

Multidimensional Approach to the Energy Security Analysis of Belarus Part 2: Economic and Geopolitical Trends

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Energy security is a complex phenomenon incorporating a variety of economic, social and environmental aspects of a country's life. Building on a previous FREE policy brief, published on September 5, which dealt mainly with the situation up until today, this text deals more with the future. It takes a detailed look at existing trends and discusses potential positive effects and challenges to energy security in Belarus. It also provides potential measures for addressing adverse effects of these trends on the country's energy security.

When evaluating energy security consequences of external and internal factors, a decision maker is advised to view energy security as a complex phenomenon. The main components of Belarusian energy security identified in the first part of this paper published in the FREE Policy Brief Series September 5, 2011, include (i) primary energy source distribution (diversification of energy sources, especially away from natural gas as well as reducing the economy's energy intensity), (ii) international trade considerations, (iii) the 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 (iv) environmental considerations of the energy use (related to both actual and the perceived impact of the energy production and consumption on the environment).

Other dimensions of energy security also include the social impact of energy production and consumption, as well as the sustainability of energy use.

Below I provide a detailed look at these and other existing trends. Potential positive effects and challenges in the context of energy security of Belarus will also be discussed. Finally, potential measures of addressing adverse effects of these trends on the country's energy security will be suggested.

Main Energy Security Challenges for Belarus in 2011-2020

The following components of the energy security of Belarus are considered to be of primary importance:

- Reducing energy intensity of the economy;
- Diversification of energy sources used in heat and power generation, especially diversification away from natural gas consumption;

- Diversification away from Russian fuel imports;
- Securing stable operation of gas and oil pipeline systems close to full capacity;
- Reducing impact of energy production and consumption on the environment.

The main trends in Belarusian and regional policy and economy, as well as their impacts on the aforementioned components of energy security are the following:

- Natural shale gas and liquefied natural gas revolution in Europe;
- Launch of the Nord Stream gas pipeline system in 2011-2012;
- Construction of nuclear power plant station in Astravets;
- New suppliers of hydrocarbons to Belarus.

I will purposefully not discuss important topics as carbon-free technologies development in Belarus, participation in the international carbon-reduction dialog, etc., since these trends are unlikely to become anything close to significant determinants of the Belarusian energy security puzzle within the next decade.

Natural Shale Gas and LNG Revolution in Europe

Recent developments in the technology of natural shale gas extraction in Europe and elsewhere, bring a lucrative prospect of boosting the world's natural gas supply. Several of the European countries, including Austria, Germany, Hungary, Poland, Sweden, Ukraine and United Kingdom have announced plans to study fields with shale gas extraction potential. This could secure European gas supplies, drive gas prices in Europe down, and diversify European imports away from Russian natural gas. The natural shale gas extraction development factor will be further reinforced by the increased volumes of the

LNG imports to Europe from the Americas and Northern Africa.

Contraction of gas prices in the European market will positively affect Belarusian economy as natural gas imports from Russia will become less expensive even if no active steps by the Belarusian government are undertaken. Nevertheless, the natural shale gas and LNG revolution will also widen the body of potential importers of natural gas via pipelines from Poland and Ukraine and by sea freight from seaports in the Baltic States. Specifically, in the summer of 2010, the Belarusian government announced having plans of negotiating a possible construction of a Belarusian LNG terminal in Lithuanian Klaipeda. This terminal is projected to have an annual capacity of five to eight billion cubic meters of natural gas which would be transported to Belarus via the pipeline system.

The shortcoming of the lower prices for natural gas and diversified body of importers in Europe is a reduced demand for Belarusian natural gas transit capacity as Russian exports to Europe contract. Moreover, potential transportation of shale gas from Poland via the pipeline system (see Figure 1) is likely to conflict with the Russian gas transit going into the opposite direction. From an economic perspective, it is very likely that benefits for Belarus obtained from lower gas prices will overweight potential losses from the reduced transit of Russian natural gas to Europe.

Figure 1. Natural gas and oil pipeline systems in Eastern Europe.



Source:

http://www.eia.doe.gov/emeu/cabs/Russia/images/fsu_energymap.pdf

From a political perspective, Belarus losing its role as a transit country would substantially weaken its position in foreign relations with both Russia and Europe.

