

## SERBIA: NATIONAL ENERGY SECURITY INDICATORS AND POLICY CHALLENGES

### Country factsheet

#### SERBIA'S ENERGY SECURITY COMPONENTS:

- **Availability of resources:** Serbia is an energy poor country, which is (with the exception of coal) largely dependent on imports of energy resources. The country has very limited oil and gas reserves amounting to 77.4 million barrels and around 4.8 billion cubic meters, respectively. At the moment the only available gas sources in Serbia are the production on local gas fields in Vojvodina and import from Russia via Hungary and Ukraine (Beregovo metering station)<sup>1</sup>. Local gas production satisfies less than 8% of Serbia's needs and despite some exploration activity since 2010, it is hard to expect that existing production could be significantly increased. The share of imports in crude oil supply has dropped by more than a third in the past three year on the back of renewed exploration activity by the national oil and gas major, Naftna industrija Srbije (NIS), reaching 58% by the end of 2013. However, due to the high share of coal and hydro power in the overall electricity mix, Serbia is one of the least energy dependent countries in Southeastern Europe. Coal, mainly domestic lignite, represents a 53% share of the gross inland consumption of energy<sup>2</sup>. Although the government had adopted some limited policies since 2009 for incentivizing the development of renewable energy sources such as wind and solar, (excluding hydro power) the power generation from renewable energy sources is practically non-existent. Despite the still large imports of oil and gas, Serbia is one of the least energy dependent countries in the SEE region. Less than a quarter of the country's final energy consumption is satisfied by imports. Yet Serbia faces the challenge of falling domestic oil and gas production in the production, which is likely to be replaced by more imports as the economy remains very energy intensive with little immediate prospects for a renewable energy boom similar to Romania and Bulgaria.
- **Reliability of supply:** The concept pertains to the protection of energy services from interruption. Most commonly, countries strive to enhance energy reliability through: 1) diversifying the supply sources and the supply chain; 2) stockpiling on additional storage capacity and emergency stocks; 3) reducing the demand for energy; 4) developing a redundant infrastructure; etc. Serbia has been one of the hardest hit countries from the gas supply crisis in 2009 since the country's gas imports are fully dependent on Russia and on one supply route through Slovakia and Hungary. Instead of seeking to diversify its gas supply through the construction of strategic interconnectors with Bulgaria and Croatia, Serbia had remained an energy island that has devoted most of its political efforts in promoting Gazprom-led pipelines such as South Stream and, most recently, Turkish Stream. Meanwhile, inadequate investment in grid capacity and a diversified sources of power generation

<sup>1</sup> Ministry of Mining and Energy, Serbia: Security of Supply Statement of the Republic of Serbia, Belgrade, Serbia, 2009

<sup>2</sup> Data from the European Energy Community, 2012

has left Serbia highly vulnerable to power shortages as became horrendously obvious during the deadly flooding of the Serbia's biggest coal mine at Kolubara.

- **Environmental sustainability:** Despite the fact that close to a third of all power generation is derived from the country's water resources, power output is still largely dependent on dirty conventional thermal power plants using coal. Around 43% of the electricity generated in the country comes from steam power plants using coal, while another fifth is produced by efficient combined heat and power plants (CHP), part of the large network of district heating companies (DHC), operating in the urban centers of the country<sup>3</sup>. As a result, CO<sub>2</sub> emissions are remaining extremely high despite limited investments in desulphurization and ash filtering technologies. CO<sub>2</sub> emissions per capita are some of the highest in the Central and Eastern Europe (CEE) and around 23% higher than the world average<sup>4</sup>. This is contributing to continuing problems with water and air pollution caused not only by the high dependence on coal for power generation but also the extensive use of wood burning for heating in small cities and village areas.
- **Affordability:** The problem with energy affordability has remained persistent not only in Serbia but in the whole region. Serbians have been heavily exposed to the inability to cover the cost of utilities. Energy deprivation is also predicated upon the spatial and technical limitations associated with switching towards more affordable fuel sources in the households. High energy prices and inability of the governments to adequately compensate the energy poor has heightened the risk of civil unrest or political instability as was visible in the case of Bulgaria. Some parts of the population have had no option other than using wood and coal for heating, which according to the World Bank is an important factor contributing to energy poverty. Unlike Bulgaria where more than half of the population uses solid fuels for heating and cooking, the share in Serbia has hovered around 18%. Yet due to subsidized power tariffs, a growing number of the population had been switching to electricity for heating replacing district heating facilities. However, with residential infrastructure outdated and household energy intensity remaining way above the OECD average, energy costs have skyrocketed. As a result, around 40% of the Serbian population cannot adequately heat their homes<sup>5</sup>.

