



Euro-Norwegian Cooperation in the Field of Energy Efficiency

Insights and recommendations



Norway
grants



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Insights and recommendations

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Introduction

Cooperation on energy policy is now one of the key aspects discussed by the European Union member states and aspiring countries, due to the fact that it is one of the conditions for further integration. It constitutes one of the most important assumptions underpinning contemporary Europe and the decisions made at the supranational level affect the internal policy, as well as the objectives for economic development of most European countries. The below publication will elaborate on the problem of energy policy cooperation seen from the perspective of Central and Eastern Europe and Norway, especially in the context of Renewable Energy Sources (RES) and alternative new technologies of energy processing.

The experts present differing views, which stem from different perspectives i.e. geopolitical location, diversified economies, access to resources and EU membership. The various points of views set the background for relations between states in policy and economy. It might seem however, that the main problem of Europe in the energy policy cooperation domain is the fact, that the European countries rely on diversified fuel and power industries. Moreover, they differ in their energy policy goals and priorities.

In the opening entry Mirosław Bieliński highlights the benefits of RES as a long-term investment and a strategy for European energy policy. "Energy from renewable sources has a great future worldwide. Every now and then we hear about more modern technologies, lower costs, grid parity transitions. Almost the whole of Norway's energy supply comes from RES, as does Iceland's. Of course, a decisive factor was the geographical and climatic conditions but also effective investment policy" the author writes.

Renewable Energy Sources (RES) and alternative new technologies of energy processing are more common in some countries than others. They have traditionally been the strongest in the more developed and more environmentally aware Western European economies like Norway. These can be successfully transferred further, across the European Union. Øystein Kvarme dedicates his article to the ecological aspects of hay used as a fuel for power plants in certain sections of the Polish economy. As the author writes: "The industrial hay collected mainly from the previously non-productive areas and used as a fuel does not restrict the biodiversity and does not disturb the element circulation in nature". Marcin Śmiech develops this topic with his take on the Common Agricultural Policy and the general impact of EU policies on the implementation of alternative energy strategies.

Alternative energy is also reflected in differing concepts of ensuring energy security in various European countries. It is commonly known that natural gas is considered a strategic energy resource. Nevertheless increasingly often the issue of finding non-standard sources is raised. Some refer to the development and increase of investments in RES as

a solution. The German expert Johannes Rieckmann underlines the newest trend in his country. There the aim is to increase the energy efficiency, as well as focusing on the projects involving energy saving. Given the fact that Germany is often presented as the leader of Europe, her energy policy doctrine may feature heavily in EU policies, setting their priorities for renewable energy sources and energy efficiency.

I really do hope, that all gathered publications will deepen the readers' knowledge about the cooperation on energy policy in Europe and about various perspectives on the use of RES and alternative resources. These views will make us realise how the European energy policy is being shaped and that it cannot be analysed without acknowledging the political culture of individual countries.

*Kinga Redłowska
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Mirosław Bieliński

Energy's role is to support not to deprive

This article focuses on the chosen cost-, regulatory- and effectiveness-related aspects of the Polish energy system. It is not intended to provide its analysis nor a comprehensive picture. It does not present a perfect system that could serve as an example for others. It is, however, a recommendation for those, who would like to and can contribute some common sense into systemic solutions.

Recommended goals

1. Ensuring cheap, good quality energy and its continuous supply to all clients in the long-term perspective
2. Energy should support industrial and enterprise development, but, above all, it should help increase inhabitants' standard of life. This point encompasses environmental protection.
3. Creating regulatory instruments that would boost energy security, understood as (a) access to "cheap and high-quality energy" for all its users and (b) market's resilience to political turmoil in the country and abroad.

Starting points

It is hard to imagine our everyday life without common and failure-free access to electricity. We are surrounded by devices that require the continuous supply of increasingly better quality energy. Both our life and our comfort of living have come to depend on them. Energy has become a foundation of our technology-driven civilisation. Without it, we cannot manufacture goods, supply water, heat, ensure the operation of hospitals, law-enforcement agencies that guarantee the safety of the state and its citizens. Therefore, the cost of interruptions in energy supplies is estimated at even a few dozen times the cost of energy supply itself.

Cheap and ecological micro-production technologies are developing fast hand in hand with demand management and energy-saving techniques. In general, the cost of traditional and large-scale energy is on the rise. New business models keep appearing, introducing new approaches and new quality. There are also new threats, as for instance cyber-attacks.

Current state (Poland)

The energy system in Poland must provide electrical energy made in power plants with approx. 40 thousand MW capacity to about 16 million recipients (i.e. households, enterprises, institutions) via over 820 thousand-kilometre long energy grids. The average demand for power is about 20-21 thousand MW, the peak demand for power has

never exceeded 27 thousand MW in the wintertime and 24 thousand in the summertime. During the long off-peak periods (at night, weekends and on holidays) demand amounts to about 15 thousand MW. Demand is strongly related to seasonal fluctuations and long-term predictions assume (a) a slight increase in energy demand, (b) decreasing the difference between the peak annual demand (winter) and the lowest annual demand (summer).

A client's bill includes all the costs related to the energy system, i.e.: energy production (there is a wholesale energy market and power plants are responsible for energy production), transfer of energy from power plants to the energy grid (role of PSE – the grid operator), its distribution to the socket (the task of the distribution network operator – OSD) and the margin of the seller (electrical energy market, sales companies).

The market structure is as follows: a sales company pays the power plant for producing energy and pays the distribution network operator for providing it to the socket. The distribution network operator shares the payment with the grid operator. Prices of services provided by the PSE and OSD monopolies are determined by the Energy Regulatory Office. A regulatory sales electrical energy price is maintained for individual clients (G tariff). There are two systems of supporting renewable energy sources in place: the old one with green certificates added to the energy price and a new auction one. In the old system there is a regulatory price for energy from renewable sources, however RES producers can switch to the market price any time if it is more beneficial to them. Turnover companies are obliged to buy green certificates. RES energy in the auction system has a guaranteed price, higher than the market one, which is transferred by turnover companies upon end clients. The turnover of electrical energy between power plants and sales companies is far from transparent as over 50% of energy is produced inside integrated energy groups that control the flow of cash in the “production-distribution-turnover” triangle.

Energy production – the problem of adapting costly traditional sources

The challenge is adapting production of energy from traditional sources to the fluctuating demand. The fluctuations are due to our natural, daily and weekly rhythm of life, however partly also due to the operations of RES facilities, in particular windfarms. Coal-fired power plants that dominate the Polish energy system do not allow to ensure the right level of system flexibility in line with economic feasibility arguments. In the nearest future, the cost of their functioning will only keep rising but not only because of the EU climate policy; also due to the increasing prices of raw resources. Therefore, we need new solutions, such as new flexible sources in the area of energy supply and demand management to optimize the costs of the entire system. Additionally, one must remember about the ageing of production facilities, which have to be replaced with new capabilities. With large changeability on the energy market (both in terms of revenues and costs), high investment risk, execution of such an investment should be supported by proper regulatory mechanisms and carried out by entities with a strong financial position.

The energy sector's capabilities total about 40 thousand MW yet the peak demand has never exceeded 27 thousand. Do these numbers prove a lack of or surplus of power? Opinions are divided.

For instance, on 11th August 2017 the system's demand for power was on a record-high level: 22,900 MW. However, on the very same day Koźienice Power Plant (the second largest coal power plant in the EU) was forced to limit production due to the temperature and low level of water in the Vistula river used to cool down energy blocks. It seems this is nothing extraordinary in August. In every August... Moreover, in two energy plants (Bełchatów and Rybnik) there were breakdowns and a few other blocks were in maintenance. On that day power plants and heat and power plants steered by the National Power Dispatch Centre provided by 5.9 GW power too little to meet the demand. On the other hand, the power of coal-fired blocks ready to supplement the system in case of urgent breakdowns (the so-called spinning reserve) has dwindled almost to the bare minimum of 647 MW. The situation has become critical.