A possible side effect of the lower prices for natural gas is reduced incentives for the Belarusian government to reform power and heat generating sector and contract the energy intensity of the economy. While the former outcome may be economically justified by lower gas prices and diversified sources of natural gas in the new economic environment, the latter raises serious concerns over the pace of economic modernization in the country.

On the other hand, the environmental impact is mixed. While lower incentive to modernize the economy could result in a slower progress of lowering the pollution intensity in energy use, increased incentives to use natural gas, one of the environmentally friendliest hydrocarbons, would play a positive role in ensuring that the intensity of pollution reduces.

Launch of the Nord Stream Pipeline System

Dubbed by the Belarusian President, Aliaksandr Lukashenka “the silliest Russian project ever”, the Nord Stream pipeline system will allow Russia to redirect 55 billion cubic meters of natural gas (nearly 33% of the current Russian gas exports) via this more direct route to the final consumers. Thus, if European demand for Russian gas stays unchanged, the gas transit through Belarus and Ukraine will drop to nearly 100 billion cubic meters from the current 158 billion cubic meters. The 100 billion cubic meters figure is close to the capacity of the Ukrainian gas pipeline system alone. Therefore, one may hypothesize that in the worst case scenario Belarus may suffer a complete loss of its gas transit revenues.

In fact, even optimistic scenarios of the distribution of the residual transit demand between Ukrainian and Belarusian pipeline systems, imply both a substantial reduction of volumes transferred via Belarusian pipeline system, and a decline in transit tariffs triggered by strong price competition between Belarus and Ukraine. As a result, profits from the gas pipeline system in Belarus are likely to diminish.

This negative outcome is reinforced by the above mentioned trends of increased extraction of natural shale gas in Europe as well as prospective development of the LNG trading routes with Northern Africa and Americas. A conservative estimation of the reduction of European demand for Russian natural gas indicates that it can be reduced by 28 billion cubic meters (17% of the current Russian imports). Coupled with the launch of the Nord Stream, the decline of transit volumes through Belarus and Ukraine can be nearly 75 billion cubic meters annually, which is more than a 50% reduction from current levels.

Notably, these 28 billion cubic meters is an equivalent of the natural gas consumption by

Poland and Hungary alone, the European countries currently most dependent on Russian gas imports.

Thus, the launch of the Nord Stream presents a substantial threat to the stable operation of the Belarusian gas pipeline system and requires careful policy steps (which will be discussed further ahead).

The fact that Belarus loses an important lever of its transit capacity may lead to lower negotiation power in fuel prices dialog with Russia, thus, leading to the smaller subsidies for the Russian oil and gas imports. However, a reduction of the world gas prices due to the growing European production of natural gas and LNG trade is likely to at least partly offset this effect.

Reduced profits received from the natural gas transit is likely to lead to a decrease of budget funds available for technological modernization of the Belarusian economy, which, in turn, may lead to an inadequate pace of changes in energy efficiency and pollution intensity of energy use as well as slower modernization of the power and heat generating sector and diversification away from the natural gas use.

On the other hand, the launch of the Nord Stream and reduced negotiation power towards Russia could increase incentives for Belarus to diversify away from Russian fuel imports as subsidies for the Russian oil and gas imports will contract.

Construction of Astravets Nuclear Power Plant

Although the launch of the Astravets nuclear power plant is unlikely to happen before 2017-2018, debates around this controversial project and its rationale requires a discussion of its energy security implications long before the plant is constructed.

The projected two-reactor nuclear power plant has an operating capacity of 2.4 GW. Unadjusted for load fluctuations in demand,

this figure is an equivalent of 63.5% of the electricity consumption in Belarus. A rough seasonally unadjusted estimate of the Astravets nuclear power plant electricity production is a 35-40% of the daily peak load electricity consumption in the country – a usual figure for the baseload demand figure. Therefore, it is expected that once in full operation, Astravets plant could provide for the entire baseload demand on electricity in Belarus.