The historical trend of the Serbian energy security, as measured by the International Index of Energy Security Risk (IIESR)<sup>6</sup>, ranks the country at number 60 among the top 75 energy consumers with only Ukraine from the reviewed countries lagging behind it. IIESR does not have data for Serbia before 2006 but the level of energy security has remained almost unchanged since then. The average risk index number has hovered around 1450, which is well below the OECD average of 912 for 2013. The high index score signifies high energy insecurity manifested by the abysmal share of the fossil fuels import expenditure relative to the GDP; one of the highest energy and carbon intensity rankings; and the relatively high gas import exposure.

## SERBIA'S MAIN ENERGY SECURITY CHALLENGES

### 1. The nexus between energy poverty and low energy efficiency

The Serbian energy intensity is among the highest in Europe. According to the Serbian energy minister, it is around 2-3 times higher than neighboring EU member-states, i.e. Bulgaria and Romania, and 4-5 times higher

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<sup>3</sup> Data from the Eurostat

<sup>4</sup> European Energy Community, 2012,

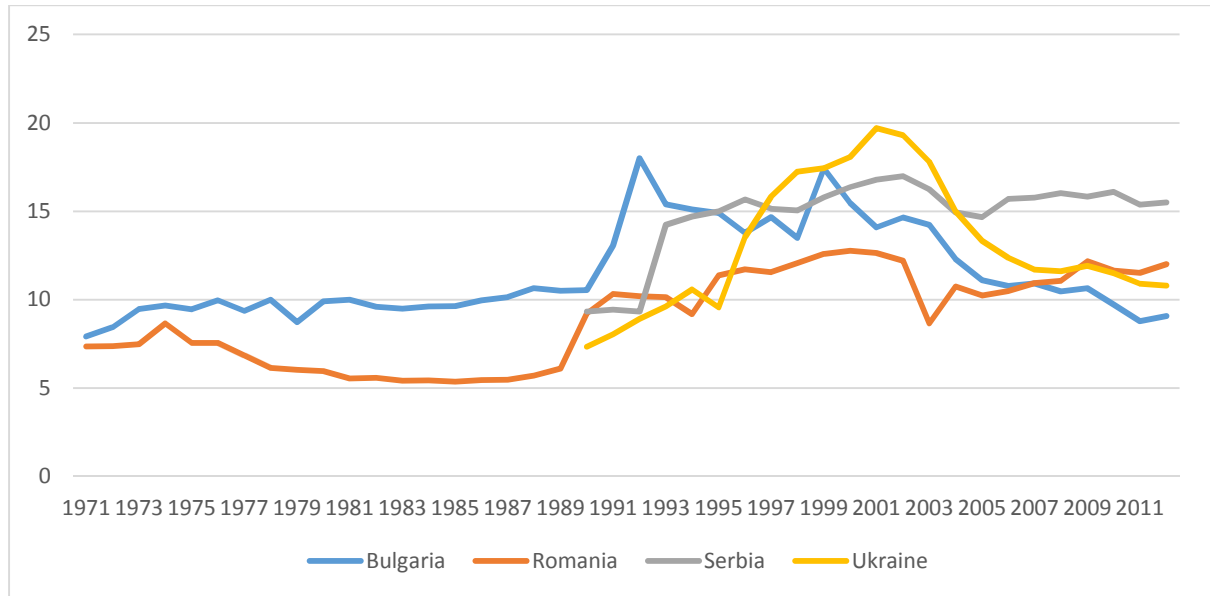
<http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=45&aid=8&cid=regions,&syid=1980&eyid=2011&unit=MTCDPP>

