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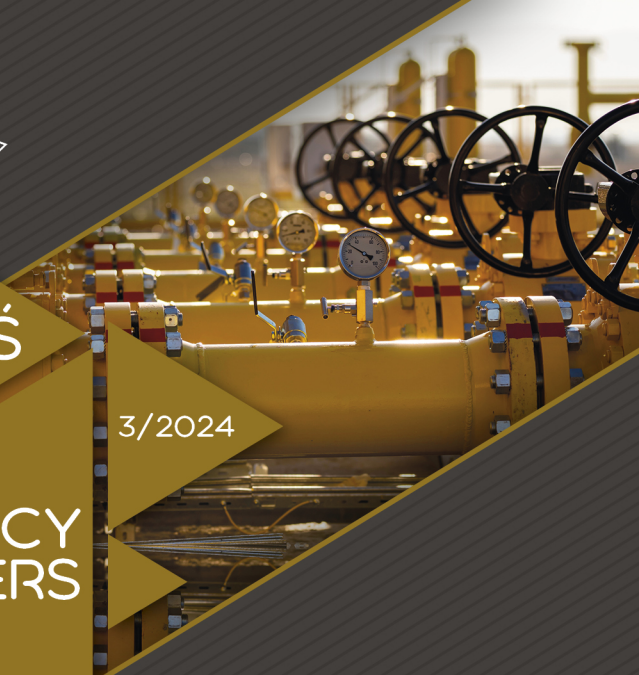
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Central European countries' path to energy derussification: opportunities and challenges

Edited by
Michał Paszkowski

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Lublin 2024

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Executive summary

Unlocking opportunities: Central European countries' approach to crude oil sector derussification

The current crude oil infrastructure in Central European countries efficiently transports the commodity to nearby refineries. Historically, access to crude oil has primarily been facilitated through the Druzhba pipeline. The process of derussification necessitates regional refineries to reconfigure the logistics of crude oil procurement, whilst the availability of grades with optimal characteristics remains a pivotal consideration. The war caught many by surprise, with a shift in supply routes constituting one of the unanticipated worst-case scenarios in numerous instances. Nevertheless, the process of altering the supply portfolio is gradually unfolding, with an increasing influx of grades from Saudi Arabia, Norway, Guyana, and the United States (US) permeating the region.

Ukraine: experiences and challenges in derussification of the energy sector

The Russian Federation uses energy as a tool to influence the internal politics of neighbouring countries, in particular Ukraine. This covers not only blackmail in the supply of natural resources but also the control of critical infrastructure and the introduction of agents of influence in energy markets. After the Revolution of Dignity and the annexation of Crimea, Ukrainian governments began the process of depriving the Russian Federation of influence in the energy sector. During 2014–2022, Ukraine achieved only partial success. After the full-scale invasion of 2022, the Ukrainian government took drastic measures to reduce Russia's influence, including a total ban on energy trade, diversification of supplies, and confiscation of Russian assets.

Filling the gap: the importance of US energy resources in the Central European region

The energy industry's intersection with international politics is undeniable, as access to commodities shapes the independence, cooperation, and conflicts of countries, leading to evolving power dynamics. Energy security directly impacts military strength, economic development, and citizen well-being, while also influencing geostrategy and foreign policy. The challenge intensifies with dwindling conventional energy resources and rising demand. In Central Europe, the 2022 Ukraine war, initiated by Russia, significantly affects energy security, prompting efforts to reduce reliance on Russian resources. This dynamic further influences energy cooperation within the European Union and also transatlantic relations, notably with the US.

Romania's role in regional energy security during the process of derussification: part of the problem or part of the solution?

After the full-scale invasion of Ukraine in 2022, Romania had to revise its stance on regional interconnectivity of natural gas and electricity and supporting its neighbours, primarily Moldova. Romania indeed accelerated the development of natural gas deposits in the Black Sea and long overdue pipeline and power grid investments. Despite its immediate crisis response, which was generally positive for regional energy security, the long-term prospects are less optimistic. Romania's de facto energy policy continues to hamper investments in the power sector, which in 2022-2023 took place rather despite the state than with its support. Instead of becoming a provider of energy security to the region as the main EU natural gas producer in Central European countries, beyond 2027, Romania may start competing with others for limited supplies, potentially increasing imports from Azerbaijan or, even worse, Russia.

Contemporary technological advancements in energy systems and their impact on reducing dependency on Russian energy resources

The energy landscape of Central Europe has experienced a profound transformation in recent years, marked by a collective push for energy security and independence. However, the region's longstanding reliance on Russian fossil fuels, particularly natural gas and crude oil, has left it vulnerable to geopolitical risks, as demonstrated by Russia's invasion of Ukraine in 2022. In response to this vulnerability, Central European countries are actively pursuing energy

derussification, seeking to diversify supply chains and embrace modern technologies to enhance resilience and sovereignty. Undoubtedly, the role of modern technologies in this process through the use of renewables, energy storage, smart grids, electrification of transportation, decentralised energy systems, and digitalisation will increase the security of Central European countries.



Introduction

The eruption of a full-scale conflict between Russia and Ukraine in 2022 represents a pivotal moment in the history of Central European countries. This military engagement, unprecedented since World War II, underscores Russia's resurgence in leveraging power to assert its international standing. Russia's preparations for this war spanned several years and encompassed a multifaceted approach, encompassing military actions (such as the annexation of Crimea and occupation of eastern Ukraine since 2014), diplomatic manoeuvres, propaganda campaigns, and energy strategies. Throughout this period, Russia pursued a range of activities aimed at exerting influence over Ukraine, with energy manipulation serving as a prominent tool. This included the construction of pipelines like Nord Stream 1, Nord Stream 2, and TurkStream, alongside instigating natural gas disputes. These efforts were geared towards undermining Ukraine's credibility on the global stage, portraying it as an unreliable transit country for natural gas transportation.

Since 2014, Ukraine has undertaken extensive efforts towards achieving energy independence from the Russian Federation while maintaining its role as a transit state. Significant projects have been implemented on the Ukrainian natural gas infrastructure, particularly in anticipation of the expiration of the Russian-Ukrainian transit agreement in 2025. This agreement termination will undoubtedly prompt a re-evaluation of the energy landscape in Central European countries. Prior to the outbreak of the 2022 war, the region relied heavily on energy supplies from Russia. The Russian Federation's policy aimed to prevent these countries from pursuing sovereign energy policies that diversified their sources and routes for crude oil and natural gas supplies. Consequently, Russia sought to monopolize energy markets. However, the 2022 conflict demonstrated that Central European countries were capable of implementing measures to alter the structure of their energy supplies and collaborate with alternative suppliers. This resilience highlights the region's ability to adapt and respond to challenges in the energy sphere.

The structure of this paper is problem-centric, addressing several critical topics concerning the transition of Central European countries away from reliance on energy resources from the Russian Federation. While undoubtedly challenging and time-consuming, the measures already initiated, coupled with existing infrastructure, provide a foundation for implementing diversification policies. Among the complex issues at hand is the transition away from crude oil supplies for numerous refineries situated in the heartland of Europe. Here, the challenge encompasses not only the capacity of infrastructure to supply refineries via the Adria

and TAL pipelines (currently undergoing expansion) but also the availability of crude oil of suitable quality. Additionally, the question of filling the void left by energy resources from Russia is of significant interest. In this regard, the United States of America (US) is emerging as a key player in the energy market of Central European countries. It is anticipated that the share of commodity supplies from the US will rise in the forthcoming years. The full-scale attack by the Russian Federation on Ukraine in 2022 serves as yet another episode in the enduring struggle between these countries. Undoubtedly, the events of 2022 represent the climax of Russia's actions against Ukraine. Considering the intricate nature of their relations, it becomes evident that the process of derussification, particularly concerning Ukraine, will be exceedingly challenging. Departing from reliance on energy resources from Russia is not only a sustainable endeavour but also a crucial component of energy transition efforts. Modern and low-carbon technologies, such as nuclear energy and renewables, can serve as vital complements to ensuring electricity availability while concurrently facilitating the disengagement from energy cooperation with Russia. Romania, in particular, faces such challenges. As one of the largest natural gas producers in Europe, the country's development of resources in the Black Sea could significantly impact the energy security landscape of Central Europe. Nevertheless, Romania must confront numerous obstacles on this path, and overcoming these challenges is likely to bring about significant changes in the energy dynamics of Europe.

Countries from Central Europe confront a multitude of challenges and opportunities in the derussification of their

energy sectors. A key challenge lies in ensuring the availability of energy from alternative sources to Russia, while opportunities arise from the potential reorientation of the entire energy sector, including shifts in crude oil and natural gas supply directions as well as embracing energy transition initiatives. The ability to generate electricity and reduce vulnerability to price fluctuations during wartime conditions is crucial for ensuring energy security. The path towards energy independence from Russia will vary for each of the Central European countries, driven by unique dynamics. Nonetheless, it is a shared objective, pursued despite fluctuations in individual countries' approaches to cooperation with Russia. Inevitably, the derussification process is underway, yet the pace remains uncertain. Consequently, the process presents an intriguing area for research, as highlighted by various sections of the publication.