It is worth paying attention to the cost-related aspect. All the power plants have fixed costs – regardless of whether they are operating or not. Additionally – changeable costs are borne by the power plants that produce (“generate”) electrical energy. Surplus of available power is therefore costly for the economy.

A good illustration of the changes that have taken place on the market is the evolution of the idea of developing the power plant in Ostrołęka. This power plant, like any other, has to compete with energy price on the market. Its specific location, far away from fuel sources, has a considerable impact on the stabilization of the energy system and providing energy to recipients in north-eastern Poland. And that's it. In the longer-time perspective the power plant in Ostrołęka will lose against the power plants located in the south of Poland due to the higher prices resulting from the costs of coal transport. This is a clear paradox: the power plant is needed by PSE and not clients who demand cheap energy. Consequently this power plant is very important from the systemic point of view, yet unnecessary from the regulatory point of view. If it is built, it will be very costly.

RES – foreseeable benefits at a considerable price

Energy from renewable sources has a great future worldwide. Every now and then we hear about more modern technologies, lower costs, grid parity transitions. Almost the whole of Norway's energy supply comes from RES, as does Iceland's. Of course, a decisive factor was the geographical and climatic conditions but also effective investment policy. On the Polish market, a new RES Act has appeared that introduces an auction system. However, the Act was not so much to support RES as the state in minimizing RES-related expenditure, which it does effectively.

The Act doesn't solve any problems, though, such as the unequal distribution of costs of the existing RES-support system through green certificates (it will operate in parallel for several years) or assisting the introduction of new technologies, in particular micro-production and storing energy which will be appearing in the coming years and which are vital for energy security. Unequal distribution of RES-related costs takes a par-

ticularly heavy toll on the inhabitants of northern and eastern Poland, which is less industrialized. They pay incomparably more than others for distribution fees since the cost of connecting RES is imposed on the clients in the form of distribution company's tariff. One should strive to approximate the impact of more expensive distribution in the north of Poland and including "an average RES fee" in distribution tariffs countrywide based on real RES-related costs.

RES is an area enabling potential activities of prosumers whose individual and small investments in energy production capabilities can – through their mass nature – support production capabilities on the national scale and help achieve reliable energy supplies, however, what is equally important, also boost the society's entrepreneurial spirit. The RES Act should provide more active support for prosumers.

Grids – stable regulations are necessary

A continuous challenge in the energy industry is improving the quality of energy distribution understood as reliable, failure-free provision of energy with the right parameters to end recipients. All the "blackouts" in Poland so far have not been caused by lack of energy, but by lack of possibility of supplying energy to recipients because of the failure-prone grid or its low resistance to unfavourable weather conditions. Therefore, there's a need for investment in the grid and its management. However, to ensure effective execution it is necessary to ensure a stable and predictable regulatory environment that would guarantee the right rate of return for investors.

Another problem is considerable differentiation among electrical energy distribution rates, which in the case of some tariffs amount to even 50%. There are higher distribution rates in poorly developed regions with low population density (northern and eastern Poland) and lower distribution rates in the most industrialized areas (southern Poland). This is also due to RES-related investment, which pose a great burden to the investment budget mostly in the less developed areas (where it is easier to locate windfarms). This means that, at present, the energy industry has a negative impact on the country's spatial development, providing economic impulses to invest in the best developed regions. With the current regulatory model these disproportions will only increase.

At the same time, regulations do not encourage to invest in grids in areas with lower energy consumption (rural areas) due to their smaller significance for the revenues of OSD. Today, the reliability of electrical energy supplies in non-urbanized areas is considerably worse than in the cities.

The present solutions related to determining electrical energy tariffs and lack of implementation of smart meters on a mass scale cause that energy recipients (in particular households) are not taken into consideration when planning activities aimed at balancing out supply and demand. It's just to the contrary. The tariffs that have existed for many years encourage clients to use more electrical energy during peak demand, where there's the greatest risk of system imbalance. This calls for a regulatory change as well as for investment in new technologies (smart grids).

Sales and customer service – a seemingly free market

At present over 90% of clients are serviced by turnover companies that belong to the 4 enterprises controlled by the Treasury. They are monopolists supported by asset structures of these groups (proprietary production and distribution network) and the “status quo” of the regulatory policy. It’s the clients that bear the cost of this situation in the form of higher energy bills. The procedures make it difficult to change one’s energy supplier.

Slowing down the implementation of smart grids and meters deprive clients of access to information about their energy consumption and makes it difficult to analyse the offers of competitors. Additionally, the competition is impaired by the lack of decisions about freeing the tariff for municipal recipients and the lack of unequivocal solutions regarding agreements with sales companies operating on the market.

The existing quantitative indices (for instance OPEX/PPE, number of contracts/year, speed of settling issues) as well as the qualitative ones (the first contract rule, ease of access) point to very important areas of possible improvement in effectiveness compared to the commonly adopted standards in the more developed countries on the utility markets (Germany, England, USA) or on the Polish telecommunication and financial market.

Effectiveness – it’s clients who pay for its non-existence

Despite the restructuring efforts undertaken in recent years, there are still considerable ineffective areas in the sector. This lack of effectiveness is financed by energy recipients across all the segments: production, turnover, distribution, sales and service. Apart from a few exceptions, the production, distribution and sales sector generate higher costs than other European energy companies. Only based on the comparison of the most effective elements of various power plants in Poland (the so-called “method of catching up with the champions”) one can conclude that effectiveness could be improved by 20 to 30%.

The Treasury’s role

The Treasury dominates in terms of sector ownership and management. It is characterized by a toxic approach to the market as it strives to maintain the “status quo” of the vertically integrated energy group it controls. Paradoxically, despite such a strong position on the market, at present, the Treasury is interested neither in boosting effectiveness so that it could at least ensure higher dividends for the budget nor in lowering the energy cost for the economy or individual consumers. The Treasury is perceived as a shareholder that exerts pressure on the management boards of energy companies so as to initiate ventures that are quite important from the perspective of the country’s energy security, yet, above all, it undertakes actions that are to ensure social security for various social groups at the expense of the society as a whole, not paying any attention to the economic benefits or the social perspective. Poor management at the Treasury-level is demonstrated by low valuations of energy companies that lag far behind the valuations of their counterparts from Western Europe.

Summary of the current situation

- Inadequate structure of production capabilities in the context of RES generation and energy demand.
- Lack of proper regulatory mechanisms stimulating investment in new production sources if they were necessary from the perspective of industrial system security.
- Lack of proper tools to monitor and model regulatory solutions in the RES-support area that would help define the costs and benefits for the whole economy.
- Poor reliability of distribution networks and lack of a proper regulatory policy that would support investment in this area that are detrimental to the reliability of energy supplies in rural areas, which decreases the comfort of living of their inhabitants.
- Non-harmonized distribution rates damaging to the less industrialized regions, which contribute to the growing difference in costs to the benefit of Silesia and Warsaw and to the detriment of northern and eastern territories.
- Lack of real competition on the energy sales market due to monopolisation of such operations by four energy groups which have energy distribution networks and a dominating share in the energy production market.
- Low production effectiveness (besides a few private coal-fired power plants)
- Poorly defined Treasury's policy for the energy sector, lack of proper regulatory actions.

Suggested change – assumptions

Ensuring cheap, good quality and continuously delivered electrical energy that would reach all clients requires, in the long-term perspective, ensuring the proper level of profitability in the energy sector that would serve as an incentive both to invest in it as well as to lower operational costs. This, in turn, requires implementing proper structural changes to boost competition in the sector and calls for legislative and regulatory changes.