<sup>5</sup> Stadtmüller, Helena (2014). Understanding the link between energy efficiency and energy poverty in Serbia. Heinrich Böll Stiftung.

<sup>6</sup> Institute for 21<sup>st</sup> Century Energy, U.S. Chamber of Commerce, <http://www.energyxxi.org/international-energy-security-risk-index>

than the EU average<sup>7</sup>. This has meant not only very high energy consumption per capita for households and industry, but also very high transmission and distribution losses. All thermal power plants in Serbia are older than 20 years, and the average age of generation units stands at around 35-40 years<sup>8</sup>. The state-owned power generation and distribution company, EPS, plans to decommission 1,100 MW of installed TPP and CHP capacity until 2020<sup>9</sup>. Albeit improving somewhat in the past 15 years, energy losses still make up around 37% of gross inland consumption<sup>10</sup>. In the power sector, more specifically, transformation and distribution losses have remained painstakingly above 15% for the last decade at the background of large improvements in the other three countries in the study. Outdate energy infrastructure and insufficient grid investment are compromising the country's security of supply.

Fig. 1 Electric power transmission and distribution losses (% of output)



Source: World Bank

The situation looks similar in the residential sector where lack of adequate buildings maintenance, limited wall and window insulation and old piping system have exposed persistent inefficiencies. Buildings constructed before 1985 make up the 74% of the residential building floor area when no mandatory energy efficiency standards were implemented. According to official estimates, energy consumption in these buildings is 2-3 times higher than in the newer buildings keeping to the EU energy efficiency building standards<sup>11</sup>. In addition, due to poor insulation and low windows and roof refurbishments, the final energy consumption for heating is estimated at around 220 kWh/m<sup>2</sup>, higher than the EU average<sup>12</sup>.

As living standards rose in the past decade, so did overall energy consumption in residential buildings. As in Bulgaria a large portion of this increase came from the bigger use of electricity for household heating purposes. According to official estimations, one third of households in Serbia use electricity for heating, but at least another third occasionally use electricity for heating purposes as well. Household consumption in overall power demand has gone above 50% by 2011, while in most of the EU countries, this share stands at under 30%. The switch from district heating to electricity was also prompted by rising natural gas import prices and the wide-ranging subsidies to electricity consumers. Still, more close to 58% of the residential

<sup>7</sup> Solujic, Antonela (2013). Implementation of Energy Efficiency Policy in Republic of Serbia. Republic of Serbia Ministry of Energy, Development and Environmental Protection.

<sup>8</sup> Country Report on Energy Business Serbia. (August, 2014). Balkan Energy News