Michał Paszkowski
Lublin 2024



Michał Paszkowski

Unlocking opportunities: Central European countries' approach to crude oil sector derussification

Introduction

The full-scale attack launched by the Russian Federation on Ukraine in February 2022 has wrought significant changes in the refining sector of Central European countries. Previously, numerous plants in the region relied on eastern supplies. However, the imposition of sanctions has elevated the importance of crude oil terminals and pipelines in ensuring stable supplies. Leveraging existing tools, some countries have successfully undertaken a comprehensive diversification process, transitioning away from crude oil supplies originating from the Russian Federation and bridging the gap with alternative grades.

The conflict in Ukraine has precipitated a shift in the external environment for energy companies operating in Central European countries. This has led to an increased

significance of crude oil grades previously not imported into the region. Consequently, ensuring continuity of supply has become more challenging, necessitating the import of crude oil from distant regions such as Brazil, Guyana, and the US. Simultaneously, the Russian Federation has undertaken active measures to restructure its business partnerships, diverting a substantial portion of its commodities to the Asia-Pacific region¹. Despite sanctions, efforts to circumvent restrictions, particularly concerning petroleum products, persist. Consequently, in 2023, a portion of crude oil supplies continued to reach Central European countries through both official channels, facilitated by permits obtained for some plants, and unofficial channels, involving the circumvention of sanctions.

The aim of the text was to examine the measures adopted by Central European countries post the Russian Federation's invasion of Ukraine in February 2022, aimed at diversifying the sources and routes of crude oil supplies to regional refineries. Concurrently, the cognitive aim was to assess the feasibility of achieving complete derussification. This task presents significant challenges due to factors such as the availability of grades akin to those from the Russian Federation (particularly Urals grade), limitations in technical infrastructure for crude oil transportation, and political considerations.

¹ V. Soldatkin, O. Astakhova, *Russia exports almost all its oil to China and India – Novak*, Reuters, 27.12.2023, <https://www.reuters.com/business/energy/half-russias-2023-oil-petroleum-exports-went-china-russias-novak-2023-12-27/> [20.04.2024].

Import and transportation infrastructure in the region

In the Central European member states of the European Union, both technological and logistical factors play a crucial role in facilitating diversification efforts. A well-functioning infrastructure is imperative for importing crude oil from alternative directions. Additionally, technological advances significantly influence the origin of crude oil imports.

The region boasts twelve refineries located across Lithuania (Mažeikiai), Poland (Płock, Gdańsk), Czechia (Kralupy, Litvínov), Slovakia (Bratislava), Hungary (Százhalombatta), Bulgaria (Burgas), Romania (Năvodari, two in Ploiești), and Croatia (Rijeka). These refineries vary in capacity and can be categorised based on different criteria². However, regarding diversification efforts, two key categories emerge: technological advancement and geographic location, specifically access to crude oil terminals. Refineries that are technologically advanced and capable of processing various grades of crude oil include Burgas, Bratislava, Năvodari, Gdańsk, Százhalombatta, Płock, and Petrotel in Ploiești. Conversely, others such as Rijeka, Petrobrazi in Ploiești, Kralupy, Mažeikiai, and Litvínov generally lack the flexibility to select crude oil grades freely, as this affects the optimisation of petroleum product production. Geographically, refineries can be distinguished based on their proximity to sea basins (the Baltic Sea, the Black Sea, the Adriatic Sea) and inland locations. Refineries situated close to sea basins, such as Burgas, Năvodari, Gdańsk, Rijeka, and Mažeikiai, benefit from favourable geographic locations. Conversely, refineries

² See M. Paszkowski, *Przemysł rafineryjny w państwach Europy Środkowej: uwarunkowania, wyzwania, perspektywy*, Prace IEŚ, no. 4, Lublin 2022.

located inland, such as Bratislava, Százhalombatta, Płock, Petrotel and Petrobrazi in Ploiești, Kralupy, and Litvínov, face logistical challenges related to import infrastructure (crude oil terminals) and transportation (pipelines).

In Central European countries, crude oil terminals and pipelines play a crucial role in ensuring the availability of crude oil. Their efficient operation facilitates both the receipt of commodities and transportation to refineries in the region. Geographically, terminals on the Baltic Sea (such as Klaipėda in Lithuania and Gdańsk in Poland), the Black Sea (including Midia and Constanța in Romania and Burgas in Bulgaria), and the Adriatic Sea (like Omišalj in Croatia) are of paramount importance for plants in Central European countries³. The existing crude oil terminals fully enable the supply of crude oil to refineries located both by the sea and inland. However, the primary challenge concerning crude oil supplies, including from alternative sources to the Russian Federation, lies with pipelines. For years, the majority of refineries in Central European countries relied on crude oil imports via the Druzhba pipeline. Deliveries through this pipeline served half of the operational plants, including Mažeikiai, Płock, Gdańsk, Bratislava, Litvínov, and Százhalombatta. Conversely, some refineries imported crude oil from Russia via sea routes, such as Burgas, Năvodari, and two plants in Ploiești. Notably, only refineries in Rijeka and Kralupy imported alternative grades of crude oil. In addition to the Druzhba pipeline, the TAL/IKL pipelines play a significant role, facilitating crude oil supplies

³ M. Paszkowski, *Crude oil terminals in Central European countries in the era of the shift away from Russian commodities*, "IEŚ Commentaries" 2024, no. 31(1055), <https://ies.lublin.pl/en/comments/crude-oil-terminals-in-central-european-countries-in-the-era-of-the-shift-away-from-russian-commodities/> [20.04.2024].

from the Trieste terminal to Czechia. Similarly, the Adria pipeline enables crude supplies to Százhalombatt in Hungary, Bratislava, and partially Kralupy, among others. Moreover, crude oil supplies are directed to refineries in Pančevo, Serbia, and Brod in Bosnia and Herzegovina, albeit these refineries are situated outside EU member states.

Diversification measures

For refiners in Central European countries, the successful implementation of a policy aimed at diversifying sources and directions of supply hinges on two key factors: a robust infrastructure and the availability of appropriate grades of crude oil. The onset of the 2022 war compelled plants in this region to swiftly engage in commercial activities. The dominant supply directions included Middle East countries (primarily Saudi Arabia), Norway, Guyana, and the US.

The outbreak of war elicited a negative response from the international community, leading many countries to impose sanctions on crude oil imports from Russia. Depending on the evolving situation and the availability of alternative grades, individual refineries undertook diversification measures. Two distinct groups of plants emerged: those swiftly discontinuing crude oil supply from Russia and those granted derogations to continue purchasing and processing Russian crude oil. The first group comprised plants in Poland (Płock, Gdańsk), Lithuania (Mažeikiai), Croatia (Rijeka), and Romania (Năvodari and two in Ploiești)⁴. The effectiveness

⁴ *Poland's PKN Orlen ends final Russian oil contract without penalties, says CEO*, Reuters, 5.04.2023, <https://www.reuters.com/business/energy/polands-pkn-orlen-ends-final-russian-oil-contract-without-penalties-says-ceo-2023-04-05/> [21.04.2024].

of their measures stemmed from geographic accessibility to crude oil terminals and pipelines as well as political actions. Governments in Poland, Lithuania, Croatia, and Romania strongly supported Ukraine and condemned Russia's actions. Conversely, the second group included plants in Czechia (Kralupy, Litvínov), Slovakia (Bratislava), Hungary (Százhalombatta), and Bulgaria. Their stance on the necessity of continuing Russian crude oil supply varied due to diverse geographic, political, and ownership conditions. Some refineries faced challenges in securing alternative supplies due to inadequate pipelines (mainly in Czechia). Others, despite having technical solutions for diversification, opted to maintain Russian supplies (mainly in Slovakia). Additionally, plants owned by Russian companies (Bulgaria) faced complexities in transitioning away from Russian crude oil. Hungary's decision to continue importing crude oil from the East was influenced by its foreign policy stance and lack of opposition to the Russian-Ukrainian war⁵.

In 2022, some refineries opted to continue imports and secured derogations from imposed sanctions. Consequently, refineries in Czechia, Slovakia, Hungary, and Bulgaria continued importing crude oil via land (through the Druzhba pipeline) and sea routes from Russia⁶. Notably, Czechia undertook measures to expand the capacity of the TAL pipeline, enhancing the ability to import crude oil through the

⁵ B. Fincziczki, D. ab Iago, *Hungary wants Russian oil ban off the agenda at EU meet*, Argus, 25.05.2022, <https://www.argusmedia.com/en/news-and-insights/latest-market-news/2335042-hungary-wants-russian-oil-ban-off-the-agenda-at-eu-meet> [28.04.2024].

⁶ European Commission, *Russia's war on Ukraine: EU adopts sixth package of sanctions against Russia*, 3.06.2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2802 [18.04.2024].

Trieste terminal⁷. In Bulgaria, the government in Sofia implemented regulations to compel Lukoil to diversify its operations. These measures included revoking operational control of the Rosenets crude oil terminal, imposing a significant tax on profits, banning the export of petroleum products produced from Russian crude oil at the Burgas refinery, and shortening the derogation period for importing crude oil from Russia by sea⁸. Conversely, despite possessing the technical capacity for alternative crude oil supplies through the Adria and Százhalombatta-Šahy pipelines, refineries in Slovakia and Hungary did not undertake appropriate diversification measures due to policy choices.