Some opponents of the Astravets plant construction note that the plant's capacity may be excessive as several other nuclear power plants are being constructed in the region, including a plant in Lithuania and Russia's Kaliningrad oblast. It is suggested that it may be optimal for Belarus to purchase electricity from these plants rather than constructing its own. This view, however, does not take into consideration two important issues. Firstly, it is highly unlikely that anything but the excess baseload electricity production will be traded (i.e. limited volumes of energy at night for approximately 5 to 6 hours per day); at all other time Belarus would need to rely entirely on its thermal power plants to generate electricity. Secondly, shifting from the dependence on hydrocarbon imports to the dependence on electricity imports will not cause a substantial improvement of the country's energy security.

Current production of electricity by fossil fuel operated power plants in Belarus is an equivalent of 18 TWh, 55% of the total electricity consumption in the country. A launch of the Astravets nuclear power plant would allow reducing fossil fuel operated power plants' utilization to virtually zero level. In addition, nearly 15% of the combined heat and power plants may operate as heat plants only.

Yet, it is unlikely to lead to the substantial changes in the usage of the existing heat plants: while nuclear power plants can provide heat, Astravets is located far from densely populated regions of Belarus, which makes heat delivery to the final consumer close to

impossible because of the high losses in transfer.

As a result of decreased utilization of power plants and CHP plants, demand for natural gas from the heat and power generating sector will be reduced by 38%. Thus, the share of natural gas in the sector's consumption balance will shrink to nearly 50% from the current 91% figure. The Astravets plant launch will also lead to nearly 25% reduction of the sector's demand for petroleum products.

Therefore, the economy-wide TPES of natural gas is likely to contract by 28.5% and TPES of crude oil and petroleum products by nearly 2% once the Astravets plant is in full operation. The estimated annual benefit from the reduced imports of hydrocarbons is likely to reach USD 1 billion at current fuel prices.

Overall, Astravets power plant launch is expected to have strongly positive effect on diversification of energy sources in heat and power generating sector as nuclear power will gain the second largest share among the energy sources used in the sector and the natural share will reduce to nearly 50% of the total consumption by the sector. The plant construction is also likely to have a positive effect on the energy intensity by reducing losses from the power generating sectors and by closure of obsolete plants.

Moreover, the effect on diversifying fuel imports away from Russia is two-fold. Although Belarus will be able to reduce its Russian gas imports by almost a third of its current level, nuclear fuel for the Astravets station is likely to be imported from Russia. Nevertheless, given positive shifts in Belarusian regime's relations with the West, it is highly likely that by the time of the power plant launch, the current suspicion of the Belarusian government by the international community will have vanished and alternative importers of uranium would then become an option.

Overall, the Astravets plant will have very limited impact on Belarus' role as a transit corridor for Russian hydrocarbons.

Environmental consideration is probably the most controversial issue with respect to the projected plant. The issue becomes even more uncertain when one takes into account not only objective environmental costs and benefits, but also subjective factors, such as suspicion of Belarusians to nuclear power – a legacy of the Chernobyl accident.

A nuclear power plant will undoubtedly lead to a reduction of pollution intensity in the Belarusian economy. Yet, there are a number of factors that may offset the seeming gains. Firstly, a low probability of technological disaster at the power plant, mean that most Belarusians consider the plant as an environmentally but dangerous project for the country. Secondly, Lithuanian environmentalists have expressed their concerns over the proximity of the projected plant to the Lithuanian capital, Vilnius (only 40 km), especially as the Neris (Viliya) river that flows through Vilnius will be the main water source for the Astravets plant. Thirdly, international environmental experts rarely consider nuclear power plants considerably greener than their fossil fuel operated counterparts as uranium extraction and enriching produces substantial amounts of polluting substances at their fuel producing facilities. Finally, spent nuclear fuel treatment still remains one of the issues without a sustainable technological solution. Belarus is likely to export its nuclear waste to either Russia or Ukraine that have spent nuclear fuel storage facilities.

Therefore, from an environmental perspective, while Belarus will enjoy most of the benefits of the cleaner power generation, it is likely to create substantial trans-boundary environmental risks mostly for Lithuania, Russia and Ukraine.

New suppliers of hydrocarbons

Belarus currently attempts to diversify its oil supply by shipping Venezuelan crude to Black Sea and Baltic Sea ports. In addition, there

exists a sound potential of diversifying Belarusian natural gas imports by gaining access to Ukrainian and Polish natural shale gas deposits as well as through constructing an LNG terminal at the Baltic Sea.

