Multidimensional Approach to the Energy Security Analysis in Belarus

Mykhaylo Salnykov, BEROC
September, 2011

Energy security is a complex phenomenon incorporating a variety of economic, social and environmental aspects. This brief outlines fundamental aspects of energy security in Belarus that decision makers, policy analysts and the general public should be aware of when trying to understand the consequences for energy security of existing and suggested policies as well as other domestic and external factors. The paper pays special attention to the economic dimension of energy security (such as energy intensity of the economy and diversification of energy sources), international and geopolitical dimension (diversification of energy suppliers and use of the hydrocarbon pipeline system) as well as environmental considerations (actual and prospective environmental impact of the energy consumption and production).

Energy security is an issue of primary concern for decision-makers worldwide. This is especially true in many post-Soviet countries, where the current dependency on Russian energy imports is being reinforced by the high energy intensity of these economies – a legacy of the energy inefficient Soviet technologies coupled with a lack of technological modernization over the past two decades.

Belarus, a landlocked country with a population of 10 million people, is one of the countries struggling to solve an energy security puzzle in the midst of perturbations of the energy markets and important changes in regional geopolitics.

Belarus' economy has been growing steadily in the early 2000s with an impressive 7.7% average annual GDP growth – a figure surpassing the economic performance of its closest post-Soviet neighbors, Ukraine (7.6%) and Russia (7.5%). The 2010 economic crisis resulting in substantial downturns in Ukraine (-15.0%) and Russia (-7.9%), had very mild impact on the Belarusian economy, which grew 0.2% in 2010.

Despite the apparent robustness of the Belarusian economy as compared to its neighbors, the crisis revealed a major weakness of the Belarusian economic model, the country's utmost dependence on economic and political relations with Russia. Belarus is trying to move away from the Russia-centered economic model, in an attempt to diversify the sources of its economic growth. Not surprisingly, Russia is using a number of economic and political levers, of which oil and natural gas are the most important ones, in an attempt to tame a rebellious ex-vassal.

As a result, Belarus recently faced a variety of new energy challenges that must be successfully tackled for the country to preserve its political and economic independence.

The Belarusian Economic Growth Drivers

Belarusian economic growth in the late 1990s-early 2000s was primarily driven by the combination of three main factors: (*i*)

The Forum for Research on Eastern Europe and Emerging Economies (FREE) is a network of academic experts on economic issues in Eastern Europe and the former Soviet Union at BEROC (Minsk), BICEPS (Riga), CEFIR (Moscow), CenEA (Szczecin), KEI (Kiev) and SITE (Stockholm). The weekly FREE Policy Brief Series provides research-based analyses of economic policy issues relevant to Eastern Europe and emerging markets.

privileged access to Russian markets for Belarusian industrial and agricultural exporters and energy importers; (*ii*) preferential support of the enterprises and sectors with a large state share, especially those producing for export, and (*iii*) governmental policies on wage and price control, which resulted in temporary cost advantages for traditional exports (WB 2005). These factors were reinforced by the low capacity utilization that experienced a sudden drop in the early 1990s as the Soviet Union collapsed.

Immediately prior to the 2010 economic downturn, productivity growth was the main driving force of the industrial growth in Belarus (WB 2010a). For most economies in transition, productivity growth is driven by (i) productivity increases within the firms and (ii) labor reallocation. In Belarus, most of the productivity increase occurred due to the former driving force. Recent data show that productivity growth is slowing down – a sign that productivity improvements has so far been gained through "low hanging fruit" type of investments, but these are now coming to an end. (WB 2010a).

Productivity growth in 2004-2008 was reinforced by increasing capacity utilization from approximately 45% in 1996 to 57% in 2004 to almost 70% in 2009. Yet, it is commonly perceived that most of the underused capacities are outdated and need rehabilitation or replacement. Thus, the actual figures of the unused capacities may be well inflated. Therefore, the years of reclaiming unused capacities will soon become history, and Belarus is gradually approaching a point at which output growth would require either costly capacity expansion or increase of capacity-usage efficiency. Of these two alternatives, improvements in energy efficiency are the one that does not show signs of being exhausted in the near future.

Belarusian energy efficiency increased by nearly 50% between 1996 and 2008 as the government began designing and enforcing a comprehensive energy efficiency policy. The measures included among others (*i*) establishing a Committee for Energy Efficiency in 1993, which evolved into Energy Efficiency Department of the Committee for Standardization with a mandate to develop and implement the energy efficiency improvement strategy; (*ii*) substantial financing, amounting to USD 4.2 billion in 1996-2008 and USD 1.2 billion in 2008 alone ; (*iii*) political commitment to energy efficiency, as illustrated by two National Energy Savings Programs approved in 1996 and 2001 respectively and the 1998 Law on Energy Savings (WB 2010b).