Prospects for changing crude oil supply structures

The Russian-Ukrainian war has compelled refiners in Central European countries to reevaluate their crude oil supply structures. Consequently, grades from various regions, previously not considered by individual plants, have been redirected to this part of Europe. For refineries still importing crude oil from Russia, the process of derussification will be prolonged.

A shift in the crude oil supply structure to certain refineries in Central Europe has been evident since 2022. Some plants promptly increased their intake of grades from non-Russian sources. This was notably observed in

⁷ *TAL approves pipeline upgrade to help Czechs ditch Russian crude*, Reuters, 30.11.2022, <https://www.reuters.com/business/energy/tal-approves-pipeline-upgrade-help-czechs-ditch-russian-crude-2022-11-30/> [18.04.2024].

⁸ M. Paszkowski, *Lukoil plans to sell its refinery in Bulgaria*, "IEŚ Commentaries" 2024, no. 54(1079), <https://ies.lublin.pl/en/comments/lukoil-plans-to-sell-its-refinery-in-bulgaria/> [22.04.2024].

refineries in Poland and Lithuania (owned by ORLEN) and Croatia, where the latter had previously imported minimal quantities of Russian crude oil. Similarly, in Romania, the refinery in Năvodari, owned by the Kazakh company KazMunayGas, augmented its supply of crude oil from Kazakhstan. A parallel scenario unfolded for the other two plants in Ploiești. However, a notable concern arises regarding Kazakhstan's export of the new KEBCO-grade crude oil⁹. It is widely understood that this is Russian crude oil sold on the international market, with Kazakhstan's involvement in its sale. Consequently, refineries importing this crude oil effectively circumvent sanctions and continue to procure crude oil from Russia, particularly evident in refineries in Romania and Bulgaria¹⁰.

The prospects for diversifying crude oil sources and routes vary among other refineries in Central Europe. In Czechia, imports to the Kralupy and Litvínov refineries have historically utilised two distinct channels – the Družba and TAL/IKL pipelines. Currently, efforts are underway to expand the transmission capacity of the TAL pipeline, facilitating a shift in crude oil supply direction to Czechia and reducing reliance on imports from Russia. In Slovakia and Hungary, the situation is more complex, with political considerations playing a significant role. Both the Százhalombatta refinery in Hungary and the Bratislava refinery

⁹ N. Coleman, *Kazakhstan rebrands crude exports via Russia Transneft system*, S&P Global, 7.06.2022, <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/060722-kazakhstan-rebrands-crude-exports-via-russia-transneft-system> [25.04.2024].

¹⁰ M. Paszkowski, *Impact of Russian-Ukrainian war on crude oil supplies to Bulgaria and Romania*, "IES Commentaries" 2023, no. 248(1000), <https://ies.lublin.pl/en/comments/impact-of-russian-ukrainian-war-on-crude-oil-supplies-to-bulgaria-and-romania/> [22.04.2024].

in Slovakia, managed by MOL, are indirectly influenced by the government in Budapest. Existing pipelines, such as the Adria pipeline in the Croatia-Hungary section and the Százhalombatta-Šahy pipeline in the Hungary-Slovakia section, have the capacity to fully supply both plants from the south, without the need for Russian crude oil imports. Conversely, diversification efforts for the Burgas refinery in Bulgaria have been constrained by its ownership structure under Lukoil. The potential sale of the plant could lead to a scenario where no Russian crude oil is delivered to Bulgaria. In light of these changes, the Sofia government is contemplating a return to the Burgas-Alexandroupolis pipeline project, possibly reversing original plans. This would enable the Burgas refinery to procure crude oil from the Mediterranean, reducing reliance on transporting crude oil through the congested Turkish straits¹¹.

Conclusions

The 2022 Russian-Ukrainian war has had a profound impact on the crude oil supply dynamics of refineries in Central European countries. While several plants have ceased importing crude oil from Russia, others continue to do so, inadvertently contributing to the aggressor's war efforts. Achieving the complete elimination of Russian crude oil from this region will require a shift in the attitudes of political elites in certain countries.

¹¹ M. Paszkowski, *Bulgaria considers returning to construction of Burgas-Alexandroupoli pipeline*, "IEŚ Commentaries" 2023, no. 56(808), <https://ies.lublin.pl/en/comments/bulgaria-considers-returning-to-construction-of-burgas-alexandroupoli-pipeline/> [24.04.2024].

At present, the existing transportation capacity in Central European countries is generally adequate for most refineries to redirect crude oil supplies. This is exemplified by the ongoing expansion of the TAL pipeline, primarily serving the refineries in Kralupy and Litvínov. In terms of infrastructure, these refineries are the only ones necessitating specific investment. In other cases, decisions regarding crude oil imports are influenced more by political and business considerations rather than infrastructure or technological constraints. A notable illustration of this dynamic is observed at the Burgas refinery, where a shift in political attitude towards the continued importation of Russian crude oil is evident. The government in Sofia is actively taking steps to diminish Moscow's influence on the energy sector, highlighting the pivotal role of policy initiatives in addressing this issue.

In conclusion, the prospects for achieving the derussification of crude oil supplies to refineries in Central European countries are not hindered by infrastructural limitations. Rather, it is primarily pro-Russian policies that dictate the direction of crude oil supplies. The existing refineries and pipelines possess the capacity to adequately serve the regional market with alternative grades of crude oil available on the international market. Ultimately, the full derussification of crude oil supply directions and the cessation of crude oil imports from Russia by refineries in Central European countries can only be realised through political determination and willpower.



Serhii Yevtushok

Ukraine: experiences and challenges in derussification of the energy sector

Introduction

Ukrainian-Russian relations in the field of energy have always been characterised by tension and complexity, which reflects historical and geopolitical realities. During the last two decades of conflict and cooperation, they finally escalated to a critical degree after 2014. Russia, using energy as a tool of influence, actively directs its efforts to strengthen its position in Ukraine's internal affairs. Until 2022, this was manifested in attempts to force the Kyiv government to take certain actions with the help of natural gas price policy, transit agreements, and other mechanisms.

Attempts by the Ukrainian government to derussify energy supplies and reduce Russia's influence are having results, although achieving complete success in this matter is proving to be a complex task.

The Kremlin's natural gas needle

Historically, after gaining independence, Ukraine was a consumer of and transit country for natural gas and crude oil from Russia to the countries of the European Union. Russia, taking advantage of Ukraine's dependence on energy imports, often used energy as a lever of influence and as a weapon to achieve its political goals. In the early and mid-2000s, one of the most revealing stories was Ukraine's transfer of military equipment, including military strategic aircraft, for natural gas debts.

Over the past two decades, Ukraine and Russia have had a number of conflicts over the terms of natural gas transit to the EU. The first conflicts started back in 2005–2006 and 2008–2009. The Russian Federation supplied natural gas to Ukraine under long-term contracts at significant discounts compared to market prices at the time. After that, Russia began to blackmail the Ukrainian government by increasing the prices, receiving various political preferences and levers of influence over Ukraine.

The Russian Federation used long-term contracts and the transit of natural gas as almost the main instrument of influence. For example, during the presidency of Viktor Yanukovich in 2010, Russia obtained concessions from Ukraine in the form of an extension of the agreement on the stay of the Black Sea Fleet of the Russian Federation in Crimea (the Kharkiv Agreements) using the prices for the supply of natural gas¹. Later, in 2014, units of the Russian Black Sea

¹ КСУ перевірить конституційність «Харківських угод», Radio Svoboda, 14.04.2023, <https://www.radiosvoboda.org/a/news-ksu-kharkivski-uhody-konstytutsiynist/32363691.html> [24.04.2024].

Fleet took part in the annexation of the peninsula. In 2014, there was a new round of conflicts. After the Revolution of Dignity and the annexation of Crimea by Russia, cooperation between the countries in the field of energy deteriorated even more. After the change of the pro-Russian government in Kyiv following the Revolution of Dignity in 2014, Russia again stopped natural gas supplies to Ukraine, demanding it recognise the debts accrued by Russia's Gazprom, which were formed as a result of the manipulative terms of the supply contract. Ukrainian Naftogaz, in turn, put forward conditions regarding the revision of the transit contract and demanded compensation from Gazprom.

This new round of the Russian-Ukrainian natural gas conflict was only resolved in 2019 when the Arbitration Institute of the Stockholm Chamber of Commerce (SCC) decided that Gazprom should pay an additional 4.63 billion USD to Naftogaz of Ukraine for not delivering the agreed volumes of natural gas for transit. This decision ended the largest dispute in the history of the SCC, where the demands of both sides reached tens of billions of dollars².

Since 2015, Ukraine has refused direct natural gas contracts with Russia, applying the practice of "virtual reverse" gas from Slovakia. The transition to market mechanisms in this sector allowed Ukraine to diversify natural gas supplies, bypassing the Russian Federation.

If direct supplies of natural gas to Ukraine stopped after 2015, transit agreements continued. Again, at the beginning of 2019, Russia stopped natural gas transit through Ukraine,

² А. Зануда, *Стокгольмський арбітраж задовольнив ключові вимоги «Нафтогазу»*, BBC News, 31.05.2017, <https://www.bbc.com/ukrainian/news-40091739> [22.04.2024].

this happened after the previous agreement on transit between Russia and Ukraine expired. However, later, through the mediation of the EU, a new agreement was concluded for 5 years, which allowed the transit of natural gas through Ukrainian territory to continue (valid until the end of 2024), and the Ukrainian government has already announced that it will not sign a new agreement³.