The transformation of the sector should proceed in the following directions

1. Completing the unbundling process, which was effectively initiated almost 10 years ago through singling out distribution network operators (OSD) and turning them into separate business entities that have no influence on the operations of the entities specialising in energy production and its sales. The aim of unbundling will be realized if OSD is removed from under the influence of sales and production companies, i.e. the four vertically integrated energy groups: PGE, Tauron, Energa and Enea.
2. Sale of turnover companies by the vertically integrated groups. This is a necessary element to promote genuine competition among energy sellers in Poland.

This change should be connected with the obligation to sell 100% of produced energy by power plants on the power exchange maintained by the Warsaw Stock Exchange (TGE) and establishing the one-contract rule (a comprehensive one) for clients.

3. Merging the distribution companies belonging to the ENERGA and ENEA groups. In this way over 90% of the distribution market will be divided among three business entities of similar size and facing comparable challenges, which will facilitate regulatory compliance.
4. Privatization of the distribution segment – preferably by the Warsaw Stock Exchange and executed gradually, maintaining the control of the Treasury during the period of stabilizing regulations at a respectively high level. Today, the segment's value amounts to about PLN 60 billion and may increase with better management and higher quality of regulations.
5. Maintaining a controlling interest in PSE by the Treasury and the largest production entity (PGE).

Additionally, the fulfilment of these goals requires harmonizing activities in the legislative and regulatory domain:

1. Implementation of mechanisms stimulating investment in new, stable production sources representing characteristics compatible with the needs of the system related to RES development and in solutions related to demand and supply management that should be treated in the same way as investment in new sources.
2. Considerable strengthening of competence of the organs responsible for shaping and implementing policy and regulations in the energy sector (two ministries, the Energy Regulatory Office) – among other things considerably greater budgets for studies, analyses, exerting pressure on better choice of talent, etc.
3. Implementation of stable and predictable regulatory conditions for network enterprises related to quality elements. One must ensure the right rate of return for investors and motivate them to develop and modernize the distribution grid.
4. Harmonization of distribution rates in Poland that will help equalize them countrywide accompanied by the implementation of mechanisms balancing out the operating costs of distribution network operators.
5. Implementing regulatory changes and executing investments in the smart grid that would enable sending price signals to energy recipients compatible with the current energy supply and demand situation.
6. Creating real competition on the retail energy market through ownership changes but also by freeing the G tariff and simplifying the procedure of changing energy sellers.

Expected outcomes

1. Optimising investments in power plants and energy grids.
2. Low energy wholesale price in the long term.
3. Neutrality towards the EU climatic polity.
4. Low retail price – the difference between wholesale and retail price will result from low RES-support costs and competition in the costs related to customer service.
5. Increasing pressure on boosting effectiveness in the energy sector by drawing a clear line between the carried out functions – increase in Treasury's tax revenues and higher dividends from its ownership of energy companies.
6. Deconcentration of the vertically integrated energy groups should bring about PLN 60 billion within 2 years, which will facilitate financing production projects or strengthen the budget.

Commentary

Today, the energy industry is taking advantage of its role as a supplier of a product that is in demand everywhere and by everybody. Market mechanisms operate in a limited scope, as there is no pressure to increase the effectiveness or quality, and social costs do not go hand in hand with the available benefits. The huge investment potential does not modernize or contribute to the development of the economy as much as it could. Consequently, the energy sector has become burdensome both for the economy and for the society. Instead of giving, it takes away... A few consequent actions could turn this situation around.

Common sense tells us that a lot of space should be reserved for new technologies and new business models that will generate value for clients and for the economy.

Wojciech Jakóbiak

Poland's hybrid energy policy

Poland's Energy Policy by 2030 specifies that the country's energy security assumes by definition ensuring stable supplies and an acceptable price level. The energy policy aims to accommodate the realization of both goals through the country's efforts. Poland and Norway's collaboration in the gas sector may serve as proof that these aims can be also achieved on an international level.

Poland needs about 15 billion cubic meters of natural gas a year and about 4 billion cubic meters are excavated in the country. At present, between 8 and 10 billion cubic meters are imported from Russia whilst the rest is bought under spot contracts at the commodities exchange via the reverse of the Yamal-Europe pipeline, from the LNG terminal in Świnoujście as well as from Qatar, Norway and the US. The Polish government is going to expand the transfer infrastructure with the Norwegian corridor, i.e. the Baltic Pipe, which is to establish a connection through Denmark between our country and Norway which has vast gas deposits.

From the Polish point of view the project is of great significance as it is to provide another alternative source of gas besides Russia. Supplies from the German commodities exchange are executed based on different contracts than those concluded with the Russian Gazprom, yet they apply to the mix from the German market, where the natural gas from Russia delivered through the Nord Stream pipeline plays an important role. However, Poles want non-Russian gas that they can now get through the LNG terminal. Yet, at the same time, they want a stable and competitive offer compared to the prices suggested by the Russians. Therefore, they consider building the Norwegian Corridor necessary. For Poles it won't be possible to implement this policy without accounting for the economic framework, among others, because the Norwegians adopt a business-like point of view, whilst Poles want not only security but also a competitive price.

From the Norwegian perspective, gas supplies to Poland, which according to the Baltic Pipe feasibility study, may amount to 10 billion cubic meters a year, are an opportunity to enter another market. Until now Statoil hasn't had a strong presence in this part of the globe. It sometimes made guest appearances at the terminals in Poland and Lithuania while spot supplies of LNG. A long-term contract with the Polish PGNiG would mean a qualitative change and would be perceived as an opportunity to expand Statoil's presence in Central and Eastern Europe, because natural gas could also be delivered through Poland to clients in other parts of the region. This would be a reply to the stagnant demand in Western Europe, which is boosting its energy efficiency and investing in renewable energy sources.

This shows that political and economic arguments intertwine in Poland's energy policy which is aimed at decreasing the dependence from gas and, by default, from Russia's

foreign policy, whilst at the same time it aims to offer consumers attractive gas prices. The main tool to achieve this goal is still the company PGNiG, which, according to the provision included in its Articles of Association, may execute ventures important from the point of view of the country's energy security even at the expense of its business outcomes. This is proof that in the analysis of our country's energy policy the political factor is inseparably connected with the economic one and they cannot be perceived separately. Poland's energy policy is therefore a political-economic hybrid.

Zbigniew Kasztelewicz

EU Climate and Energy Policy. Polish Dilemmas and Challenges

The Polish mining industry represents world-class quality and is one of the few leading sectors in Poland. EU's criticism of coal energy is not just and short-sighted and it doesn't account for long-term economic consequences. Historically, Poland has always relied on coal and this situation cannot be changed quickly or radically – this is our economic peculiarity compared to other EU member states. Until this day there is no solid scientific proof that it's CO₂ emissions that cause climate changes. Regardless of what we think, one should search for technologies limiting emissions of carbon dioxide and other greenhouse gases into the atmosphere. Increasing the role of coal should be related to its processing into liquid and gas fuels, including synthesis gas and hydrogen as well as the production of briquette of coal dust.

The EU climate policy, through the rise of electrical energy prices and purchase prices of CO₂ result in modern metallurgic, cement and lime industries as well as other energy-consuming companies leaving Poland and Europe, which will cost us many jobs. For some time now the economic and financial situation in Europe and worldwide has become increasingly complicated. At the same time, we can see that some EU member states strive to increase the share of their own electrical energy resources to protect their industries and workplaces. The author thinks that the EU climate policy and its main assumptions must be thoroughly revised. What's particularly striking about the climate policy is the lack of a holistic approach. There are no indices for countries whose energy policy is based on coal that would account for such obvious facts as the affluence of economy, their consumption level and the impact of other sector on the condition of the natural environment. Energy production outside of Europe is not more energy friendly than in Europe. Wouldn't it be better to master the best known technology and improve low-emission systems? Wouldn't it be better to promote and adopt consumption indices as those that actually relate to and determine emission standards?