<sup>9</sup> Ibid

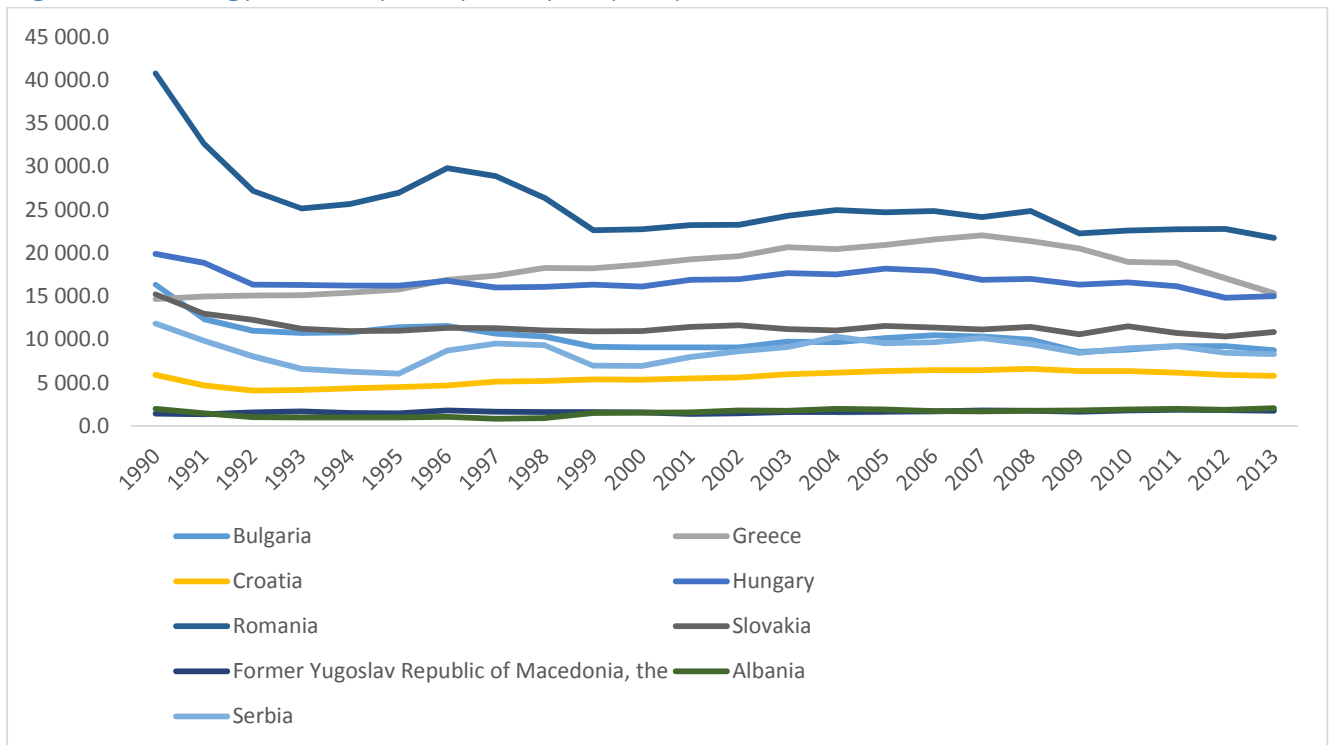
<sup>10</sup> Data sourced from the Eurostat energy balances

<sup>11</sup> The First Energy Efficiency Plan of the Republic of Serbia for the Period from 2010 to 2012 published in July, 2010

<sup>12</sup> Ibid

heating is sources from wood and coal, which are cheaper than district heating and electricity, especially in the smaller cities.

Fig. 2 Final Energy Consumption per capita (TOE)