The next systemic tool to eliminate Russia's influence on the natural gas market in Ukraine was the Law of Ukraine "On the Natural Gas Market"⁴ adopted in 2015, which implemented the norms of the Third EU Energy Package in Ukraine. Despite the large number of restrictions, especially in the field of natural gas supply for domestic consumers, the introduction of stock trading, and the creation of their own internal trading platforms significantly increased the level of transparency of the industry and the possibility of monitoring it. In addition, the implementation of the norms of the Third EU Energy Package made it possible to unbundle the gas transmission system of Ukraine and improve infrastructure management.

The market of petroleum products "on wheels"

After 2014, the Ukrainian government tried to limit cooperation with Russia in the field of energy, but strict bans on trade in energy resources were not introduced. This also applies to Belarus, which was the main supplier of gasoline.

³ О. Куницький, *Україна не продовжить контракт на транзит у ЕС газу з РФ*, DW, 24.10.2023, <https://www.dw.com/uk/cernisov-ukraina-ne-prodovzit-kontrakt-na-tranzit-rosijskogo-gazu-v-es/a-67196965> [24.04.2024].

⁴ Верховна Рада України, *ЗАКОН УКРАЇНИ. Про ринок природного газу*, <https://zakon.rada.gov.ua/laws/show/329-19#Text> [26.04.2024].

In the first half of 2022, it hit the gasoline market in Ukraine hard, and Russian missile strikes on the oil infrastructure caused a large deficit, which was covered by imports “on wheels” from the EU and other countries. This experience shows the huge risks in cases of inadequate protection of critical infrastructure.

In addition to blackmail using imports or energy prices, Russia is trying to gain full or indirect influence on the energy sector by establishing control or acquiring ownership of critical energy infrastructure. A vivid example of how Russia used energy to influence Ukraine is the case of former pro-Russian politician Viktor Medvedchuk. According to journalistic investigations⁵, in 2015, Medvedchuk’s entourage took control of the oil pipeline “Samara-Western direction” and began to receive profits from the transit and supply of petroleum products in Ukraine. With the support of Russia, the pro-Russian politician formed a business group that, in addition to the pipeline, included a network of petrol stations in Ukraine and crude oil refineries in Russia itself. With the help of the obtained profits, Medvedchuk was able to accumulate large resources to influence the domestic political situation in the country, which included a political party and TV channels. At the beginning of 2022, Medvedchuk was the main pro-Russian politician in Ukraine. After the start of the full-scale invasion, while under investigation, Medvedchuk tried to leave Ukraine, but he was detained and

⁵ М. Омелянюк, «Дизельна труба» у власності Медведчука опинилася з відома Порошенка, Суспільне новини, 25.05.2021, <https://suspilne.media/133456-dizelna-truba-u-vlasnosti-medvedcuka-opinilasa-z-vidoma-porosenka-bigusinfo/> [25.04.2024].

transferred to Russia in exchange for Ukrainian prisoners of war, and all assets were transferred to the state.

In the third quarter of 2021⁶, the main exporters of petroleum products to Ukraine were Belarus, Russia, Lithuania, Türkiye, and Greece. However, in the third quarter of 2023, the main suppliers changed to Greece, Lithuania, India, Poland, and Turkey. These countries together provide almost half of the consumption of petroleum products in Ukraine, and none of them account for more than 14% of the total volume of imports. In this market the government applied market mechanisms and restrictions to ensure petroleum product supply, effectively manually managing the reorientation of imports from the EU market. The main traders in Ukraine were able to reorient themselves and maintain their positions in the market⁷.

After banning the direct import of petroleum products from Russia and Belarus, the government also restricted the import of these products of Russian origin. The main problem with such a restriction is the control over compliance with such requirements by the countries that import petroleum products to the EU. With surplus exports of products going to the EU, Russia directed its exports to such countries as India, Turkey, and China. At the same time, suppliers from these countries often circumvented sanctions on imports to the EU and Ukraine with only nominal “refining” of their

⁶ Проміняли білорусів на індусів. Як змінився ринок пального, Економічна правда, 12.09.2023, <https://www.epravda.com.ua/publications/2023/09/12/704192/> [19.04.2024].

⁷ Рейтинг імпортерів бензину 2023 року очолила ОККО, Enkorr, 12.01.2024, https://enkorr.ua/uk/news/rejting_mporterv_benzinu_2023_roku_ocholila_okko/257681 [23.04.2024].

petroleum products and further exports already indicating themselves as the country of origin⁸.

The sphere of electric energy and ENTSO-E

On 24 February 2022, as part of a test of the power system in isolated mode, Ukraine disconnected from the power systems of Russia and Belarus. The tests were carried out as part of the process of joining the energy system of Ukraine to ENTSO-E. The tests were supposed to last three days, but after the start of the full-scale invasion, Ukraine did not reconnect to the Russian energy system, and already in March 2022, Ukraine joined ENTSO-E as an emergency measure. Although the Ukrainian energy grid operator Ukrenergo completed all technical measures to fully join ENTSO-E only in November 2023, the disconnection from the Russian and Belarusian energy grids strengthened the overall level of energy security of Ukraine during this transition period. Ukraine's access to the European electricity market provided several important advantages for it. First, it is an opportunity to receive emergency aid from EU countries and Moldova, which is extremely important in the context of Russia's missile attacks on energy infrastructure. Second, it is an opportunity to import/export electricity in hours of reduced/increased consumption of the energy system. As the experience of the last two years has shown, during missile attacks on the energy infrastructure, the Russian Federation tries to hit generation facilities that ensure the manoeuvrability of the energy system. Because of this, Ukrenergo is forced to introduce restrictions on the supply of electricity during

⁸ Проміняли білорусів на індусів...

peak hours or import it. Also, the Ukrainian budget received 8.7 billion UAH from March 2022 to March 2023 for access to interstate crossings and for the export of electricity⁹.

Since the beginning of the full-scale invasion, the Ukrainian government and the legislative branch of government have begun the process of confiscating the assets of Russians on the territory of Ukraine. It was established that a number of electricity distribution companies belonged to Russian oligarchs connected to the Kremlin. In particular, the electricity distribution systems companies “Khersonoblenergo”, “Zhytomyroblenergo”, “Kirovogradoblenergo”, “Chernivtsioblenergo”, and “Rivneoblenergo” were confiscated and transferred into state ownership¹⁰.

Russian nuclear fuel

Until 2022, the Ukrainian nuclear industry also remained dependent on the Russian Federation. In particular, the power units of Ukrainian nuclear plants were built according to Soviet designs – reactors of the VVER type (water-water power reactor), which used Russian fuel assemblies. Although the Ukrainian subsoil has uranium deposits and Ukraine inherited a number of mining and beneficiation complexes, its own full cycle of nuclear fuel production was not set up.

Ukraine had two main contracts with the Russian Federation, one for the supply of fuel and one for export to Russia

⁹ Завдяки приєднанню та роботі у синхронному режимі із енергосистемами європейських країн (ENTSO-E) Україна отримала додаткові 8,7 млрд гривень, Ukrinform, <https://www.ukrinform.ua/rubric-economy/3683170-sinhronizacia-z-entsoe-dopomogla-ukraini-dodatkovu-otrimati-87-milarda.html> [17.04.2024].

¹⁰ Центр протидії корупції, Росіяни заплатають. Як Україна забирає активи поплічників Путіна, 10.05.2023, <https://www.pravda.com.ua/articles/2023/05/10/7401435/> [24.04.2024].

for storage of spent nuclear fuel. Even before the start of the full-scale invasion, Energoatom, the state-controlled company that owns all of Ukraine's nuclear power plants, began the process of diversifying its nuclear fuel supply. At the beginning of 2022, half of the supplies were provided by Rosatom, and the other half was provided by the American company Westinghouse. In 2022, supply contracts with the Russian Federation were suspended¹¹.

In 2022, Energoatom completed the construction of a storage facility for spent nuclear fuel on the territory of the Chernobyl NPP site and put it into operation. Accordingly, Ukraine has fully met its waste disposal needs. Therefore, after 2022, the Ukrainian nuclear industry was completely independent from Russia, despite the "common" heritage in the nuclear industry from Soviet times, which began with the production of nuclear fuel and ended with projects for the construction of new power units. In 2015, Ukraine refused the services of Rosatom regarding the project to complete the power units of the Khmelnytsky NPP.

After the Russian missile attacks on the energy infrastructure during two years of full-scale war, a certain "renaissance" of nuclear energy took place. Since February 2022, nuclear generation has provided more than 50% of electricity in the country, despite Russia's occupation of Zaporizhzhia NPP, the largest nuclear power plant in Europe, with a total capacity of 6,000 MW. Ukrainian nuclear power plants have also become a reliable source of electricity

¹¹ Як Україна зламала монополію росії на виробництво ядерного палива, Економічна правда, 21.11.2023, <https://www.epravda.com.ua/columns/2023/11/21/706830/> [19.04.2024].

supply at a time when other types of generation are subject to devastating missile attacks.

In order to ensure reliable electricity generation in the long term, and to replace Soviet-type reactors with modern ones, the government decided to complete the construction of two power units at the Khmelnytskyi NPP in cooperation with the American company Westinghouse. In April 2024, the construction of power units 5 and 6 started, using Westinghouse AP1000 technology¹².