Europe's political and economic situation is very difficult. Both Europe and Poland need cheap electrical energy for development. With contracting economy and rising unemployment expensive energy, called ecological may cause considerable social unrest. Poland should embark on some decisive actions in its negotiations with the European Union about the role of coal in the European energy sector, not forgetting about the role of the European industry that guarantees workplaces.

I think that today's and suggested climate and energy policy of the European Union could be changed by replacing the penalties and subsidies with a business-oriented attitude accounting for not only low-emission but both low-emission and competitive

policy. Our country has a limited amount of energy resources except for black coal and lignite deposits. Geological resources of black coal amount to over 50 billion short tons and those of lignite to over 23 billion short tons. In Poland lignite and black coal are not only the cheapest energy resources but also the only ones that make our country energetically self-sufficient. The three above-mentioned aspects, namely energy security, energy self-sufficiency, economic feasibility and workplaces suffice to perceive the Polish coal as “Polish gold”. Crude oil or gas resources are limited. Vast shale gas resources have eventually not been confirmed. Therefore, to ensure continued economic development of our country one must do everything to achieve a political consensus in Poland and the approval of the European Union of the new Polish energy policy for the next decades of the 21st century assuming that Poland’s energy sector will be based on coal and high-efficiency power plants using pure clean coal technologies and complemented with economical renewable resources on condition that national energy resources will be used first and imported fuels and technologies second.

Katarína Hazuchová

Cooperation on low Carbon transition as an opportunity and challenge for Energy Security

For many states of the EU, the energy question has for a long time been seen through a prism of internal political concern. The hegemonic status of a dominant supplier on the energy market has secured relative stable and optimum prices, unrestrained by any significant external interference.

Countries remained rather inhibited from moving to collaborative strategies on energy-related issues with their neighbors, driven by their expectation that other states will defect from genuine cooperation, not seeing any payoff in collaboration. The EU's energy market thus has long been internally fragmented and without any significant structural change.

The progressing integration in the EU has opened a new dimension to the external strategies in energy policy and brought new incentives for collaboration among the EU countries in a market-based trend. However, the internal political discourse vis a vis external dimension of energy policies has remained live in many EU countries.

Additionally, political failures and of private markets have long been creating holes in the public goods provisions but mainly in negative externalities, triggering social, environmental and economic costs. Today, these narratives together with the rapid technological progression and innovation, have been drivers for transformation towards more efficient, sustainable, decentralized and cleaner energy production with a vision of more stable commodity prices, less wastage of energy and decrease in pollution.

Looking through the prism of the external dimension of energy policy, the EU has been rather a unique player also globally, raising its ambition, being a leader in the transition to a low-carbon future, concluding the Paris Agreement, which is a binding instrument of this transition.

Decarbonisation of energy systems has thus become an imperative in energy policies and planning.

In the context of the latest events, it has become more likely, that the situation of volatile energy supplies from the dominant energy supplier may persist in the future, making the EU reconsider its own strategic calculations. Pursuing collaboration among EU countries has become not just a competitive advantage but a priority.

In pursuing the diversification of supplies, innovation, energy efficiency and cost-effective and clean energy supply, and in directing the energy strategy of the EU, it was

necessary to introduce a mechanism that will convince all EU states about the lack of danger in defection by others, which was translated in a Roadmap and Framework known as the Integrated SET-Plan and European Strategic Energy Technology. At the same time, the Roadmap also aimed to provide a signal to Russia on further developments in the EU and its cooperative position.

However, the independent dilemma appears to be the dominant strategy when there is a reason for it. What if there is a reason for countries to defect, as it was during last winter's energy crisis in southeastern countries?

What if the Roadmap of the EU will not be a sufficient payoff for the real policy of the Russian energy supplier?

And what kind of new strategic cooperation in the energy domain does the EU need to break this dilemma and help to fulfill its strategic objectives, strengthening cooperation and ensuring energy security?

Krševan Antun Dujmović

Energy policy and security in Central and Eastern Europe

Introduction

Energy security has been the key issue not just within the energy policy of Europe and the EU, but also the key issue of new geostrategic ambitions of global players in Central and Eastern Europe. This has been evident ever since the energy supply crises in Europe during which Russia cut off supplies to Ukraine, and especially since the eruption of hostilities between Russia and Ukraine in 2014. The vulnerability of Europe due to its high level of dependency on Russian gas motivated the European Commission to come up with a new strategy to overcome this issue and diversify supply routes.

Nord Stream 2 project as a challenge to Eastern European Countries

Notwithstanding, Germany, the biggest economy in Europe, seeks to intensify cooperation with Russia in energy projects, namely the Nord Stream 2 project, which is to bring Russian gas directly to the biggest EU market, bypassing Ukraine, Poland and the Baltic states. From the German perspective this is a perfectly viable project that would contribute to the greater energy security of Germany and Europe which would be supplied by Russian gas through Germany, regardless of the occurrences in the East, primarily Ukraine. On the other hand, countries in the Baltic, Poland, Scandinavian countries and some other EU member states in Central and Eastern Europe believe that Nord Stream 2 is directed against them, as they are being excluded from gas transit routes. Furthermore, these countries believe that this German-Russian project will undermine their energy security, contribute to new divisions in Europe, and even threaten their national security. Countries in Central and Eastern Europe have many negative experiences caused by the great extent of dependency on Russian energy supply, which opens the door for stronger Russian influence even on a political level. So it seems that Germany, with its growing influence in the EU, and a number of countries in Central and Eastern Europe are at loggerheads over the big project which is set to bring 55 bcm of gas. Thus, energy security has turned into a core problem of Europe.

The role of LNG in energy security of Eastern Europe

Countries in Central and Eastern Europe are trying to resolve this problem and strengthen their energy security by increasing LNG imports, mostly from the United States. Lifting the ban on oil exports and energy revolution, ignited by fracking and massive shale gas production, have enabled the US to be the champion not just in energy consumption but also production. The US is currently constructing a number of LNG ter-

minals that will supply not just Asia but also Europe, and the first tankers with American shale gas have reached the shores of Portugal and newly built LNG terminals in Poland and Lithuania. Poland has also launched an initiative of interconnecting with Croatia, which will soon start the construction of the LNG terminal on Krk island. This interconnection between the Baltic and the Mediterranean Sea could also supply a number of countries in Central and Eastern Europe, as far as Ukraine.

Conclusions

The Nord Stream 2 project and the North-South Gas Corridor as a joint Polish-Croatian effort within the Three Seas Initiatives show a diametrically different approach within Europe to its energy security and policy, one relying on pipelines with Russian gas, the other relying on shale gas imports from the US. The US has also introduced sanctions targeting the Nord Stream 2 Project. It is to be seen which initiative will prevail in Europe's energy security, and whether the geostrategic and economic interests of Russia and the US can coexist in Europe.

Johannes Rieckmann

Perspectives of energy security in Germany in the face of geopolitical, European and domestic contexts

Germany has to handle the situation regarding its energy supply problem which is certainly not a piece of cake. The country is one of the largest energy consumers not only in Europe but in the world. Much of this energy has to be imported from other countries for a variety of reasons.

Germany is largely dependent on imports from a single country, which was regarded as a reliable supplier in the past; however, it might no longer be regarded so in the medium term future. Due to environmental considerations and domestic political reasons nuclear power plants are shut down, while – despite deposits of natural resources not yet being depleted – mining and production of mineral oil, stone and brown coal and natural gas are reduced or abandoned. New methods of extraction, like for instance unconventional fracking of shale gas, have “been under a de facto ban in recent years” (Stuchtey & Below 2015). All of this creates a need to diversify energy supply, which for various political, legal and technical reasons cannot be rushed.

