty among the population, affordability is a critical issue for Bulgarian energy security. In the World Energy Outlook, energy poverty is defined as having two components – affordable access to electricity, and reliance on traditional uses of biomass (mainly wood and coal, and inefficient stoves for burning them). Bulgaria experiences serious problems regarding both components. In 2010 over a third of households reported being unable to afford keeping their homes adequately warm, and roughly 60% reported using wood and coal as a major heating source.[2] The 2011 census data confirmed the latter – nearly 54% of homes in Bulgaria use wood and coal for heating, while in rural areas the respective share is 95%. Subsidized electricity prices have made a considerable share of people, particularly in big cities, overly reliant on electricity for heating; while the majority of the population uses non-efficient electricity appliances. This could possibly increase the price of electricity towards a market-based cost, which would have disproportionally negative effects on the energy poverty of households.

As measured by the International Index of Energy Security Risk[3], Bulgaria, in keeping with historical trends, still ranks 57rd among the top 75 energy consumers, followed only by Serbia and Ukraine. However, the country is slowly closing the gap between the rest of the EU and Western Balkan countries, as well as with the OECD average.

[1] Energy intensity is calculated as gross inland energy consumption, measured in kg of oil equivalent, per EUR 1 000 of GDP.

[2] CSD. (2014). Energy Sector Governance and Energy (In)Security in Bulgaria. CSD Reports #30, Sofia, pp.114, p. 34, http://www.csd.bg/artShow.php?id=16984

[3] Institute for 21st Century Energy, U.S. Chamber of Commerce, http://www.energyxxi.org/international-energy-security-risk-index

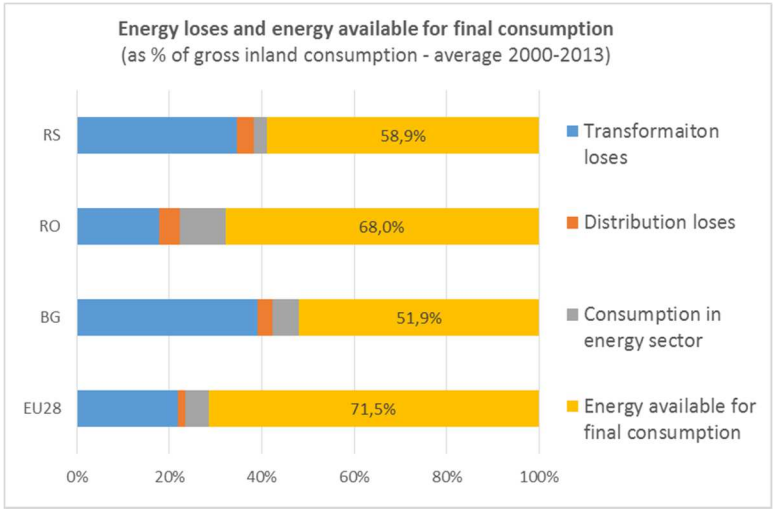


Source: International Index of Energy Security Risk, Edition 2015

BULGARIA'S MAIN ENERGY SECURITY CHALLENGES

I. Energy efficiency and energy intensity challenge: energy losses and outdated infrastructure

Almost half of the energy (48.1% as an average share for the period 2000-2013) available for gross inland consumption is lost in the processes of transformation, transmission, and distribution; while for EU28, the respective share is less than 30% (28.5%). The main reasons for this are the outdated infrastructure in the energy sector, technological base, and electricity grid, as well as the lack of investments due to the artificially low prices of electricity for the final consumers. When considering the boom of renewable energy sources in 2011-2013, it is clear that the grid has no capacity to accommodate the production of electricity from RES, especially in terms of the concentration of specific RES in particular regions (e.g. wind parks in North East and solar parks in South East, while the main grid's transmission capacity is concentrated in Central and Western Bulgaria).[4] The efforts of the national transmission system operator ESO to balance the grid load requires imposing limitations in the input of electricity from different producers depending on the consumption and the total load. Such limitations are imposed on the RES too, which requires changes in the RES law; as until then the National Electricity Company was obliged to buy the whole amount of energy produced by RES.



Source: Own calculations based on EUROSTAT data - complete energy balances [nrg_110a]

As 88% of all residential buildings in the country were built before 1990 when no energy efficiency considerations were taken in account, only 22% of households have energy efficient windows, with only 2.9% of all homes having wall insulation by 2011, the outdated building stock and the use of high-consumption energy appliances are the main contributing factors in the energy inefficiency of the

[4] More detailed analysis can be found in CSD. (2014). Energy Sector Governance and Energy (In)Security in Bulgaria. CSD Reports #30, Sofia, pp.114, p. 42, http://www.csd.bg/artShow.php?id=16984

residential sector. The potential for energy independence is still largely untapped as evident by the fact that only 1.5% of the residential buildings in the country had installed solar panels by the beginning of 2011.[5] The key challenges for improving the energy efficiency in the residential sector are the lack of detailed data on energy consumption and implemented savings measures, which impede both the targeting and the monitoring processes, and the low average incomes and high levels of energy poverty among the population.