Sanctions pressure

Since 2021, the Ukrainian government has been working on the implementation of the policy regarding “critical” minerals, which play a strategic role in the energy industry. Among the tools to remove the influence of Russia on the country’s energy sector, the mechanism of special economic sanctions of the National Security and Defense Council began to be widely used¹³.

After the legislative improvement of the sanction’s mechanism¹⁴, the government began work on limiting the right to use subsoil for companies from Russia, companies with beneficial owners from the Russian Federation, and businessmen cooperating with them. After the start of the full-scale invasion, the Verkhovna Rada of Ukraine adopted

¹² На Хмельницькій АЕС стартував проєкт з будівництва енергоблоків №5, 6 за американською технологією Westinghouse, Energoatom, 15.04.2024, <https://energoatom.com.ua/ua/post/1713> [21.04.2024].

¹³ Президент, УКАЗ ПРЕЗИДЕНТА УКРАЇНИ №306/2021, <https://www.president.gov.ua/documents/3062021-39457> [25.04.2024].

¹⁴ Верховна Рада України, ЗАКОН УКРАЇНИ: Про санкції, <https://zakon.rada.gov.ua/laws/show/1644-18#Text> [27.04.2024].

a law that, among other things, prohibits Russian citizens and companies from Russia from using subsoil.

As mentioned above, the right of companies beneficially owned by Russians to use subsoil was limited. In particular, they are prohibited from obtaining special permits for subsoil use, participating in auctions for the sale of such permits, and using subsoil. Using such a mechanism, after 24 February 2024, several dozen special mining permits for companies whose ultimate beneficial owners are Russians or sanctioned persons were suspended¹⁵.

The possibility of using such mechanisms to assist in the derussification of the energy sector became the introduction of effective mechanisms of transparency in the economic and energy policy of the state. In particular, without legislative requirements regarding the disclosure of beneficial owners of companies and the disclosure of financial statements, it is impossible to fully establish and block Russian assets.

The introduction of martial law in Ukraine became a serious challenge for this process. It provides for restrictions on free access to information that may pose a threat to the national security of Ukraine. Accordingly, nearly all registers and statistical information have been closed. This especially applies to the energy sector, where most of the information about the production, processing, and consumption of energy resources is closed. On the one hand, this complicates the task for the Russians to identify targets for their attacks, on

¹⁵ Верховна Рада України, ЗАКОН УКРАЇНИ: Про внесення змін до деяких законодавчих актів України щодо удосконалення законодавства у сфері користування надрами, <https://zakon.rada.gov.ua/laws/show/2805-20#Text> [19.04.2024].

the other hand, it excludes the possibility of quality public control of the sphere and discourages investors who could join the restoration of the energy system.

Conclusions

Russia uses energy as a comprehensive tool to influence the domestic political situation in neighbouring countries, including Ukraine. Given the Ukrainian experience, Russia's influence is not limited to blackmail in the supply of natural resources. The Kremlin is trying to establish a "winning" position by gaining control over critical infrastructure and its maintenance. In addition, the Russian Federation introduces its agents of influence into the energy markets, who very often act against the country's national interests and use corruption in order to increase this influence.

After the Revolution of Dignity, the annexation of Crimea, and the start of the war in Donbas, Ukrainian pro-European governments began a long-term process of removing Russia's influence on the country's energy sector. From 2014 to 2022, Ukraine had only partial success in reducing Russia's influence: despite a sharp decrease in the import of energy resources (primarily, in the natural gas sector) and an almost complete rejection of cooperation at the interstate level, the significant influence of the Russian Federation, its citizens, or pro-Russian agents of influence remained.

After the full-scale invasion of 2022, the Ukrainian government took radical measures to reduce influence in absolutely all sectors. Regardless of the sphere, the Ukrainian government:

- 1) completely banned the trade of energy resources with the Russian Federation;

- 2) expanded the process of diversification of the supply of energy resources;
- 3) confiscated assets of Russian citizens and imposed sanctions on pro-Russian politicians and businessmen.

The rapid confiscation and transfer of assets belonging to the Russians to the management of state-owned companies avoided catastrophic situations in the natural gas, electric power, and nuclear sectors at the beginning of the invasion. Instead, a large share of the supply of petroleum products from Belarus, in combination with missile attacks on infrastructure, created a crisis in the market, which was characterised by a sharp increase in prices and a shortage of petroleum products.



Joanna Sanecka-Tyczyńska

Filling the gap: the importance of US energy resources in the Central European region

Introduction

It seems indisputable that the energy industry is strongly linked to international politics, and access to commodities influences the independence of countries, their cooperation, or conflicts between them, creating constantly changing balances of power. Energy security has a direct impact on a country's military strength, economic development, and the well-being of its citizens. Additionally, energy security is a key element of geostrategy and a determinant of the foreign policy of modern countries, particularly with the increasing challenge of dwindling resources of conventional energy sources and the continuously growing demand for them¹.

¹ E. Waśko-Owsiejczuk, *Geostrategia Stanów Zjednoczonych w dobie rewolucji lupkowej*, "Studia Polityczne" 2016, no. 1(41), pp. 154–155.

The situation in the energy market is further complicated by the tense international climate and various conflicts. In Central European countries, the 2022 war in Ukraine, instigated by the Russian Federation, has emerged as a significant factor adversely affecting energy security. Consequently, geopolitics consistently shapes Central Europe's strategy for securing energy by reducing dependence on commodities from Russia. This dynamic also impacts the extent and character of energy cooperation among European Union member states and in the transatlantic realm, with particular focus on the US.

Conditions of the problem

The energy landscape in Central European countries remains in flux, subject to constant change. Within these evolving conditions, perceptions of energy cooperation with the US, a leading global exporter of crude oil and natural gas, vary across individual countries. The analysis of US energy policy toward Central European countries must consider several objective conditions as its starting point.

After the end of the Cold War, Central and Eastern Europe emerged as a crucial arena for strategic competition among major powers, owing to its pivotal geographical position between Europe and Asia. Central European countries, in particular, witnessed a convergence of diverse interests, where the imperative to diminish energy dependence on Russia extended beyond economic considerations to encompass the geostrategic trajectory of the European continent. Moreover, it significantly influenced relations within the transatlantic sphere and even the broader international order. The principal actors, the US and Russia, each with

distinct capabilities, wielded political influence over Central European countries through disparate means and strategic opportunities².

The energy dimension of international relations gained prominence in the early 21st century, coinciding with increased political engagement by global powers. A little over a decade ago, the US relied heavily on imports of crude oil and natural gas, with its involvement in the Middle East and North Africa primarily driven by concerns over resource security. However, the advent of the shale revolution fundamentally altered the landscape of the energy sector, positioning the US as the world's leading producer of crude oil and natural gas, and a significant exporter of energy resources³.

During the second decade of the 21st century, the US notably intensified its efforts to bolster its energy presence in Europe. Recent years have witnessed strategic competition among superpowers for influence in the Central European region. This competition has manifested in various forms, including the contentious construction of the Nord Stream 2 gas pipeline, efforts by Central European countries to diversify their energy supply sources to varying degrees, and the United States' endeavours to gain access to the European natural gas market. Additionally, cooperation between the

² A. Podraza, *Bezpieczeństwo energetyczne Polski w kontekście neoimperialnej polityki Rosji oraz współpracy europejskiej i transatlantycznej: Polska jako hub gazowy*, "Sprawy Międzynarodowe" 2020, vol. 73, no. 1, p. 137.

³ A historic date for the US is 2020. Net imports of crude oil were zero. The importance of this change is demonstrated by the fact that in 2008, the value of imports of this commodity by the US amounted to 400 billion USD. *Energetyczna mozaika w stosunkach międzynarodowych*, Forsal.pl, 23.04.2022, <https://forsal.pl/gospodarka/artyku-ly/8404278,energetyczna-mozaika-w-stosunkach-miedzynarodowych.html> [12.02.2024].

US and the European Union in energy trade and supply security, initiatives such as the American Partnership Initiative for Transatlantic Energy Cooperation, and the role of NATO in safeguarding critical energy infrastructure have all played significant roles. Furthermore, energy cooperation within the framework of the Three Seas Initiative has emerged as a notable aspect of regional dynamics⁴.

Before Russia invaded Ukraine in 2022, Europe, including Central European countries, relied heavily on Russia to fulfil its energy needs. Among the numerous consequences stemming from the architecture of natural gas pipelines established in the latter half of the 20th century, spanning Central and Eastern Europe, one significant aspect is the profound dependence of these regions, including the Balkans, on Russian commodity supplies. In 2021, countries such as Belarus, Estonia, Lithuania, Latvia, Moldova, and Slovakia were entirely reliant on Russian commodities. Additionally, Austria, Bulgaria, Czechia, Greece, Poland, Slovenia, Hungary, and Ukraine depended on Russian supplies to an extent exceeding the 50% threshold. Furthermore, in 2022, Germany and Russia were on the brink of completing the Nord Stream 2 gas pipeline, which would directly supply natural gas and increase German imports of this commodity from Russia to approximately 60%.