These factors increase the economic cost of energy supply while limiting room for maneuver in the realm of geopolitical carrot and stick options. In the long run, though, the consequences of current economic and political constraints and pressures might be more desirable than one sees at first glance. The outcome may well be a more independent and sustainable German energy supply. Oil covers the lion’s share of Germany’s energy consumption, followed by gas and coal. Nuclear power plants play a declining role, while that of so-called renewables, i.e. wind and solar energy and from biogas utilization, are fostered and growing.

The operation of nuclear power plants has been a very controversial topic in Germany for a long time, and certainly since the Chernobyl catastrophe in 1986. Following the 2011 disaster triggered by an earthquake at the nuclear power plant Fukushima Daiichi in Okuma, Japan, the German chancellor Merkel decided for an about-turn. Thwarting the 12-year extension of the operation of nuclear power plants that had been pushed against significant resistance by the coalition of the parties CDU and FDP in 2010, she accelerated the Atomausstieg (nuclear power exit). Eight older reactors were shut down right away, with the others earmarked to follow until 2022. The currently planned phase-out was contested judicially but may have to be postponed for other reasons: the Netzausbau – i.e., the extension of the electricity grid necessary in the context of the shift to alternative energy supply – is lagging behind.

The resulting bottleneck in supply can so far only partially be bypassed by the use of renewable energy sources, which is subsidized significantly as a key part of Germany's Energiewende (turnaround in energy policy). The third of the three pillars of the Energiewende (besides the nuclear phase-out and enlarging renewables) comparatively has to be seen as a medium- to long-term initiative: the investment in energy savings and energy efficiency (e.g. the improved thermal insulations obligatory for houses constructed since 2016, and in research and development regarding new technologies).

The triad of the abandonment of mining, nuclear phase-out, and a slow (and costly) shift to renewables comes with a transitionally increased dependency on the import of fossil fuels, namely of mineral oil and natural gas. This alone would not be a reason to cause headaches. Of course, global trade is an issue and the raw materials that must be imported from other parts of the world due to the geographic location of their deposits or due to the economic viability of extraction are numerous, for instance, from rare soils.

The tricky aspect is the uncertainty regarding the relationship with the main trading partner. Russia is by far Germany's largest supplier of oil, natural gas and stone coal. Imports exceed those of other important trading partners as Norway (oil, gas), the United Kingdom (oil) and the Netherlands (gas). The dependence is mutual, with Russia relying on a secure energy demand and according revenues. The connection has historic roots – Germany's rapprochement with the Soviet Union and Willy Brandt's Ostpolitik (politics towards the East) in the 1970s, the "pipes for gas" agreement, and arrangements intentionally aiming for the interdependence of value chains in the cross-border natural gas market (Westphal, 2014; Stuchtey & Below, 2015). Pipeline projects, like Yamal in 1997 and Nord Stream in 2011, deepened the connection.

The recent stance of Russia with its assertive endeavors to reestablish its influence in the former satellite states of the Soviet Union and beyond – its drive to restore its role as a geopolitical power by means of hybrid warfare and military force, and its outright grasp for territory of sovereign countries – creates major challenges. The European Union has imposed embargos and sanctions against Russia as a reaction to the annexation of Crimea and its hand in the destabilization of Eastern Ukraine. The sanctions target, among other things, the supply of Russia with energy-related services, technology and equipment regarding "deepwater oil exploration and production, arctic oil exploration or production and shale oil projects" (European Union, 2015). The result is a somewhat paradox situation: Germany as an EU member, on the one hand, has to support and enforce these sanctions, while on the other hand, it is heavily dependent on the production and import of the impaired Russian industry sector.

While a Russian oil or gas export ban over an extended period of time does not seem likely, it must be strategically regarded as a contingency in the future. The de-escalation and restoration of trust between Russia and the EU / EEA/ EFTA are mandatory for energy security, from a European and especially German perspective. Germany should, notwithstanding the above and in order to expand its scope of feasible diplomatic action, diversify its fossil fuel import sources in the short- to medium term. The ties, particularly to

Norway, should be further developed, and new partnerships considered with suppliers from African countries. In addition, Germany should adapt its infrastructure accordingly (e.g. create storage sites for liquefied natural gas). In the longer term, the decision to invest heavily in renewable energies probably means backing the right horse. Not only will a sustainable energy system in Germany be more ecological and contribute to slowing down global warming, presumably caused by man, it will also make Germany more independent and enable it to live up to its role as a strong and reliable partner of its neighbors in the periphery of the European Union in these intense times.

The opinions expressed in this article are the author's own and do not reflect the view of the Brandenburg Institute for Society and Security or the German government.

European Union. (2015). EU sanctions against Russia over Ukraine crisis. Retrieved from http://europa.eu/newsroom/highlights/special-coverage/eu_sanctions/index_en.htm

Stuchtey, T., & Below, A. (2015). German Energy Security, Raw Materials Supply and Shifting Geopolitical Impacts. BIGS Policy Paper No.5. Brandenburg Institute for Society and Security, 1-26.

Westphal, K. (2014a). Institutional change in European natural gas markets and implications for energy security: Lessons from the German case. Energy Policy, 74, 35-43.

Øystein Kvarme

Ecological aspects of hay used as a fuel for power plants. Hay properties, harvesting, transport and storage

Using industrial hay as a fuel for power plants is part of the Polish energy policy directed at the protection of natural resources and reduction of conventional fuels in the production of electric energy. It will prevent a permanent exclusion of grasslands from the production. The industrial hay collected mainly from the previously non-productive areas and used as a fuel does not restrict the biodiversity and does not disturb the element circulation in nature – just as it happens in the case of the creation of monocultures of the energy crops. A balanced exploration of the green biomass (including industrial hay) from the protected areas has a positive effect on the protected species and habitats of flora and fauna. Such activities are carried out presently, but the mown green matter is not fully used.

The process of hay production used as fodder starts with grass mowing at the correct time. It is important to correctly assess the development stage of the plant species dominating in the meadow. Mowing starts when the plants are at the initial stage of grass heading and budding of legumes. At that time, fiber constitutes 23% of the dry matter. It should be especially noted that the time ranges refer to the hay which is meant for fodder. Mowing according to the recommended time makes it possible to get optimal material for hay of best feed quality, but it also allows to obtain the biggest crops from 1 ha, which is important when hay is meant for energy purposes.

In order to obtain good hay, it is necessary to lower the level of the dry matter as quickly as possible from 20-25% in the green matter to 80-85% in hay. In order to obtain 1 kg of hay, it is necessary to have 4 to 5 kg of the green matter.

The most important factor affecting the quality of industrial hay is drying, therefore this aspect must be recognized as the most crucial. Apart from that, the hay losses during the drying process are undesirable.

The drying process of the green matter can be accelerated by:

- Selecting the appropriate date of hay production, i.e. “adjusting to” good weather,
- Using a mowing machine equipped with a grass compressor and/or scarifier which will make water evaporate from the damaged plants,
- Using mowers which produce a compressed and narrow swath (it should be quickly and proportionally scattered all over the meadow using a tedder – each

time, tedding causes a loss of 1 to 2% of the dry matter, and the plants scattered on the field dry faster – the unscattered swath causes heat-sealing of the green matter),

- Additional drying after harvesting,
- Additional drying on special scaffolding constructed in the field (racks, fences, trestles, piles with rakes, etc),
- Additional drying with cold and warm air in buildings.

With good weather and properly performed procedures, already on the first day, it is possible to reduce the plant's water level to 60%. After two days and with good weather it is possible to reach a moisture level of 40%. Then, it is advisable to limit dynamic mechanical treatments, which will stop the process of crumbling of leaves and other parts of plants. With further drying, the green matter will lose 10-15% of water daily, assuming that the weather conditions are good.