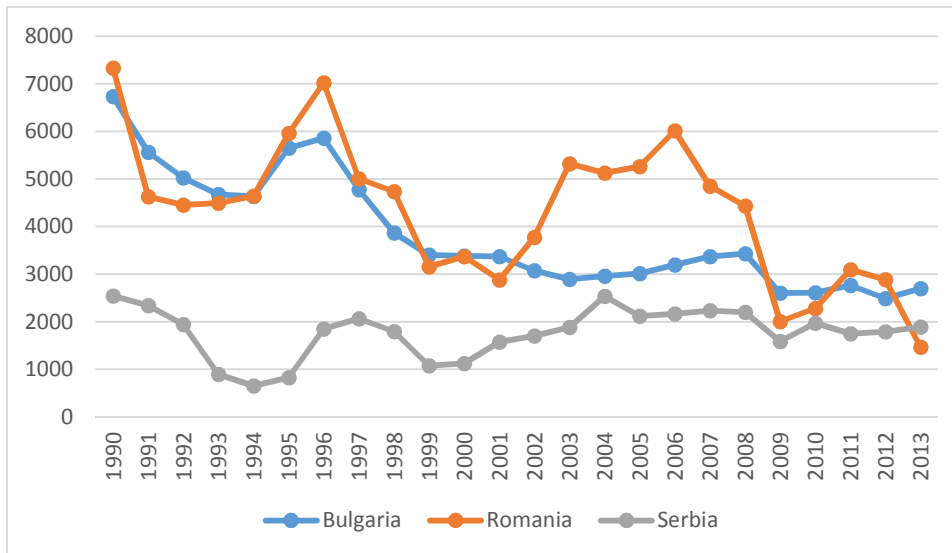


Source: Eurostat

## 2. Internal and External Energy Dependence

The flooding crisis from May, 2014 revealed that Serbia faces a double energy security challenge. On the one hand, the country is heavily dependent on one source of power generation (70% of its power generation comes from a few behemoth coal-fired power plants), and, on the other, it is dependent on the import of electricity and gas from a limited number of suppliers. As the largest coal mine in Serbia, Kolubara, became flooded by heavy rainfall, the state-owned EPS company faced large scale coal shortages for its large TPPs, which automatically turned into blackouts across the country. The deficit in electricity generation was compensated by expensive imports from Bulgaria that were still not enough to satisfy the domestic electricity consumption. Despite an ambitious Action Plan for introducing renewable energy sources in the power system through preferential feed-in tariffs, Serbia has used very little of its massive renewable energy potential and is unlikely to reach its 2020 goal of raising the share of renewable energy in power production from 29% today to 37% in 2020.

Fig. 3 Net Gas Imports in selected countries



Source: Eurostat

Serbia is also largely dependent on the import of natural gas from Russia via Hungary. Russia’s state-owned Gazprom is also the majority shareholder in the country’s largest energy company, NIS. The latter has firmly supported large-scale gas pipeline projects promoted by Russia instead of seeking diversification options via interconnectors with Croatia and Bulgaria. Not surprisingly, Serbia pays one of the highest gas import prices in Europe, which has dissuaded local residents from pursuing domestic gasification and has pushed them out of the district heating systems in large urban centers. Serbia has improved its short-term gas security profile by opening its newly constructed Bantski Dvor UGS storage facility in 2011 with Gazprom as the main shareholder. However, unless it is able to connect to potential Azeri gas supply via the Bulgaria-Greece interconnector and LNG deliveries from an upcoming regasification terminal in Croatia, Serbia is likely to remain dependent on Russian gas supply in the next 5-10 years. The regional effect of UGS Banatski Dvor would remain limited due to its Russian supply.

### 3. Liberalisation and Unbundling of the Energy Market

The Serbian energy sector is dominated by two vertically-integrated energy companies, Elektroprivreda Srbije (EPS), and Naftna Industrija Srbije (NIS), which are the largest power producer and distributor, and the largest oil and gas producer, importer and distributor, respectively. Elektromreža Srbije, EMS, is the country’s only electricity transmission and transmission system operator. Despite significant steps in the implementation of the 3<sup>rd</sup> Energy Liberalisation Package of the EU, the government has so far failed to fully unbundle the ownership of the power supply and distribution companies. De-jure separation of the ownership of EMS and EPS have been implemented in line with the EU acquis but de-facto separation of control is yet to be implemented.