In Russia's policy, there existed a correlation between the favourability of recipient countries towards Russia and the cost of purchasing Russian natural gas. Russia has

⁴ P. Wilczek, *Współpraca polsko-amerykańska w latach 2016-2020. Fakty i liczby*, The Warsaw Institute Review, 15.06.2020, <https://warsawinstitute.review/pl/aktualnosci/wspolpraca-polsko-amerykanska-w-latach-2016-2020/> [17.02.2024].

frequently wielded this resource as a tool in its foreign policy, as evidenced by the natural gas crisis of 2009. During this crisis, Russia leveraged natural gas supplies to compel Ukraine into signing an unfavourable contract for supply and transit, and to enter into a “fleet for gas” agreement, resulting in an increase in Russia’s military presence in Crimea. Within the framework of Russia’s foreign policy strategy, which can be characterised in neo-imperial terms, energy resources, particularly natural gas and crude oil, have been utilised to assert influence over European countries. This approach has precipitated competition with other major powers, notably the US⁵.

In March 2022, the US imposed a blanket ban on all imports of Russian crude oil, petroleum products, liquefied natural gas (LNG), and coal. The energy crisis precipitated by export cuts underscored Europe’s heavy reliance on Russian fossil fuels. In response, European countries, with backing from the US, initiated measures to reduce Russia’s influence on the energy markets of Central European countries. However, these measures proved costly and failed to offer long-term solutions. In light of these challenges, Europe and the US have shifted their focus toward bolstering renewables capacity as a means to achieve greater energy independence.

The energy crisis triggered by Russia’s invasion of Ukraine and Europe’s intensified endeavours to diminish its reliance on Russian natural gas imports underscores the

⁵ M. Zaniewicz, *Nowa geopolityka gazociągów w Europie Środkowo-Wschodniej*, The Warsaw Institute Review, 21.12.2019, <https://warsawinstitute.org/pl/nowa-geopolityka-gazociagow-w-europie-srodkowo-wschodniej-2/> [15.03.2024].

multifaceted goals within the European energy sector: (1) reducing dependence on strategic competitors like Russia, which have demonstrated the ability to wield the export of commodities as a tool in international politics; (2) ensuring the availability of affordable energy supplies; and (3) transitioning towards renewables or “green energy” sources to mitigate the impacts of climate change.

The importance of the US in the energy policy of Central European countries

Central European countries hold real significance for the US from a security perspective given that some countries in this region are members of NATO. Moreover, the countries in this area regard the US as a primary guarantor and stabilizer of both military and energy security, alongside the European Union and their own resources. This perception is especially pronounced in light of the escalating threat posed by the Russian Federation⁶. It is noteworthy that Central European countries represents a market with considerable potential for the US, which until recently had minimal presence due to the region’s energy dependence on Russia. As countries in the region increasingly emphasise the necessity of diversifying energy supplies, there arises a greater opportunity to undermine Russia’s dominance in this market. One of the

⁶ In 2023, over 180 billion cubic meters (bcm) of natural gas reached European Union countries, of which 72 bcm came from the US. The European Union established a joint task force on energy security, the aim of which is to ensure stable supplies of LNG from the US to Europe and accelerate the transition to renewables. As a result, the US increased LNG exports to Europe by 141% in 2022 compared to the previous year. *US and European Energy Security amid Great-Power Competition*, Air University, 31.07.2023, <https://www.airuniversity.af.edu/JIPA/Display/Article/3475784/us-and-european-energy-security-amid-great-power-competition/#sdfnote7anc> [4.03.2024].

tools is the expansion of the North-South Gas Corridor to enable the import of natural gas to Central European countries (including from the US)⁷.

In December 2019, the US Congress passed the European Energy Security and Diversification Act of 2019. The preamble of the document highlighted that the proposed legislation aimed to advance the global energy security objectives of the US while encouraging Central and Eastern European countries to diversify their energy sources and supply routes, thereby enhancing the energy security of the broader European region.

The act mandated the US Department of State to prioritise activities supporting the development of energy infrastructure in Europe, particularly projects involving collaboration with the European Commission and governments in the region. Assistance provided under this act was intended to encompass political, technical, and diplomatic support. Eligible projects included those related to natural gas infrastructure, electricity transmission, and the promotion of renewables. The Department of State gives preference to projects that: (1) improve the capacity to transmit natural gas and electricity within and between European countries, (2) have been recognised by the European Commission as integral to regional energy security, (3) increase the integration of the European energy market, (4) may attract other sources of financing, and (5) may potentially leverage US goods and services⁸.

⁷ A. Chojan, *The United States on the Three Seas Initiative*, "Yearbook of the Institute of East-Central Europe" 2019, vol. 17, issue 3, p. 88.

⁸ Congress.gov, *European Energy Security and Diversification Act of 2019*, <https://www.congress.gov/bill/116th-congress/house-bill/1453?q=%7B%22search%22%3A%5B%22H.+R.+83%22%5D%7D> [23.02.2024].

In the 21st century, three primary areas of energy cooperation have emerged between the US and Central European countries (and, by extension, the EU). The first revolves around the traditional energy industry, particularly the trade in liquefied natural gas (LNG). Undoubtedly, the US capitalised on the situation arising from the conflict in Ukraine by ramping up LNG supply to the European market. This expansion was made possible by the “shale revolution”, characterised by the widespread adoption of hydraulic fracturing and advanced horizontal drilling techniques in natural gas and crude oil extraction. Natural gas production, including from shale formations in the US, surged by 95% between 2000 and 2022. Since 2011, the US has held the position of the world’s largest natural gas producer. Through the “shale revolution”, the United States bolstered its position and influence while simultaneously weakening the dominance of gas-powered entities like Russia and OPEC-associated nations. Leveraging the energy revolution, Americans have sought to safeguard their interests and reaffirm their status as a global power⁹.

Cooperation with Central European countries in traditional energy industries was particularly pronounced during the presidency of Donald Trump, who prioritised achieving “energy dominance” for the US on the global stage, thereby supporting the domestic crude oil and natural gas sector. This policy led to a substantial increase in crude oil production in the US, surging from 6.8 million barrels per day (mbd)

⁹ A. Riley, *The Geostrategic Implications of the Shale Gas Revolution*, 2012, <https://assets.publishing.service.gov.uk/media/5a7c59bce5274a2041cf36e2/evidence-alan-riley.pdf> [23.02.2024].

in 2008 to 17.8 mbd in 2022. In 2015, Congress lifted the ban on the export of American crude oil, resulting in oil exports reaching over 1 mbd in 2017 and nearly 5 mbd by 2023.

Furthermore, natural gas production also experienced a significant uptick, rising from 558 bcm in 2009 to 979 bcm in 2022. As production expanded, debates arose regarding the political significance of natural gas and the impact of LNG exports on the domestic economy and labour market. Consequently, exports surged from 0.8 bcm in 2009 to 47.4 bcm in 2019¹⁰. However, amidst the ongoing US election campaign, President Joe Biden, who is seeking re-election, temporarily suspended the issuance of permits for the construction of new gas liquefaction terminals on 24 January 2024. This suspension included the stipulation that long-term supply contracts, including those with Central European countries, would not be subject to any restrictions¹¹.

The second area of cooperation between the US and Europe involves American financial backing for the development of Small Modular Reactors (SMR) in Central European countries (the “Phoenix” project). Poland, Czechia, and Slovakia are slated to receive funding under this program. In Poland, the SMR technology being implemented by Orlen Synthos Green Energy is the BWRX-300, developed by GE Hitachi Nuclear Energy. It is projected that such units will be operational in Poland by 2030, with initial support from

¹⁰ *Między korektą a rewolucją: polityka energetyczno-klimatyczna Joe Bidena*, PISM, 20.12.2021, <https://www.pism.pl/publikacje/miedzy-korekta-a-rewolucja-polityka-energetyczno-klimatyczna-joe-bidena> [20.02.2024]; *Tracking Progress: Climate Action Under the Biden Administration*, World Resources Institute, 29.01.2024, <https://www.wri.org/insights/biden-administration-tracking-climate-action-progress> [25.02.2024].

¹¹ *Europe's new energy risk: Trading Russia for America*, Politico, 2.04.2024, <https://www.politico.eu/article/europes-risky-new-energy-reliance/> [13.03.2024].

the US directed towards the construction project of a nuclear power plant in Ostrołęka¹².

The third dimension of cooperation involves joint US-European initiatives and investments within the realm of climate policy. The energy transition underway in Central European countries has sparked interest and investments from American firms in the region. At the onset of President Joe Biden's administration, which coincided with the economic downturn triggered by the COVID-19 pandemic, emphasis was placed on advancing clean technologies. This included investment in the national energy infrastructure and the creation of new employment opportunities in the clean energy sector. On the international stage, US energy policy holds significance for American allies, particularly in the context of climate policy. Coordination with allies such as the EU is imperative to address climate challenges effectively¹³.

Conclusions

The US employs a diverse array of methods and tools to engage with European countries in energy cooperation. American legislative and executive institutions closely monitor developments and establish strategic directives. Congressional hearings on Europe's energy security, attended by administration representatives, provide insights into the

¹² *United States Takes Next Step in Supporting Innovative Clean Nuclear Technology in Europe*, 26.06.2022, <https://www.state.gov/united-states-takes-next-step-in-supporting-innovative-clean-nuclear-technology-in-europe/> [14.01.2024].

¹³ U.S. Department of State, *The Road to US Nuclear Energy Revival May Run through Warsaw*, 23.05.2023, <https://www.energypolicy.columbia.edu/the-road-to-us-nuclear-energy-revival-may-run-through-warsaw/> [10.02.2024].