While the perspectives of these recent international advancements are not certain, in the case of sustainable progress they are likely to have important implications for the energy security of Belarus, which are closely interrelated to the implications of the shale gas and LNG revolution.

Emergence of new suppliers of hydrocarbons will have a positive impact on diversifying away from Russian fuel imports, but will also reduce incentives for the energy intensity and pollution intensity reduction as well as the modernization of the heat and power generating sector as economic stimuli for technological modernization fade away.

Diversification of hydrocarbon suppliers presents risks for the usage of Belarusian gas and oil pipeline systems. If oil would be transported from either Black Sea or Baltic Sea ports, this oil would compete with the Russian oil transport routes headed into the opposite direction to either Ukrainian Odesa seaport or Baltic refineries (see Figure 1). Pipeline transportation of shale gas from Poland would compete with Russian natural gas going in the opposite direction. At the same time, reduced revenues from transit of Russian hydrocarbons may be outweighed by benefits incurred from lower prices for hydrocarbons from the alternative sources.

Table 1 provides a summary of the reviewed trends and their impact on the energy security challenges faced by Belarus.

Table 1. Summary of the existing trends and their impact on energy security of Belarus

	Shale gas and LNG revolution	Nord Stream launch	Astravets nuclear plant construction	New suppliers of hydrocarbons
Reducing energy intensity of economy	-	-	+	-
HPG sector diversification away from gas	-	-	++	-
Diversification away from Russian fuel imports	++	+	++/-	++
Usage of pipeline system to full capacity	--	--	0	+/-
Environmental effects of energy	+/-	-	+/-	-

Legend: ++ strongly positive effect;
 + positive effect;
 0 no effect or very limited effect;
 - negative effect;
 -- strongly negative effect;
 +/- mixed effect;
 ++/- mixed effect with strong positive effect and possible risks.

Policy recommendations

Table 1 suggests that the most of the vital energy security components will experience both positive and negative shocks in the nearest future. Nevertheless, it is possible to undertake a number of policy measures to enhance positive effects and secure against risks.

Reducing energy intensity of economy

All possible negative effects on the energy intensity reduction will be a result of either lowering incentives to modernize the existing technologies due to lower hydrocarbons prices or a reduced capacity to modernize due to drop in budget revenues. Yet, as discussed above, improving energy efficiency may become an important driver of economic growth in the foreseeable future.

Besides already existing Energy Efficiency Department of the Committee for Standardization and construction of the Astravets power plant having a positive impact on the energy intensity of the economy, the

Belarusian government may also consider the following options:

- Establishing a Research and Development (R&D) program on energy efficiency;
- Creating a special energy efficiency fund to be used for the modernization and energy intensity reduction measures;
- Imposing standards of energy use, especially in energy intensive sectors;
- Introducing taxation schemes on energy use with industry-specific energy intensity reference values in order to provide additional incentives for businesses to undertake modernization and reduce energy intensity;
- Issuing a mandate requiring gradual replacement and rehabilitation of obsolete equipment, especially in heat and power generating and energy intensive industrial sectors.

Heat and power generating sector diversification away from gas

Similarly, to the energy intensity challenge, the HPG sector diversification away from gas will be negatively affected by the reduced incentives to modernize and the lack of budget funds to impose these modernizations. Hence, the following measures may be considered:

- Ensuring adequate progress of the Astravets power plant construction;
- Imposing standards and taxation schemes of energy use by the sector;
- Study options for electricity imports, especially in off-peak hours;
- Gradually replace and rehabilitate obsolete equipment.

A number of steps to encourage use of specific fuel sources can be undertaken:

- Study possibilities of expanding production and/or imports of coal;

- Transfer some smaller-scale heat plants to coal and/or wood as environmental conditions permit;
- Integrate production of fuel wood into conventional forestry and industrial timber procurement;
- Assure quality standards and efficient use for forest chips.