Currently, Belarus' energy intensity is the lowest compared to the neighboring CIS countries (see Figure 1). Specifically, in 2008 Belarus used 1.17 tons of oil equivalents (toe) to produce USD 1,000 of its GDP – a substantial advantage compared to Ukraine's 2.55, Russia's 1.60 and Moldova's 1.50 toe/USD 1,000. Yet, despite substantial recent progress and good standing in its regional sub-group, Belarus is still far from its energy efficiency potential, as showed by comparison with the closest Western neighbors: Poland and Lithuania use respectively 0.41 and 0.46 toe/USD1,000 (IEA 2010). Economic modeling suggests that a baseline scenario of 50% decline in energy intensity within the next decade would be a source of an additional annual GDP growth by 3.5-7%.

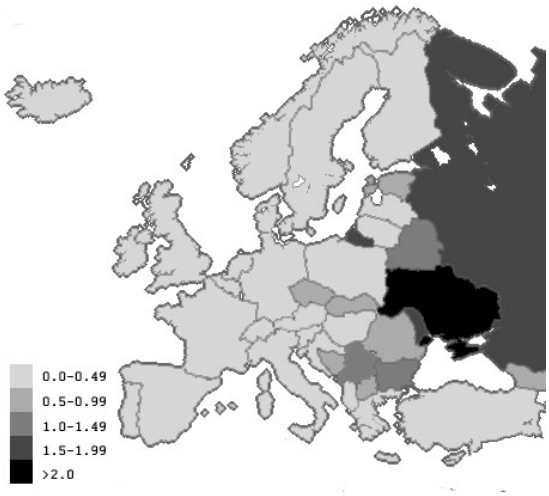

Figure 1a. Energy intensity in Europe (tons of oil equivalent TPES per USD1,000 GDP), 2008. *Source of data: IEA, 2010.*

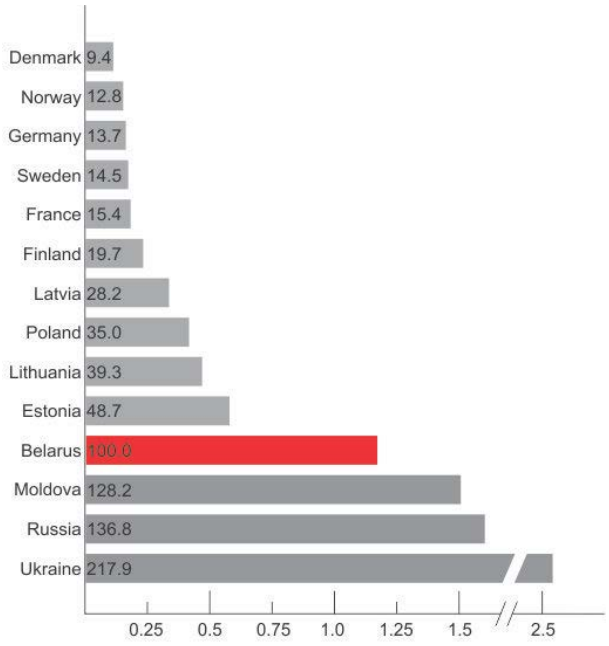

Figure 1b. Comparison of energy intensity, 2008. Numbers on the bars denote a percentage of the energy intensity of Belarus. *Source of data: IEA, 2010.*

Currently, as implicit subsidies from Russia in the form of cheap oil, natural gas and electricity diminish, economic growth induced by the productivity increase, and capacity reclaiming is being exhausted, it becomes apparent that the search for new sources of economic growth must incorporate energy security considerations.

Overview of the Energy Security Dimensions in Belarus

Energy security is a multidimensional issue, which requires considerations with respect to:

- Primary energy sources distribution
- International trade and the geopolitical context
- Impact of energy on the environment

I will review them in turn.

Primary Energy Security Dimensions in Belarus

A reasonable diversification of energy sources results in a more sustainable energy model of the economy.

Currently Belarus' primary energy source is natural gas, which accounts for 63% of its energy supply (see Figure 2). Natural gas is primarily used for heat production (55% of the total natural gas supply) and electricity production (20%). Over 80% of Belarusian centralized heating stations use natural gas and nearly 95% of electric energy in the country is produced with natural gas as primary fuel.