State Department's ongoing initiatives, while representatives from interest groups and non-governmental organisations articulate matters of interest to the US. The Helsinki Commission, a joint commission for security and cooperation in Europe for the US Senate and Congress, serves as a key instrument for political oversight. It plays a vital role in monitoring the European situation and directing the activities of the American administration.

The execution of adopted strategies falls within the purview of the US President's administration, with the Department of State serving as the principal implementing body. In 2011, a specialised office for natural resources and energy was established, tasked with overseeing energy diplomacy through the deployment of special envoys to various regions worldwide¹⁴.

A bilateral mechanism for American influence on Europe's energy policy is the EU-US Energy Council, established in 2009. Subsequent meetings of the Council have reaffirmed the commitment to accelerate the energy transition, diminish reliance on fossil fuels, and curb energy consumption. These efforts aim to bolster energy security and counter attempts to wield energy as a geopolitical tool.

¹⁴ The group of active diplomats included: Boyden Gray, Matthew Bryza, Richard Morningstar, Carlos Pascual, Robin Dunnigan, and Amos Hochstein. Dunnigan, at a conference accompanying the Eastern Partnership summit in Riga in 2015, stated that "Europe's energy security is absolutely fundamental to the national interests of the United States and its foreign policy." In 2016, at a conference organised by The Atlantic Council Global Energy Center (GEC), she stressed that energy diversification solutions in Europe and other parts of the world are an American priority. M. Hulse, M. Altenbern, *US LNG Seen as Fuel for US-EU Energy Security Relationship*, Atlantic Council, 29.04.2016, <https://www.atlanticcouncil.org/blogs/new-atlanticist/us-lng-seen-as-fuel-for-us-eu-energy-security-relationship/> [23.02.2024].

In summary, it is essential to highlight that US energy policy is characterised by pragmatism, rooted in both commercial considerations and long-term objectives in international politics. Europe's energy security in the 21st century has been identified as a key component of American strategic interests, facilitated by the geopolitical landscape. Following the onset of the Russian-Ukrainian conflict, European nations swiftly sought out new suppliers, with American companies emerging as natural, secure, and dependable partners¹⁵.

¹⁵ European Commission, *Quarterly Report on European Gas Markets*, 2023, https://energy.ec.europa.eu/system/files/2023-10/Quarterly_Report_on_European_Gas_markets_Q1_2023.pdf [23.03.2024].



Ana Otilia Nutu

Romania's role in regional energy security during the process of derussification: part of the problem or part of the solution?

Introduction

Russia's full-scale invasion of Ukraine produced massive shifts in energy flows across Central and Eastern Europe. First, Ukraine and Moldova's electricity systems were synchronized with the European grid ENTSO-E in March 2022. Russia's attacks on Ukraine's power grid, the subsequent partial recovery, and the renewed attacks in early 2024 have shifted the direction of electricity flows several times from Ukraine to the region. At the same time, Gazprom's aggressive ad hoc reduction of natural gas flows to Moldova since October 2022 triggered an immediate need for increased alternative energy imports from Ukraine and the EU, in which Romania served both as a supplier and a transit country.

After years of indecision on finalising regional physical natural gas and electricity interconnections, Romania's geographical position and its geopolitical commitment to support Moldova finally put it in the spotlight on matters of regional energy security in February 2022. At various moments in 2022 and 2023, Romania itself benefited from imports of Ukrainian electricity, saving natural gas at home and optimising the use of renewables, while contributing payments which helped Ukraine repair some of the damaged infrastructure. But most importantly, Romania substantially closed the gap in Moldova's energy supplies – initially electricity, then natural gas – in critical moments such as late 2022, when it helped Moldova avoid extended power blackouts ahead of the winter. Romania has an explicit policy to support Moldova, as up to 1 million Moldovans have Romanian citizenship; but it was not as keen to export energy to other countries in the region, e.g., to supply natural gas to Bulgaria within the EU's solidarity mechanisms when Gazprom abruptly cut deliveries in spring 2022.

It is expected that, with the development of new natural gas and electricity infrastructure in the region, Romania would play an increasing role in the supply and transit of energy, while being pressured to move faster with projects that were long overdue. The finalisation in 2022, after years of delay, of the inter-connector between Bulgaria and Greece (IGB) was a major breakthrough: it substantially enhanced the use of the Romanian section of the Bulgaria-Romania-Hungary-Austria (BRUA) pipeline finalised in 2020, which, until the finalisation of the IGB, was virtually unused. BRUA now transports up to 1.7 bcm/year in both directions. However, in addition, it gave a new impetus

to Romania to accelerate other projects. Thus, Romania is likely to speed up the pipeline connection to the Black Sea (Tuzla-Podisor, now expected in 2025), and to expand BRUA with new pipelines and compressors to bring it up to a capacity of 4.4 bcm towards Hungary and 1.5 bcm to Bulgaria¹. Romania has also accelerated its planned investments to strengthen the power grid, including towards Moldova, Hungary, and Serbia², although the original driving factor for these investments, after 2020, has been the prospect of coal phase-out and the associated risks of a potential generation gap at home.

However, despite Romania's positive contribution to energy security in the region during the peak of the 2022–2023 crisis, the challenge is for the long run and mainly concerns the underlying governance problems of the Romanian energy system. Romania risks adopting the wrong policy decisions, which run contrary to EU trends and would significantly increase natural gas consumption and influence import projections beyond 2027–2030.

Resources and challenges

As of today, Romania is the largest EU natural gas producer in Central and Eastern Europe, with a total production of 10 bcm in 2023. In recent years, up until 2019, production was slowly declining by an average of 2–3% annually, as old

¹ *Planul de Dezvoltare al Sistemului National de Transport Gaze Naturale pentru perioada 2022-2031 – revizuit 2023*, Transgaz. Magistrala Energii, <https://www.transgaz.ro/ro/de-spre-noi/programe-si-strategii/proiecte-majore-de-dezvoltare> [24.04.2024].

² *Planul de Dezvoltare a RET perioada 2022–2031*, Transelectrica, <https://www.transelectrica.ro/documents/10179/14441468/Planul+de+Dezvoltare+a+RET+perioada+2022-2031+aprobat.pdf/dd6c9e5c-067c-4d97-ab15-596c9ff8dd70> [25.04.2024].

onshore deposits in operation for decades were gradually depleting and no new deposits were coming online; Romania was able to cover about 80% of its own consumption. This reduction in output happened even though 80–100 bcm³ were confirmed additional reserves in the Black Sea and deep onshore. Although not large in absolute terms, this quantity could increase the liquidity of the regional gas market for at least a decade, considering the current annual gas consumption in each country (Moldova 1 bcm without Transnistria; Bulgaria 3 bcm; Hungary 9 bcm; Serbia 2–3 bcm).

Despite the potential, the investments to develop these new deposits met with significant delays after 2018. Romania's legal framework for natural gas production, which included an outdated and excessive fiscal regime, was unsuitable, if not outright prohibitive, for large-scale new projects in gas extraction. As a result, companies were in no rush to commit to investments. The private companies, such as OMV Petrom and Exxon, delayed the decisions for commercial reasons, and Exxon finally withdrew from the Neptun Deep Black Sea project, selling its share to the state-owned Romgaz. The smaller project of Black Sea Oil and Gas (BSOG), a 10 bcm deposit in the shallow waters of the Black Sea, took off in 2022, but this was also because the company challenged the legal framework in international arbitration and assumed it would not have to comply with the restrictions that discouraged the other investors. In its turn, the majority state-owned (SOE) Romgaz experienced

³ A.C. Dupuy, *A new Black Sea natural gas project could be a game changer for the region – and a challenge for Putin*, Atlantic Council, 26.07.2023, <https://www.atlanticcouncil.org/blogs/turkeysource/a-new-black-sea-natural-gas-project-could-be-a-game-changer-for-the-region-and-a-challenge-for-putin/> [25.04.2024].

typical governance issues of energy SOEs in Romania. These are manifest in the company's incapacity to finalise investments⁴. However, pushed by the new conditions, and after certain changes in the taxation scheme, OMV Petrom and Romgaz finally announced in the summer of 2023 their decision to invest, which would mean that about 7–8 bcm per year would enter the Romanian grid in 2027–2028, adding to the 1 bcm from BSOG.

The gas grid operators were also in no rush to modernise the pipeline network in due time. Transgaz, the Romanian natural gas grid operator, managed to build the first stage of the BRUA pipeline on EU funds by end-2020, and Onesti-Gheraesti-Letcani, the final section of pipeline and the compressors to render the interconnection with Moldova functional, by September 2021. However, the remaining transport system remains obsolete. Excepting the new pipelines, Romania's grid may only function at lower pressures (15–20 bar) than the other gas grids in the region (over 45), which limits exports. Though the Iasi-Ungheni interconnection with Moldova became operational in late 2021, Romania provided mostly gas storage for Moldova in 2023, and the first effective exports of Romanian-produced gas took place only in early 2024⁵.

The electricity sector faced similar challenges: low increase in new generation capacity, with virtually no

⁴ Most notably, a 400-MW gas-fired power plant at Iernut, still not completed today, five years after the original deadline.