Transport is the most crucial element of the industrial hay production cycle. The principles of loading, transportation and unloading are the same as in the case of straw. The cost depends on the market cost components and the reaction of the market to such orders.

The most popular means of road transport used for straw or hay transportation is the so-called semitrailer 13.6 m long and 2.4 m wide. It is possible to load 44 bales with a diameter of 1.2 m, made by balers, weighing about 6 Mg, or 32 bales with a diameter of 1.5 m and a total weight of about 7 Mg (loaded in piles). However, 33 bales (big cubes) made by the Hesston baler of 1.2x1.3x2.4 m is equal to approx. 13 Mg of biomass. It should be noted that the latter type of transport exceeds the permissible loading height.

The principles of industrial hay storage are the same as in the case of straw. The main condition is maintaining adequate humidity which determines the energetic values. It is stored under shelters, rarely in barns or utilized attics of livestock buildings. Most often it is stored in stacks or piles.

Marcin Śmiech

The impact of Poland's membership in the European Union on the potential of hay.

Taking into account the economic and institutional conditions resulting from Poland's membership in the European Union, it is necessary to consider the Common Agricultural Policy (further referred to as CAP). This policy is implemented on two planes: I – addressed only to farmers and involving over 80% of the financial means (mainly direct payments) and II – supporting the rural areas. Using the CAP funds is particularly important for the Lublin province where 53.7% of people live in the countryside, and agriculture plays a very significant role in employment and income. The greatest part of the funds spent within CAP goes to direct payments which are connected with observing the rules of environmental protection.

In compliance with the Payment Act ([link](#)), farmers are not obligated to indicate the type of crops they cultivate. This requirement must be met only by those farmers whose farms are subject to diversification. The obligation to use crop diversification applies to farmers with at least 10 ha of arable land, including the arable lands which are not declared for the single-area payment scheme. In the case when the arable land occupies:

10-30 ha – at least 2 different crops are required, and the main crop should not occupy more than 75% of arable lands,

>30 ha – at least 3 crops are required, and the main crop cannot occupy more than 75% of arable lands, and the main two crops cannot occupy more than 95% of arable lands in total.

In 2015, over 38 thousand farmers lodged applications with the Agency for Restructuring and Modernization of Agriculture (ARiMR) in the Lublin province for EU subsidies to agricultural lands (including permanent grassland) with an area of more than 10 ha.

Farmers applying for payments are obliged to maintain permanent grasslands. The area reported under the single-area payment scheme (arable lands and permanent grasslands) in the years 2011-2015 in the Lublin province was as follows:

	2011	2012	2013	2014	2015
thousand ha	1.338	1.342	1.343	1.349	1.356

The Lublin region is significantly affected by the changes in the quantities and structure of the Common Agricultural Policy funds. The share of EU support in the farmers' income is considerable. This support is a stable and predictable stream of funds for agricultural holdings.

Share of direct payments in agricultural income in Poland in 2004-2010.

Year	Farm income [€]	Direct payment [€]	Percentage of payments in the income [%]
2004	6.076	1.942	32%
2005	5.817	1.881	32%
2006	7.396	2.479	34%
2007	9.880	2.885	29%
2008	8.157	3.670	45%
2009	6.421	3.882	60%
2010	9.981	4.323	43%

The surveys carried out by GUS (the Main Statistics Office) among farmers show that for over 70% of respondents, the direct payments are the main factors ensuring the profitability of their businesses. They are used for buying different production equipment, farm modernization, the purchase of land, the repayment of bank loans, and current activities. The survey shows that the payments are used for non-agricultural purposes, especially on farms below 10 ha. It can be assumed that in future the size of the crop area will remain the same, with a small tendency to grow, and the payment may be used for development purposes by individual agricultural holdings if only the production potentials they possess are used properly.

Christian Schnell

Problems and issues of energy security in the Central and Eastern European Countries and Norway

According to the 'Second Report on the State of the Energy Union', published in February 2017 by the European Commission, import dependency in EU member states stabilised in the last 10 years at 52%-55%. However, most CEE countries have observed a decrease of net import dependency, mostly due to the increase of renewable energy share. In countries with a notable increase of indigenous renewable energy production (mainly Austria, Bulgaria and Romania – lessons learned from the Transnistria crisis), energy security has increased substantially, whereas in countries with a high share of indigenous fossil fuel production, i.e. hard coal, energy security has decreased due to reduced competitiveness of the domestic mining sector, though at a reasonable level (mainly Poland and Czech Republic).

	Net Import dependency [%]	
	Net imports [% of gross inland consumptions + bunkers]	Absolute change 2005 - 2014 [pp]
Austria	65.9%	-5.8%
Bulgaria	34.5%	-12.2%
Czech Republic	30.4%	2.4%
Hungary	61.7%	-1.4%
Poland	28.6%	11.0%
Romania	17.0%	-10.7%
Slovakia	60.9%	-4.4%

Table: Net import dependency/source: EC, Second Report on the State of the Energy Union

The largest import dependency is observed for crude oil, which increased at Union-level from 81.3% in 2005 to 87.9% in 2014 – one of the key arguments for developing e-mobility. Additionally, for natural gas a high import dependency can be observed, whereas the import dependency increased to 90% in 16 EU member states. A significant decrease in import dependency for natural gas has been observed in Romania, mainly due to an increase of indigenous renewable energy production from peak load technology, i.e. solar power. Additionally, import dependency for hard coal rose at Union-level

from 55.7% in 2005 to 67.9% in 2014 – that year only the Czech Republic was a net exporter of hard coal, and even Poland was a marginal net importer of hard coal. In 2015, 90% of natural uranium was imported from outside the EU.

The supplier concentration index rose from 8.1 in 2005 to 9.7 in 2014. Mainly CEE countries rely to a large extent on fuel imports from Russia, such as Bulgaria, Hungary and Slovakia, in particular natural gas but also oil and uranium. However, Poland and Austria are also to a high degree dependent on gas imports from Russia.

	Gas imports from Russia in 2015 in [%] of total natural gas demand
Austria	60%
Bulgaria	99%
Czech Republic	12%
Hungary	66%
Poland	54%
Romania	3%
Slovakia	81%
Germany	60%

Table: Gas imports from Russia/source: EC, Second Report on the State of the Energy Union

A high dependency on specific combined technology and fuel import, i.e. nuclear power, can also be observed for Hungary and Slovakia – in both countries the share of nuclear power exceeded 50% of total electricity production. This dependency goes in line with full reliance on uranium fuel from one supplier. Therefore, for both countries strengthening the inner energy market is inevitable to avoid 'politically motivated' black-outs; however, the import capacity, 37% in the case of Hungary and 59% for Slovakia, provides certain comfort.

A further increase of combined technology and fuel imports for new nuclear power plants from Russia should be seen as counterproductive for increasing energy security in the EU. Also, the increase of the supplier concentration index for natural gas from 7.6 in 2005 to 8.8 in 2014, mainly due to Russian gas imports, is worrying. However, new gas interconnections and LNG terminals should lead to a greater security of gas supply. In particular, the disruption of the gas supply in South East Europe resulting from a gas dispute between Russia and Ukraine in early 2009 should have resulted in more effective measures at Union level; however, Bulgaria and Rumania subsequently increased their share of indigenous renewable energy production. It is worth noting that even the supplier concentration index for hard coal has more than doubled from 5.3 in 2005 to 11.1 in 2014 – a supplier concentration comparable higher than uranium or natural gas supply. In this case, Russia is the most competitive supplier in Europe, having a large reserve of low-cost high-quality hard coal available.