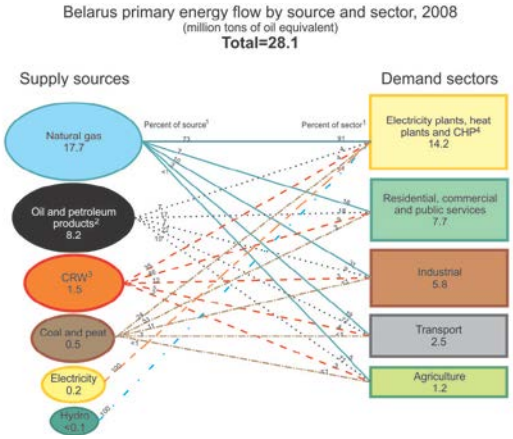

Figure 2. Energy balance of Belarusian primary energy flow by source and sector, 2008. *Source of data: http://www.iea.org/stats/*

Notes: [1]Percent scores may not add up to unity due to independent rounding, other omitted uses and secondary supply sources. [2]Net of exports. [3]Combustible renewables and waste. [4]Combined heat and power plants.

The second biggest share (29%) is crude oil and petroleum products, mainly used in the transport sector as well as the residential, commercial and public services sectors. All other primary energy sources account for less than 10% of the total primary energy supply. Renewable sources of energy are virtually unused in Belarus.

In sum, the analysis of the Belarusian energy balance reveals a disproportionately large share of natural gas use, especially in electricity and heat generation. It is therefore

clear that, in the context of emerging tensions over the imported Russian natural gas, substantial changes in the electricity and heat generation sector will be needed.

International Trade Considerations and Geopolitical Context

Belarus produces only 14% (4 Mtoe per year) of its total primary energy demand and nearly 15% of its oil and gas consumption, thus being totally dependent on fossil fuels imports from Russia. Prior to the escalation of the conflict with Russia, almost the entire demand for natural gas and oil was satisfied by Russian imports at discounted prices, which was often viewed as an implicit subsidy of the Belarusian economy. Currently Russia is reducing these implicit subsidies by narrowing the gap between prices charged to Belarus and to the EU.

An important difference between natural gas imports and oil imports is that while natural gas imports are entirely consumed by the Belarusian domestic market, a large share of crude oil imports is processed and exported as petroleum products (see Table 1). Therefore, while reducing dependency on Russian gas imports may be achieved, to a large extent, by a transition to alternative energy sources and improvements in energy, the same approach is unlikely to work for oil imports, since no transition to other sources of energy is possible for oil refineries and efficiency increase is limited to losses minimization. Thus, the only alternative to reduce dependency on Russian oil imports is diversification of oil suppliers.

In early 2010, the Belarusian government has signed an agreement with Venezuela on continuous supply of crude oil to Belarus. The first delivery was made by a railroad transfer from the Ukrainian sea port of Odessa; the following deliveries were made through the Estonian Muuga seaport and the Lithuanian Klaipeda seaport by railroad. Belarusian government has announced that it expects nearly 4 million tons of Venezuelan oil to be delivered in 2010, and the quantity is expected to grow to 10 million tons (i.e., 42.5% of the current oil imports) in 2011 and onwards. The average price for Venezuelan crude in 2010 was USD645 per ton (compared to USD 402 per ton of Russian oil), according to the national statistics committee.

Land transport of Venezuelan oil from seaports remains the most questionable issue. While railroad transfer proved to be a reasonable intermediate solution, a sustainable and cost-efficient transportation of Venezuelan oil is possible only through pipelines. Although the Lithuanian and Latvian legs of the former Soviet Druzhba pipeline system can be used, they require major investments to allow for reverse transfer from Baltic seaports to Belarus. The Ukrainian Odessa-Brody oil pipeline, in reverse direction, is the most likely route for a large share of Venezuelan oil, as Ukrainian government signed an agreement with Belarus for transfer of 9 mln tons of Venezuelan crude in 2011. Yet, the deal is heavily threatened by Russia which was using the Odessa-Brody pipeline in the opposite direction until 2010 and is losing an important lever of influence over Belarus as the country diversifies its oil imports.

Another crucial energy security consideration from the geopolitical perspective for Belarus is its own pipeline systems (see Figure 3).