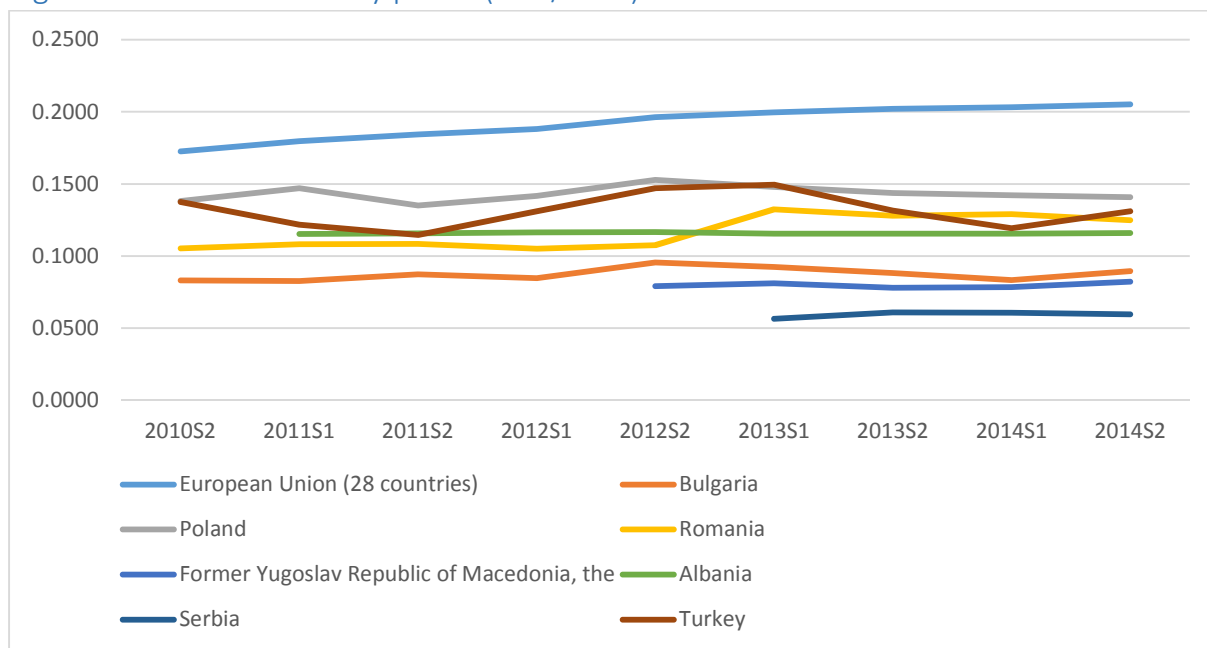
Despite having a diversified retail power market consisting of many traders and a liquid power trading with neighboring countries, EPS remains by far the largest producer and supplier of electricity to the market<sup>13</sup>. The partial liberalization from 2013 and 2014, which forced the largest industrial consumers, to exit the regulated market, was met with resistance as the businesses faced higher power tariffs due to high balancing market costs. One solution to the problem of high balancing market costs will be the founding of the South East European Power Exchange (SEEPEX), which is likely to couple the Serbian day-ahead market with suppliers from Montenegro, Macedonia and Republic of Srpska (RS) in Bosnia from November, 2015. However, it

<sup>13</sup> Country Report on Energy Business Serbia. (August, 2014). Balkan Energy News

remains to be seen how liquid the power exchange will be as the trust in the institution and the business' reluctance to join the unregulated market undermine its liquidity and efficiency.

Liberalisation has been lagging also on the regulated market where the national energy regulator (AERS) has preserved artificially low power tariffs for households. Households in Serbia pay around EUR 5 cents per KWh, which is four times lower than the EU average, and almost twice lower than neighboring Bulgaria and Romania<sup>14</sup>. The government initiated a third wave of liberalization of the power market from 1 January, 2015 allowing households to freely choose their power supplier. However, the preservation of the fixed subsidized prices charged by EPS has so far stemmed any competition prompting households to shift to a different supplier. The European Commission has criticized the progress towards liberalization and has urged the government to bring power tariffs closer to market levels. A critical precondition for this to happen is to ensure the independence of the energy regulator, still largely influenced by the government's insistence to maintain social peace.