In conclusion, mainly an increase of indigenous renewable energy production will provide less import dependency, as a high share of indigenous fossil fuel production, i.e. lignite and hard coal, will increase import dependency due to the lack of its competitiveness against imports. Additionally, the EU strategy to diversify gas imports has not been very effective so far, as Russia, the main supplier, will stay the most competitive supplier for the time being. Finally, nuclear power as combined technology and fuel import further increases import dependency, as in the case of extension of the Paks nuclear power plant located south of Budapest. Therefore, the extension of EU internal transmission infrastructure (independently from Gazprom) and strengthening combined trading power of the EU is a must to secure energy supply for now. The phase out of coal power plants at the moment generally promotes new gas power plants providing higher import dependency before RES and the energy storage capabilities are technically able to fully take over secure supply. Norway plays an inevitable role in balancing fuel imports from Russia. Also, increasing LNG imports from third countries furthers energy security.

Mykhailo Gonchar

Energy Security of Central and Eastern Europe: Hybrid Threats and New Opportunities

The Global Strategy for the EU adopted in 2016 clearly states that “today, terrorism, hybrid threats, economic volatility, climate change and energy insecurity endanger our people and territory.” The energy dimension became extremely important with the arising hybrid threats. They are hard to identify and recognize, as they do not look like threats. They could be compared to a bomb disguised as toy.

The fourth year of the Russian hybrid war against Ukraine demonstrates the helplessness of the European institutions and member states’ government agencies in identifying hybrid threats. The Russian Nord Stream 2 project certainly belongs to this category of threats. Regardless of whether it will be implemented or not, by the very fact of its initiation, Russia has provoked another disunity in the EU. On the one hand, we see the German-Austrian tandem that clears the road to this project in the EU; on the other hand, the resistance of the CEE countries, first of all, Poland, the Baltic States and Ukraine.

It would seem that such a disunity in the EU should not have arisen, as the Energy Union documents contain the criteria: “...the EU will seek to diversify its energy sources, routes and suppliers, particularly in the gas domain....” According to these criteria, Nord Stream 2 should not be attributed to the number of diversifications. The Global Strategy for the EU unequivocally points to the project initiator as a source of hybrid threats: “To the east, the European security order has been violated... Russia’s violation of international law and the destabilization of Ukraine, on top of protracted conflicts in the wider Black Sea region, have challenged the European security order at its core”.

What is interesting? To the principled refusal of the Latvian government to provide the port of Ventspils for storing pipes during the construction of the gas pipeline, Moscow responded with a 40% reduction of Russian oil products transit through it. On the other hand, we see that American LNG, which began to appear on the European market, caused ambiguous reactions in the EU. However, the appearance of another gas supplier clearly means real diversification and the Energy Union documents highlighted the importance of infrastructure development for receiving and storing LNG.

Ukraine, which traditionally used to cover about 70% of its gas consumption through Russian supplies, has not been importing Russian gas since the end of 2015, having reduced its dependence on the aggressor. It is important that EU countries such as Lithuania and Poland are at the forefront of diversification. In addition, Poland is trying to implement a project that will bring Norwegian gas to the CEE region. Romania is another

positive example. Having increased its own gas production and reduced consumption, it refused to import it from Russia. These are examples that are worthy of support and dissemination as the best European practices for the neutralization of hybrid threats.

Mykola Voytiv

Three Ukrainian Pillars of Energy Security in Central and Eastern Europe: Gas, Oil, Electricity

1. GAS

Integration

In February 2015, the EC launched the Central and South Eastern Europe Gas Connectivity Initiative (CESEC). Austria, Bulgaria, Croatia, Greece, Hungary, Italy, Romania, Slovakia and Slovenia and the EU

During the Working Group II meeting (July 10, 2015), CESEC was joined by the six Energy Community Contracting Parties: Ukraine, Republic of Moldova, Serbia, FYROM, Albania and Bosnia and Herzegovina, having signed a Memorandum of Understanding. The Memorandum signatories expressed their readiness to sustain the necessary political commitment to oversee the full and timely implementation of the CESEC Action Plan, which includes the following elements: selection of a limited number of key projects benefitting the CESEC region; identifying and addressing project-specific challenges; financing aspects, including the role of the European Investment Bank and the European Bank for Reconstruction and Development; addressing market integration challenges.

Supply

Ukraine-Poland Interconnector. The goal is to connect the Ukrainian and Polish gas networks – to diversify gas supplies for Ukraine and further integration of transmission systems and markets in the Eastern European region (5 bcm/year), as well as to give access to 80% of Ukrainian UGS capacity (about 8-15 bcm), which is located in Western Ukraine within about less than 100 kilometers from the EU border. With this infrastructure, Ukraine should be able to participate in further cooperation.

Gas corridor from Norway. Poland will import Norwegian gas through the «Baltic pipe» (length – 200 km). Negotiations between Poland and Denmark about the right of way of the pipeline is nearing conclusion and a feasibility study will need to be done soon.

«LNG Świnoujście», a Polish LNG terminal which started its operation in July, 2016, importing Qatari and US gas. Earlier, logistics expenditures of the LNG price was about 30%. This has been decreased to about 15-20%. So, both options are workable for Poland so they have reduced their dependence on Russian gas (the contract with Gazprom expires in 2022).

In this context, we may look at the prospects of the “LNG Ukraine” project, which was started but postponed.

Cooperation on the gas wells market

Polish PGNIG is a shareholder of the Ukrainian JSC “DEVON”. The company operates on the market of gas wells drilling and gas production. It produced about 124 mcm of gas in 2016.

The Croatian “Crosco Integrated Drilling & Well Services Ltd” signed the agreement with Ukrgasvydobuvannia, UGV for drilling 12 gas wells in Ukraine’s Poltava region.

2. OIL

Cooperation

Euro-Asian Oil Transportation Corridor, EAOTC (Project Sarmatia).

The transportation of Azerbaijani oil to the EU via Odesa – Brody (Adamowo-Płock-Gdańsk) oil pipeline (also known as “Odessa-Gdansk: Northern Dimension for Caspian Oil”).

The project is postponed.

Taking into account the capacity of Ukrainian oil refining, specialists and infrastructure, it is essential to go back to the initiative of building a new refinery complex in Ukraine (joint EU-Ukraine-Azerbaijan project) with refining 8-10 million tons of oil/year.

3. ELECTRICITY

Integration

Integration of Ukrainian electricity network/market into ENTSO-E.

The maximum power transmission to/from the ENTSO-E in the case of full synchronization with Ukrainian network will be from 0.885 GW to 2.2 GW by 2022 and 4 GW by 2027. It will provide additional possibilities for balancing the power system and creating conditions for more perfect competition on the EU energy markets.

The umbrella for this secured and integrated market should be a new-built energy exchange.

Victor Parlicov

Showcasing Central and Eastern Europe energy security vulnerabilities to foster a Pan-European approach to Energy Security

Energy has always been an important pillar of Security, while Security is at the core of International Relations and Politics. Integration processes on the European continent after WWII started with the European Coal and Steel Community, rooted in Energy and Security. Despite that, by the time the Russian-Ukrainian gas crisis hit Europe in 2009, EU did not have a common approach to energy security. And even at present, almost a decade after that crisis, crucial decisions on issues pertaining to European Energy Security are made at the level of individual states or even left to commercial arrangements.

Traditionally, natural gas was supplied to Europe from several sources: North Sea, North Africa, and Russia. European consumers are connected to these sources through pipelines, which created strong and long-term interdependencies between suppliers and consumers. However, in the absence of a common European gas market and robust and flexible interconnections, entire regions of the EU were dependent solely on one source of natural gas. Despite these vulnerabilities, this approach seemed to work – after all, natural gas was flowing from the USSR to Western Europe even during the Cold War, so the assumption was that it will work in the future.