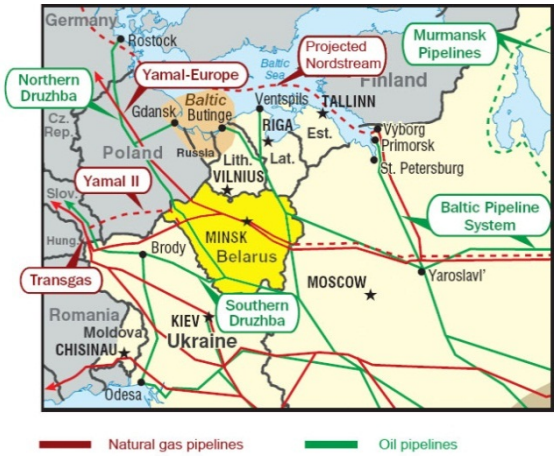

Figure 3. Natural gas and oil pipeline systems in Eastern Europe. *Source*: *http://www.eia.doe.gov/emeu/cabs/Russia/images/fsu_energymap.pdf*

In 2009, nearly 62.2 billion cubic meters of Russian natural gas (36.9% of total Russian natural gas exports to the non-CIS countries) and 89.6 million ton of Russian oil (36.2% of total Russian crude exports) went through Belarusian pipelines. For comparison, Ukraine, another major transfer route for Russian hydrocarbons, transports 95.8 billion cubic meters of Russian gas (56.9% of Russian exports) and nearly 30 million tons of Russian crude (12.1% of Russian exports). Thus, almost the entire (93.8%) Russian natural gas exports as well as a substantial share of Russian oil exports (48.3%) are transported via Ukrainian and Belarusian pipeline systems.

Until recently, Belarusian oil and gas transit capacity has been a powerful lever in its relationships with Moscow. In an attempt to diversify its hydrocarbon export routes, however, Russia has announced the construction of an alternative Nord Stream pipeline system (see Figure 4) in 2005. The two-legged 1,200 km pipeline system will transport natural gas from Russian Vyborg to German Greifswald under the Baltic Sea, thus making it the longest sub-sea pipeline in the world. Each leg has a projected capacity of 27.5 billion cubic meters per year (55 billion cubic meters for the entire system). The first leg is projected to be in full operation by late 2011, the second by late 2012.

Although the Nord Stream transfer capacity is below the annual transfer of natural gas through Belarus, it represents an important strategic instrument in Russian foreign policy to manipulate Belarus and Ukraine as they compete for a residual share of the Russian natural gas transfer. Recent trends in European energy security policy headed towards increase of energy efficiency, diversification of hydrocarbons importers and shale gas revolution will undoubtedly lead to a decrease in the European demand for Russian gas, which, in the worst case scenario, may completely eliminate Belarus from the Russian gas transfer system, as Belarusian and most of the Ukrainian gas pipeline capacity become redundant.

Impact of Energy on the Environment

Belarus lies around the average, both in Europe and in the Eastern European region, when it comes to pollution intensity of its energy use, (see Figure 4). While there is room for improvements in terms of the impact of energy on the environment, this concern is of second order as compared to the above discussion on energy intensity. Moreover, it is believed that improvement of energy efficiency of the economy through implementation of modern technologies will bring along reduction of pollution intensity as well.

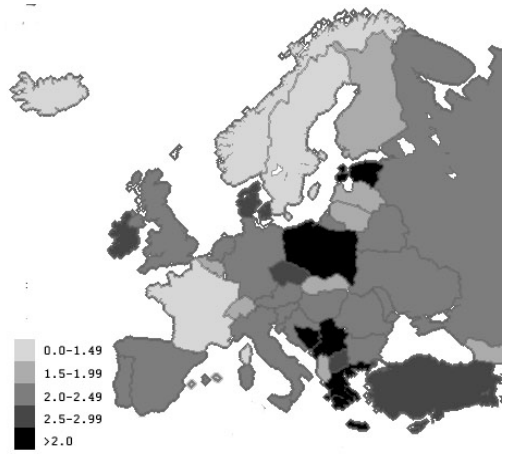

Figure 4a. CO2 intensity of energy use in Europe (tons of CO2 per toe of TPES), 2008. *Source of data: IEA, 2010.*

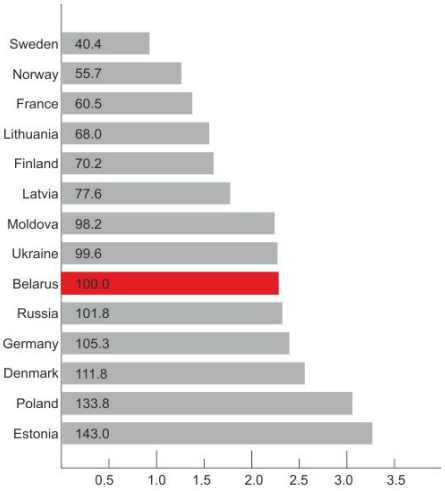

Figure 4a. Comparison of CO_2 intensity of energy use, 2008. Numbers on the bars denote a percentage of the energy intensity of Belarus. *Source of data: IEA, 2010.*

Despite the fact that current environmental implications of energy use are not especially worrisome, Belarus still remains one of the countries that suffered the most severe consequences of the 1986 Chernobyl nuclear power plant accident.