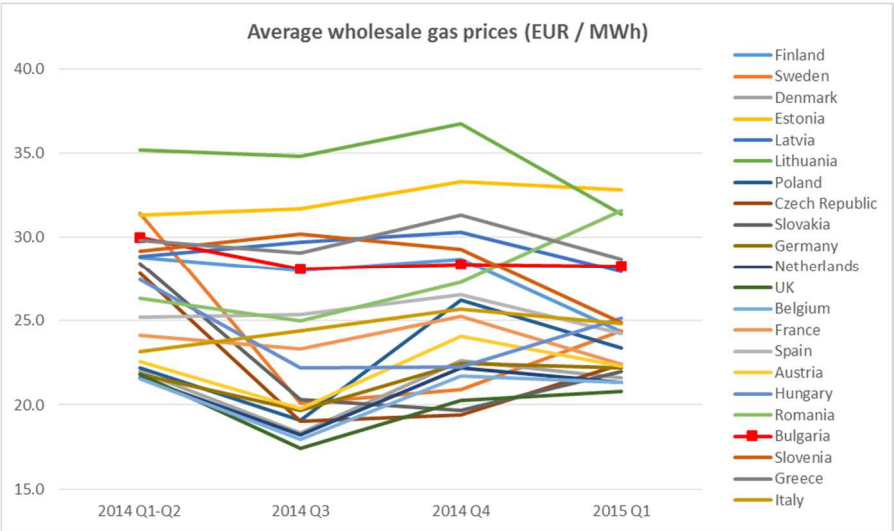
Despite the decreasing trend in the national economy's energy intensity[6], Bulgaria still has the highest values among the CEE states, and has 4 times a higher rate of consumption than the EU28 average in 2013. Nonetheless, despite the negative effect on employment in Bulgaria, part of the downward trend is due to the closing or significant reduction of production capacities of the high energy consumption industrial enterprises in last fifteen years (e.g. metallurgy and chemical sector). The historically high economic intensity on energy can be attributed in part to the rent seeking model of business development; where the traditionally low prices of energy resources have not, until recently, exerted a push on the enterprises to improve their energy efficiency, and therefore have suffered a lack of investment and modernization of industry.

Energy intensity statistics

II. Challenges in security of energy supply

Gas supply

The affordable gas supply is the most sustainable energy alternative for Bulgaria, especially if it replaces coal and wood as the main heating source in the residential sector. Bulgaria depends on imports for approximately 90% of its natural gas needs, with the domestic production accounting for the remaining 10%. The entire gas import comes from a single country through one route – Russia through Ukraine, and is imported under long-term contracts with Gazprom. Although the source and route diversification of the gas supply have been identified as one of the major energy security risks for Bulgaria in last five years, only modest progress has been achieved since the Russian-Ukraine gas supply crisis in 2009, which resulted in paying some of the highest natural gas prices in the EU. The historically high prices contributed to minimal progress in the level of gas consumption within the country, particularly in the residential sector, where only 0.68% of the households used gas as their main heating source in 2011.[7]



Source: Quarterly Gas Market Reports, European Commission, DG Energy, Market Observatory for Energy, https://ec.europa.eu/energy/en/statistics/market-analysis

[5] Data for energy efficient technologies in the residential buildings have been collected within the Census 2011 by the National Statistical Institute.

[6] Measured as gross inland consumption of energy divided by GDP (kg of oil equivalent per 1 000 EUR).

[7] National Statistical Institute, Census 2011, http://www.nsi.bg

This is confirmed by the IHS estimation that only 6% of the country's total demand in 2012 is generated by the residential sector.[8] The complete lack of gas distribution infrastructure in the cities of Bulgaria and the relatively high retail gas prices, as compared to the prices of wood, coal, and electricity, make the required investment for the gasification of a given residential building considered as too expensive, and economically not viable by the majority of population. In addition, the monopolistic structure of the national gas supply and distribution market provides ample opportunities for lack of transparency and rent-seeking behavior of state actors. The bulk of information regarding the transit of gas through the country (tariffs, taxes, fees, and revenues) is also not publicly available. The decision of the Bulgarian government to leave the transit fee revenues with Bulgartransgaz EAD infuses an additional element of non-transparency. It prevents state authorities and taxpayers from overseeing what part of the payments go to the company for the actual transportation of gas, and what share goes towards royalties to the state for using its territory for transit.[9]