Fig. 4 Household electricity prices (EUR/KWh)

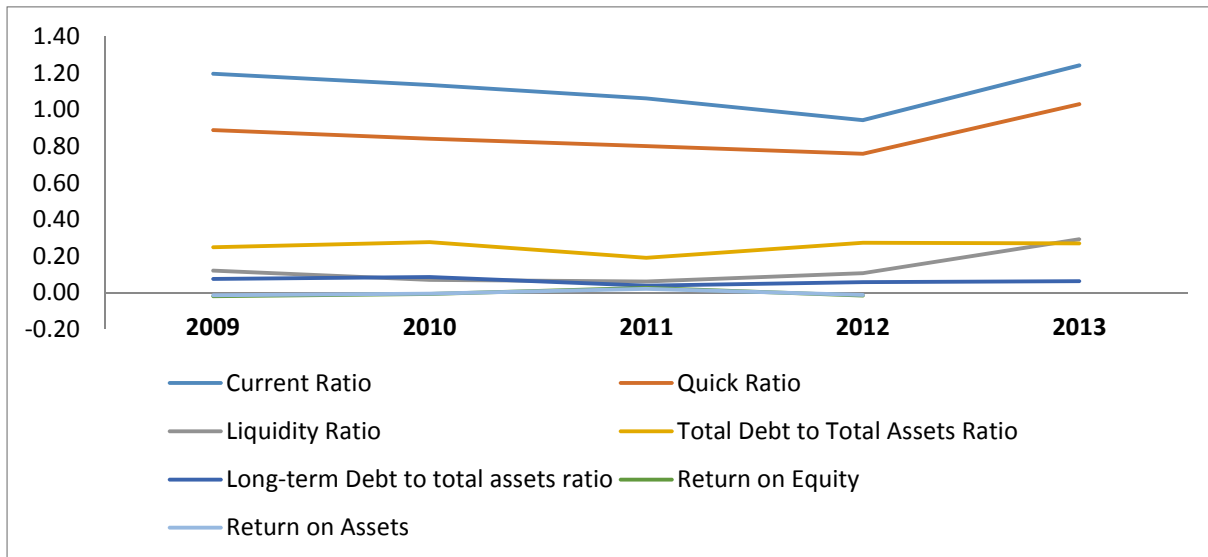


Source: Eurostat

Unlike in Bulgaria where regulated household tariffs have placed the state-owned supplier under an immense financial pressure, in Serbia, the vertically-integrated monopoly, EPC, remains a largely sustainable company as visible in the main financial indicators. The company's net profit rose by 36% to USD 24.7 million in 2014 despite the decline in power output amid the massive flooding. The government has also embarked on a difficult restructuring process unbundling the mining and power producing units, and creating the EPS Supply wholesaler selling to industrial consumers. The government has also signaled partial privatization to a multi-national energy company to improve management efficiency. The government has also mulled the restructuring of the SOE in a joint stock company, where at first only the Serbian state will be a shareholder. An asset evaluation and partial conversion into capital would improve EPS' ability to sell equity and finance new projects.

<sup>14</sup> Eurostat Datasets on energy prices

Fig. 5 Key Financial Indicators of the state-owned EPS power monopoly



The other state-owned behemoth, NIS, has also seen its finance improve significantly since its EUR 400 million takeover by GazpromNeft in 2009. From generating losses of around USD 50 million per year, the new management has turned profit of over USD 300 million in 2013. Most of it has come on the back of a USD 750 million investment spree on the Novi Sad and Pancevo refinery modernization and oil output expansion. GazpromNeft has expanded NIS presence in the whole region including in Bosnia, Bulgaria and Romania upgrading its refinery capacities to fulfill the stringent EU environmental standards. Despite the significant debt the company had incurred over the last five years, its total debt to assets ratio remains way below the minimum threshold of 1. The most acute risk the company has been facing are the probes by the prosecution into alleged corruption surrounding the sale of 51% stake in the company by the then-government of president Tadic. Civil society and energy experts have speculated that Gazprom has pressured the government into selling NIS at a below-market price in exchange for building the South Stream gas pipeline, which was suspended in late 2014. The deal included also the signing of a 30-year gas supply contract with the Russian company that has limited the government's options for energy supply diversification.