About 20% of Belarusian territory was affected by the accident and nearly 17% of its agricultural land. Costs to the economy are estimated in the order of 32 to 35 times the Belarus state budget in 1985. Nearly 22% of the national budget was spent in 1991 on remediation measures, although the figure has contracted to 6% in 2002 and 3% in 2006%. The total spending of Belarus due to consequences of the Chernobyl disaster over the period 1991-2003 exceeded USD 13 billion.

Besides the direct impacts on health, several social problems followed the worst civil nuclear accident, including the loss of rural livelihoods and outward migration of qualified workforce accompanied by inward migration of unqualified workforce and people who have economic difficulties elsewhere. A significant amount of agricultural land in the area of the radioactive fallout is still unavailable for cultivation. Development of the area remains a challenge, especially in small towns accommodating migrants from outside Eastern Europe, predominantly from Central Asia. Radioactive pollution is still a concern in the affected areas.

Not surprisingly, Belarusian population remains cautious about plans to construct the first nuclear power plant in Astravets, in the Hrodna Voblast, as nuclear power is still considered a source of substantial risks, despite extensive media campaigns and policy assurances on the exceptional nature of the Chernobyl accident.

Concluding remarks

A changing geopolitical context and gradually shifting priorities in the Belarusian foreign policy will undoubtedly affect various dimensions of the energy security of this transitional Eastern European country.

When evaluating consequences of external or internal factors for energy security, it is necessary to keep in mind that this is a complex, multifaceted issue. The main concerns to be considered about Belarusian energy security include primary energy source distribution (diversification of energy sources, especially away from natural gas, and reduction of the economy's energy intensity), international trade and geopolitical context (with a special focus on diversification of energy suppliers and an optimal use of the country's gas- and oil- transporting systems) and environmental considerations of the energy use (related to both actual and prospective impact of the energy production and consumption on the environment). Other dimensions of relevance include social impacts of the energy production and consumption, sustainability of the energy use another important elements beyond the scope of this brief.

The main trends that will alter energy security in Belarus within the coming decade most likely will include the shale gas and liquefied natural gas (LNG) revolution, the launch of the Nord Stream, possibly the construction of the Astravets nuclear plant as well as the effort of Belarus to diversify hydrocarbon suppliers.

In the next part of the analysis forthcoming in the FREE policy brief series I will analyze in detail these and other existing trends and will discuss their potential positive effects and challenges as well as potential measures for addressing the adverse effects in the context of energy security of Belarus.

▪

Recommended Further Reading

Cherp, A, A. Antypas, V. Cheterian and M. Salnykov. 2006. *Environment and security: Transforming risks into cooperation. The case of Eastern Europe: Belarus-Moldova-Ukraine.* UNEP/UNDP/UNECE/OSCE/REC/NATO Report.

Chester, L. 2010. "Conceptualizing energy security and making explicit its polysemic nature". *Energy Policy*, 38(2): 887-95.

CIA (Central Intelligence Agency) 2010. *CIA World Factbook.*

(https://www.cia.gov/library/publications/the-world-factbook/fields/2003.html)

IEA (International Energy Agency) 2010. "Key World energy statistics".

WB (World Bank) 2005. "Belarus – Window of opportunity to enhance competitiveness and sustain economic growth – a Country Economic Memorandum for the Republic of Belarus".

WB (World Bank) 2010a. "Belarus – Industrial performance before and during the global crisis: Belarus economic policy notes."

WB (World Bank) 2010b. "Lights out? The outlook for energy in Eastern Europe and the former Soviet Union".

Mykhaylo Salnykov

Belarusian Economic Research Center (BEROC)

Salnykov@beroc.by

www.beroc.by

Mykhaylo Salnykov is an Academic Director at BEROC. He earned his PhD in Economics at the Simon Fraser University (Canada) in 2008 supplemented by two Masters in Economic Theory (Kyiv School of Economics, 2004) and Environmental Sciences and Policy (Central European University, 2002).

Mykhaylo's primary research interests are in the fields of environmental and natural resources economics, energy economics, applied microeconomics and applied econometrics.