Bulgaria has only 2 bcm conventional gas reserves, but significant shale gas reserves relative to the size of the gas market. Regarding the conventional reserves, in April 2015, the Ministry of Energy of Bulgaria launched two tenders for oil and natural gas exploration rights for Block 1-14 Silistar and Block 1-22 Teres, located in Bulgaria's Black Sea continental shelf. However, the potential of the two blocks have not been estimated as being of strategic importance for improving the country's dependence on imports. Regarding the unconventional gas sources, according to the latest assessment by the US Energy Information Administration, there are recoverable reserves of shale gas amounting for 453 bcm in the Dobrudja shale basin.[10] However this was not confirmed by local authorities due to the lack of an official national study. After the initial steps towards shale gas exploration made by the state, in January 2012 Bulgarian Parliament unexpectedly imposed a moratorium on the exploration of shale gas as a result of environmental protests expressing concerns about the possible damaging effects of hydraulic fracturing on the underground water and fertility of the soil in the Dobrudja region. The sudden shift in the shale gas exploration policy revealed the lack of a strategic vision in the national energy policy and provoked suspicions of the state being influenced by private (in this case – foreign) economic interests.

Gas net import statistics

The existing import and transit gas pipeline systems are physically separated on the Bulgarian territory and is effectively reserved by contract for Gazprom's use until 2030; although Gazprom agreed to the use of the transit pipeline by Greece in South-West Bulgaria for regional supplies. After the South Stream project was unofficially frozen by the Russian state in December 2014, Russian and Turkish officials announced the effective stop of the so called "Turkish Stream," which was claimed by Russia to substitute for the Bulgarian-Serbian section of the South Stream pipeline. Given the fact that Russia has never officially terminated the bilateral contract for the South Stream development, there were some initial signs that the project would be restarted. Meanwhile, Bulgaria announced plans for building four interconnectors to all neighboring countries – Serbia, Romania, Greece, and Turkey; to include ensuring reverse flow of the existing networks with the last two countries. As the Bulgarian interconnectors are seen as improving not only the national, but also the regional energy security, the EU has provided ¼ of the required funding, which makes them particularly cost-effective for Bulgaria despite the question of ensuring gas supplies over the planned networks. However, until recently there are no (publicly announced) independent cost-benefit analysis for the different options, and there is no prioritization of

[8] Cited in CSD. (2014). Energy Sector Governance and Energy (In)Security in Bulgaria. CSD Reports #30, Sofia, pp.114, p. 63, http://www.csd.bg/artShow.php?id=16984

[9] For a detailed analysis of the market structure, liberalization process, development of pipeline projects and local production, storage and usage of conventional and unconventional gas, see CSD. (2014). Energy Sector Governance and Energy (In)Security in Bulgaria. CSD Reports #30, Sofia, pp.114, p. 49-64, http://www.csd.bg/artShow.php?id=16984

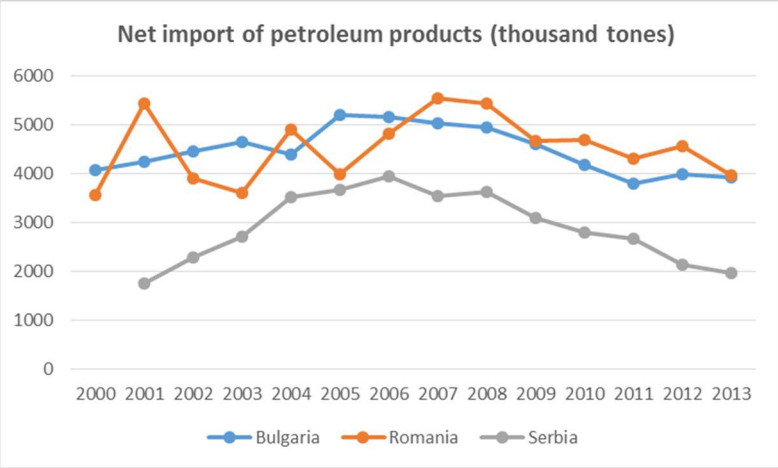
[10] US Energy Information Administration. (2014). Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 14 regions Outside the United State

the concurrent interconnectors projects, which have increased the non-transparency and frequent inconsistencies in the government decision making; respectively resulting in increased energy security risks.

Oil supply

For the supply of oil, Bulgaria is entirely dependent on imports; nearly 99% of the crude oil is imported and the country's oil reserves are minimal at around 15 mln barrels. Since 2000, on average Bulgaria imports annually about 7.5 mln tons of petroleum products with a slow but stable increase of 38% in 2013. The import of crude oil is respectively around 5.9 mln tons per year, but after peaking in 2005-2009 reaching 6.7 mln tons, the amount in 2013 returned to the level at the beginning of the period. About 80% of the imported crude oil is of Russian origin, and the entire country's oil import is processed in the Lukoil's Neftohim refinery, which is the biggest in the Balkans.