While not being directly related to the sector's diversification away from natural gas, the following measures will allow improving financial performance of the sector and, thus, providing additional resources to undertake modernizations in the sector:

- Separate commercial operation of the sector's state-owned companies from the government's conflicting position as an owner, policy setter and regulator;
- Imposing reporting standards, such as IFRS standards, in the sector in order to improve financial management of the companies and attract possible financiers;
- Adopt and implement OECD 2005 *Guidelines on corporate governance of state-owned enterprises*. While a number of the guidelines are not applicable to the Belarusian noncorporatized companies such as Belenergo and Beltopgas, general principle allow for more effective management of the companies.

I purposefully omit an option of the ownership change of the heat and power generating sector's companies in our policy recommendations, since this option is not consistent with the existing economic and political environment in Belarus.

Diversification away from Russian fuel imports

While all of the trends analyzed will have positive effect on diversification away from Russian fuel imports, this seeming progress is largely due to the fact that up until recently

Belarus has been totally dependent on Russia's fuel imports. Yet, a number of steps can be undertaken to further augment the diversification progress:

- Ensuring adequate progress of the projects enhancing the diversification away from Russian fuel supply, namely LNG terminal in Kaunas, Astravets power plant and search of alternative suppliers of hydrocarbons;
- Exploring possibility to access and explore Polish and Ukrainian shale gas fields with a possibility to operate some of the extraction facilities;
- Studying an option to create a coal-bed methane extracting consortium with Ukraine to develop technology and extract coal-bed methane in coal-rich Eastern Donbas region;
- Researching and developing biomass as a source of energy to replace a share of oil and gas usage.

Usage of pipeline system up to full capacity

It is next to certain that the configuration of the hydrocarbon routes in Eastern Europe is about to go through fundamental changes in the nearest future due to both reduced demand for Russian hydrocarbons from Europe and the launch of the Nord Stream pipeline system. Still, there exist a number of steps to ensure that Belarusian pipeline system is in operation and is enhancing the country's energy security:

- Creating a gas-transporting consortium with Ukraine to gain an additional market power to ensure adequate transit tariffs and share of volumes of the residual Russian gas exports to Europe after Nord Stream is launched;
- If Russian hydrocarbons transit volumes fall below critical level, transfer to the reverse direction to make the best use of the Polish shale gas and Baltic seaports' ability to receive oil for Belarus. By doing so,

Belarus will ensure both hydrocarbons imports diversification and adequate operation of its pipeline systems;

- Continuing search for alternative suppliers of oil and natural gas (including LNG) in order to assure adequate usage of the pipeline systems in the reverse direction.

Environmental effect

Similarly to energy intensity considerations, most of the negative effects of the current trends on the environment are related to either reduced incentives to modernize or reduced funds available for modernization projects. The following measures are intended to reduce pollution intensity of energy use:

- Establishing a Research and Development (R&D) program on environmental effects of energy use;
- Imposing environmental standards and taxes on energy use, especially in energy intensive sectors and bringing these policies closer to international standards;
- Issuing a mandate requiring gradual replacement and rehabilitation of obsolete equipment, especially in heat and power generating and pollution intensive industrial sectors;
- Establishing emission trade relations with the Kyoto Protocol Annex B countries to collect funds for the environmental modernization of equipment.

The following steps should be undertaken to minimize both actual and perceived environmental risks of the Astravets nuclear power station:

- Working with the general public to educate them about modern technologies that guarantee nuclear power safety as well as inform them of virtually accident-free record of civil nuclear power besides Chernobyl disaster;

- Establishing relations with the stakeholders that might be affected by the environmental impact of the projected power station, especially, local communities along Neris river;
- On early stages, study the possibilities for the spent nuclear fuel treatment and reach the preliminary international agreements over the potential nuclear waste storage if needed;
- Ensure compliance with the international standards of the power plant construction and operation and advertise this compliance strategy to the stakeholders.

Concluding remarks

Currently Belarus enters a completely new stage of its development as the old economic growth factors vanish, the political situation both within and outside the country transforms, and the geopolitical context changes. This new stage of the country's development presents new challenges and new opportunities for Belarusian energy security, the key for any country's independence. Careful consideration of the most critical energy security challenges coupled with professional and effective policy measures to tackle them is a vital task for securing Belarus' economic growth, political sovereignty and quality of life improvement.

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