However, as mentioned, Energy has never been just a commercial issue, and as soon as some regions found themselves dependent solely on natural gas from Russia, the latter started to use it as a tool for exercising political influence. The Eastern European and Balkan countries felt it more than others. In Moldova, Russia used and still uses Gazprom to finance separatism in the Transnistrian region¹. Over 6 billion USD worth of natural gas has been supplied to the region basically for free since 1994. Over a period of 10 years (for which data was available), the gas subsidy represented roughly half of the region's GDP and accounted for over a third of the region's budget expenses. Moreover, Russian investors took over a huge power plant and a metallurgic plant in the separatist region and used the "free" gas to produce electricity and steel, selling it not only in Moldova but on the global market. This is particularly relevant in the context of the crisis in Eastern Ukraine, since this model of financing separatism can be easily applied there, especially given that the region is rich in primary energy sources, particularly coal. Even a Government has fallen in Moldova due to a gas crisis orchestrated by the separatist authorities

1 For details, please see the following study: <http://viitorul.org/files/Policy%20Paper%202017%20-%20Impunitate%20si%20%20intelegeri%20rentiere%20sectorul%20energetic%20ENG%20II.pdf>

controlled by Russia. And Moldova is not a stand-alone case. Relations between Russia and Belarus largely revolve around the prices for gas and oil supplied from Russia. In Ukraine, the political issue of contract prolongation for the military base in Sevastopol has been tied with the so-called “discount” for gas prices. All over the Balkans, and even in Western Europe, Russia used Gazprom and gas prices as a tool for political negotiations. Gradually, such an approach pushed the most vulnerable countries to look for ways to diversify suppliers. Such initiatives as physical reverse flows on the Slovakian-Ukrainian border, or LNG terminals in Lithuania and Poland might not have happened if Russian natural gas had not had a political side attached to it.

On the other hand, there are recent trends that have the potential to become game changers:

1. The Northern American “shale gas revolution” has proven to be real and not just a “temporary bubble” as its critics were portraying it. The very fact that presently six terminals in the Gulf of Mexico are being converted from LNG import to LNG export terminals, speaks for itself. Several more are going through the permitting procedures. President Trump has already voiced the firm intention to become a major exporter of natural gas, and Świnoujście has already welcomed the first shipment of North American LNG.
2. In order to access remaining natural gas resources in the North Sea, the drilling will have to go further and further from the shore, which eventually poses the question of whether the North Sea natural gas shall be brought to the continent through pipes, or as LNG. This issue might seem technical but, in fact, if significant LNG-reception capacity is added on the continent, it creates new opportunities for the diversification of gas import sources.

There’s no doubt that the diversification of suppliers is a traditional way of enhancing security. Also, integrating European national gas markets into a single big market is to be further pursued. However, with the new trends, there is a new strategic choice to be made: should the EU proceed with the diversification of suppliers through facilitating investment in other pipelines or should the focus be changed to increasing the LNG reception capacities, which provide a much better flexibility in choosing suppliers in the long term.

Burim Ejupi

Energy Security in Kosovo – between nationalism and integration

The concept of Energy Security is widely discussed albeit there is no agreed common definition of what it really means. The UN, for example, defines energy security through continuous availability, sufficient quantities, and reasonable prices. The EU aims at energy source diversification rather than maximizing energy self-sufficiency. The European energy security concept is characterized by the link between energy security (of supply) and competition policy implying that an efficient market is the cheapest way of guaranteeing long-term energy security. The EU's concept of energy security also includes environmental components.

Energy security is a reoccurring topic in Kosovo. With a constantly looming energy crisis and the EU nudging the country towards new initiatives in the sector, it is clear that reliable energy infrastructure is vital for the country to reach a stable economic development. As the public sector discusses the available options, the private sector's growth is hindered by the unreliable energy supply, with estimated losses of €359 million annually. At the same time, long-term investments are also postponed as Kosovo's energy sector is unable to keep up with the demand growth.

But what if we could have more energy of different types, if we had it from different sources and if the whole endeavor helped in building trust and cooperation between neighboring countries in the Balkans? What if we can have integration as the security of supply, affordable prices and a healing cooperating mechanism for the shattered region?

The EU itself was born through the need to trade coal and steel. Could the Balkans be 'healed' through an energy security initiative?

Kosovo's demand and electricity consumption grew 90% over a ten-year period. This resulted in Kosovo not having the capacity to fulfill the domestic energy consumption needs, especially since the demand for energy is still increasing. Kosovo's energy supply is produced by two lignite-fired thermal power plants that were built during the Yugoslav-era and a hydropower plant. The fact that Kosovo relies on an outdated and inefficient power generation system leads to two main problems. On the one hand, energy security is not guaranteed, resulting in cases of power outages.

In this situation, Kosovo's government, on the one hand, aims at liberalizing the energy market which is based on EU directives and the third energy package adopted in 2016 as part of Energy Community Treaty. This step also includes the full integration of

Kosovo into the common regional energy market. It should be noted here that when we talk of energy in Kosovo, we primarily understand electricity. On the other hand, the construction of a new lignite thermal power plant that would replace one of the outdated ones is likely and the lack of security of supply is given as the main justification behind it.

Integration into the regional market would give Kosovo and other countries different benefits. Differences in energy sources in these countries are as evident as other differences. By joining a common energy market there would be diversification of energy sources. Kosovo is already dependent on coal production. At the same time, countries like Albania produce most of the power from hydropower plants. Moreover, through the TAP project, Albania has become a significant hot spot for the gas market, which will be very important for the region. Market integration would bring diversification of energy resources and distribution of effort and accountability for supply.

Since this year, Kosovo has started to deregulate prices and liberalize the energy market. The tariff structure has changed in a way that legally, though not in practice yet, citizens can choose their supplier. Consequently, the energy market is being liberalized internally, while a new power plant is being proclaimed without the market being integrated into the regional one. The liberalization of the market without its integration in countries like Kosovo, where 95% of production is generated by one operator, means monopolization rather than competition in the market. Thus, integration implies the diversification of production from different sources, an idea that meets the aspects of security of supply.

The high cost of the investment, for a market the size of Kosovo is bound to skyrocket electricity prices, a problem that could be mitigated if a bigger market was available. In fact, this last point is one of the main reasons why the construction of a new coal-powered plant has been under criticism. World-class researchers have alerted that investing an estimated 1.35 billion euros will take its toll on both public finances and on the welfare of the population, as electricity bills are expected to rise up to 50% and public investments will be diverted from other necessities. On top of it, the investment will also lock Europe's youngest nation in relying on a regressive and polluting fossil fuel, when it could be gearing towards renewable energy sources which are environment-friendly.

As outlined above, the current Kosovar energy strategy to ensure energy security is based on two different, divergent approaches. In order to enhance energy security with a plan that is environmentally and economically sustainable, an integrated regional energy market is crucial. A successful example of the integrated regional energy market is the Nordic Electricity Market. The premise in it is the liberalization of the electricity market which enhances competition that would drive down electricity prices for final consumers. Another benefit is the improvement in infrastructure in both generation and transmission of energy, meaning that the contributing countries can gain from different energy supply sources. This last aspect will also benefit from the increased attractiveness of investments in the area, as a bigger market would be contemplated further, regions and countries encountering an undersupply of energy can profit from the oversupply

of other countries and regions. The Nordic Market experience has also been vital for the integration of fluctuating but renewable energy sources, such as wind and solar, in the energy grids of those countries.

Despite the obvious differences between the regions, the fact is that the Nordic Market experience is a successful example of how countries can benefit from integration as a form to ensure energy security, relying on market liberalization to promote an efficient and competitive energy supply, something that the Western Balkans need to achieve in order to reach economic and social development. Finally, an integrated energy market would create more trust between the Balkan countries, which is extremely important for the common European future. The Balkan region still suffers from the consequences of a long conflict. The integration of the energy market could be just the right thing to do in order to close the chapters of suffering and open the chapters of cooperation and unity as European values.

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