Oil net import statistics



Source: Own calculations based on EUROSTAT data – oil exports and imports [nrg_133a], [nrg_123a]

The detailed analysis of the national oil market revealed that despite the formal liberalization of the sector, there is a high concentration of market power which influences both the price formation and top level policy decision making. The political protection and state capture have remained at very high levels, irrespective of the changes in the ruling parties and governments throughout the years, the episodic efforts of some state authorities (e.g. Commission for Protection of Competition and National Revenue Agency) to impose stricter controls and to improve the public accountability of Lukoil.[11]

III. Financial outlook and governance of the state-owned energy enterprises

In Bulgaria the state-owned energy enterprises (SOEEs) represent a significant part of the energy sector and de-facto determine its outlook. The governance of the SOEEs is directly influenced by the political decision making, distorting the independence of the single enterprises and the national regulator. The financial situation of the SOEEs continued to be problematic in 2013 and 2014, and the main problems remained to be the intra-system indebtedness, the unresolved issues that generate everyday financial losses (particularly for the National Electric Company EAD /NEC/), and the inefficient governance.

The overview of the financial performance of the companies for the period 2007-2013 shows that NEC EAD[12] and ESO EAD are loss-making companies for 2012 and 2013; while Bulgargaz EAD improved its financial results after four year of losses and a registered small profit of EUR 31.8 mln for 2013. Both NEC and Bulgargaz financial results are dependent mostly on the regulated prices for electricity and natural gas that are still being kept artificially

Bulgarian SOEEs key financial ratios

[11] See more in: CSD. (2014). Energy Sector Governance and Energy (In)Security in Bulgaria. CSD Reports #30, Sofia, pp.114, p. 65-68, http://www.csd.bg/artShow.php?id=16984

[12] EAD means single-owner joint stock company. All state-owned energy companies are part of the Bulgarian Energy Holding EAD, which is owned by the Bulgarian state through the Minister of Energy.

low due to political reasons. Moreover, in the case of NEC the negative financial results are due to the enormous overloading with long-term debts for developing large infrastructure projects such as NPP Belene and Tsankov kamak HPP. The expected financial results of both enterprises for 2015 and beyond continue to be negative. In the case of NEC, due to the fact that the regulated prices for households and small business customers are 54% lower than the prices paid by NEC for the energy.[13] The financial report confirms that for the first half of 2015, NEC accumulated losses of EUR 421.7 mln from selling electricity.

The key financial ratios of the SOEEs for the observed period revealed that in addition to NEC, ESO and Bulgargaz, the coal-fired Maritsa East 2 TPP and Mini Maritsa East coal mines are also in very difficult financial situations. All of the companies show deterioration of their current and quick ratios that revealed their inability to pay off their obligations if they were demanded, as well as the very limited access of the companies to liquidate assets, which would result in a need for additional external financing if they were to pay creditors. Adding to this, the long-term debt to total assets ratio of all of the mentioned companies have still revealed the enterprises' problematic situation regarding their long-term debt and the ability to reduce it. In general, the deterioration of the financial results of all these companies after 2007 have continued until recently, and their abilities to recover are significantly eroded.

Much more positive are the financial results of NPP Kozloduy and especially of Bulgartransgas. The latter is the champion among the Bulgarian SOEEs in terms of both short and long-term financial stability. However, their future opportunities are often undermined by the practice of BEH to redistribute from better performing companies to poor performers. In addition, according to the law there is a mandatory payment of 80% of the dividends by profit-making companies to the budget, which financially undermines both the company itself and BEH; and thus reduces their ability to invest. The lack of transparency and public accountability regarding the deals and financial flows among the companies within BEH increase the risks for the holding's governance, especially in terms of suspicions of political influence and protection of private interests over others.

[13] "NEC ended the first half of 2015 with a final loss of BGN 176 785 mln." http://3e-news.net/%D0%B1%D1%8A%D0%BB%D0%B3%D0%B0%D1%80%D0%B8%D1%8F/%D0%BD%D0%B5%D0%BA-%D0%BF%D1%80%D0%B8%D0%BA%D0%BB%D1%8E%D1%87%D0%B2%D0%B0-%D0%BF%D1%8A%D1%80%D0%B2%D0%BE%D1%82%D0%BE-%D1%88%D0%B5%D1%81%D1%82%D0%BC%D0%B5%D1%81%D0%B5%D1%87%D0%B8%D0%B5-%D1%81%D1%8A%D1%81-%D0%B7%D0%B0%D0%B3%D1%83%D0%B1%D0%B0-%D0%BE%D1%82-176-785-%D1%85%D0%B8%D0%BB-%D0%BB%D0%B2_44298