⁵ In 2022–2023, Moldova cut its dependency on Gazprom by de facto separating Transnistria's consumption and debts and by getting alternatives from Romania and Ukraine to the gas-fired electricity produced in Transnistria. Romania helped with electricity, which the Chisinau-controlled territory of Moldova needed substantially more than gas.

investment between 2017–2022; delays in investments in grids despite significant EU funds being available, and a legal and regulatory framework in flux discouraging competition and the emergence of new private sector players. Even though Romania's power system boasts over 18 GW of installed capacity⁶, almost 3 GW consists of obsolete coal and gas plants, which operate inefficiently and are planned for decommissioning in the next few years. The energy crisis of 2021–2022 indeed pushed investments in new generation capacity; however, this happened to a large extent not with the support of, but rather despite the state. In 2022–2023, new capacities of about 1.5 GW from prosumers, 0.6 GW in solar and wind, and 0.1 GW in smaller gas-fired power plants were installed. This happened while Romania had been subsidising excessively the energy prices for end-users since 2021 and as the government's policy to provide grant support to prosumers experienced significant delays and blockages, encouraging many individual consumers to invest without even resorting to the available grant opportunities.

Financing, however, is the least of the country's problems. Apart from the high energy prices which, in a liberalised market with no regulatory distortions, would send the right signals to investors, Romania benefits from significant amounts of EU funds for the decarbonisation of the energy sector – for electricity, heating, and energy efficiency. No less than 20 billion EUR in the Operational Programs, the Recovery and Resilience Plan, the RepowerEU, the Modernisation Fund, and the Just Transition Fund, are available in the decade 2020–2030. This adds to national funding and

⁶ ANRE, <https://anre.ro/puteri-instalate/>.

other state aid schemes such as the newly-introduced Contracts-for-Difference to accelerate wind and solar capacity investments, which would support the development of 5 GW, partly from taxing energy consumers, partly from EU funds⁷.

The institutional dilemma

However, the effective use of these mechanisms and the leveraging of private-sector funding are distorted by two major issues. First, the fragmentation of decision-making, with little coordination between various ministries and local authorities, creates friction in policies covering various aspects of energy supply and demand. The Ministry of Energy has no concern over the development of natural gas and electricity operators, located under the General Secretariat of the Government; over the Just Transition program managed by the Ministry of European Investments and Projects; or over district heating and energy efficiency in buildings, perceived as the “turf” of the Ministry of Development, Public Works and Administration, and of regional and local authorities.

Second, the Ministry of Energy acts more like a shareholder in state-owned electricity and natural gas companies. Herein lies a conflict of interest with its policy to develop energy markets and ensure coordination of energy and climate plans. This has immediate implications for policy-making. Whenever a new funding source, such as EU grants, becomes available, the Ministry's first impulse is to seek funding for

⁷ Ministry of Energy, *Contracte pentru Diferența*, <https://energie.gov.ro/contracte-pentru-diferenta-cfd/> [27.04.2024].

its own companies, instead of organising competitive processes for all market players⁸.

Beyond state aid, this mindset has profound implications for distorting market competition. During the energy crisis of 2022–2023, the legislation to protect energy consumers from price spikes, initiated by both Parliament and the Ministry of Energy, included a series of different forms of end-user price regulations, producer price regulations, compensation of suppliers, and “windfall taxation” of natural gas and electricity producers. As the state remains the main player in energy production, controlling 50% of natural gas and 80% of electricity generation, the consumer support scheme was prepared without considering the impact on the private sector’s intentions to invest. At a broader level, when it formulates policies for renewables, the Ministry of Energy does not first examine why such investments do not happen under regular market conditions: network access constraints, regulatory barriers in concluding Power Purchase Agreements, permitting hurdles, uncertainties on future price regulations, or windfall taxation. It should first seek to eliminate these barriers and only then direct state aid to where and when the funding is the issue.

Thus, overall, the ad hoc policy-making, the disconnection of policy for energy supply from the development of grids and policies on energy efficiency is a long-term, underlying governance problem which will reduce the effectiveness of Romania’s plans to also contribute effectively to

⁸ This is the reason why the first drafts of the energy chapter from the NRRP, the RepowerEU, the energy OP, and the NECP were pushed back by the European Commission for their incompatibility with state aid and had to be revised.

energy security in the region. Major policy documents such as the National Energy and Climate Plan (NECP) as well as the TYNDPs of Transelectrica and Transgaz illustrate these issues.

The policy result

Examining these documents as well as legal and regulatory changes in recent years, Romania's de facto energy policy since before 2020 focuses on two directions. In electricity, the plan is to replace large-scale coal-fired power plants with similar, large-scale natural gas-fired power plants⁹. Romania thus envisages a “coal-to-gas” transition, leaving for later the discussion of how to decarbonise the newly-built natural gas capacities if not enough green hydrogen would be available. Such an option is the short-sighted “easy way out” as it exempts the Ministry of Energy from any responsibility for actual energy policy measures such as smart grids, flexible demand, and energy storage, requiring a major overhaul of power grids which are not under its management. It is short-sighted and counterproductive because it also does not take into account the expected shifts in household and industrial demand: it considers producing roughly an equivalent amount of electricity as today, preserving the grid structure and system philosophy of the 1960s–1980s. Such an approach is inadequate as the system was built for large energy-intensive industrial consumers and virtually no household consumption, the

⁹ This appears consistently in the plans to restructure lignite and coal companies, in the NECP, in the priorities of projects for which the Ministry of Energy tries to access the Modernisation Fund, and in Transelectrica's TYNDPs.

disconnect supply-grid-demand would only increase to the 2030–2050 horizons. But at the same time, this policy simply follows from the Ministry's natural impulse to continue keeping control over the power generation under its SOEs.

On natural gas, Romania also runs against the EU trends. While the RePowerEU envisages halving the EU's natural gas consumption by 2027–2030, Romania plans to extend distribution grids to households in rural areas, starting from the alignment of new pipelines that would bring natural gas from the Black Sea as well as to replace coal with gas in power generation, as indicated above. In particular, the natural gas grid extension is an intensely-promoted policy, initiated in 2018–2019 before the pandemic and the natural gas crisis but continued in inertia. The underlying thinking is that Romania “has its own gas” (considering the Black Sea as well as Romgaz' Caragele); “controls its own gas” (with the state-owned Romgaz having full control of Caragele and half of the Neptun Deep); and builds new natural gas pipelines such as BRUA along which new distribution grids could fan out to neighbouring municipalities. Though the extension of natural gas access is popular with households, a more efficient use of public resources to decarbonize residential heating would have been to accelerate the renovation of the building stock, e.g., by co-financing the available EU funds from the same national public budget.

If all these plans indeed materialise, Romania's natural gas consumption will more than double by 2030, and the additional reserves will not make up for the increased

demand¹⁰. The additional natural gas consumption would consist of 5 bcm only for the newly installed power generation (including the coal-to-gas transition) and 3–5 bcm for the newly connected households, while the onshore production would decline from 10 bcm to about 7.5 bcm. Even if both the Black Sea Neptun Deep deposit (now confirmed at 100 bcm) and Romgaz' Caragele onshore (30 bcm) would materialise within the next 5 years, Romania would still need to import 4–5 bcm beyond 2027. This amount is higher than Romania's natural gas imports in a typical year before the pandemic and the war, around 2 bcm; and it goes against the objectives of EU policy and the imperatives of energy security. To avoid falling into increased dependency on natural gas imports in the long run, particularly from authoritarian regimes such as Azerbaijan or, even worse, a possible return to Russian natural gas, Romania's energy policy must be revised. Such a revision must, however, start by clarifying the institutional setup, eliminating conflicts of interest and planning the energy sector development with a view to the future.

¹⁰ As admitted by the CEO of Transgaz (afaceri.news), *Şeful Transgaz: Nici gazele din Marea Neagră, nici producția internă nu va satisface consumul țării în următorii ani*, 28.02.2024, <https://www.afaceri.news/seful-transgaznici-gazele-din-marea-neagra-nici-productia-interna-nu-va-satisface-consumul-tarii/> [27.04.2024].



Adam Čermák

Contemporary technological advances in energy systems and their impact on reducing dependency on Russian energy resources

Introduction

In recent years, the energy landscape of Central European countries has undergone a significant transformation, propelled by a collective pursuit of energy security, sustainability, and independence. However, this quest for autonomy has been underscored by a stark reality: the long-standing dependency on Russian fossil fuels, particularly natural gas and crude oil, which has entrenched the region in a precarious position. This vulnerability was starkly illuminated by Russia's invasion of Ukraine in 2022, serving as a sobering reminder of the geopolitical risks and economic uncertainties associated with energy reliance on a single dominant supplier.

This paper endeavours to explore the role of modern technologies in energetics and their pivotal contribution to

the process of energy derussification in Central European countries, against the backdrop of heightened geopolitical tensions and security concerns following Russia's aggression in Ukraine. By examining the opportunities and challenges presented by the adoption of renewables, advances in energy storage, smart grid solutions, electrification of transportation, decentralised energy systems, digitalisation, and policy frameworks, this study aims to provide a comprehensive analysis of the region's energy transition in the context of geopolitical dynamics.

Technologies

Aggregation flexibility

Aggregation flexibility represents a transformative approach in the energy sector, pivotal for Central European countries aiming for energy derussification. This strategy is critical for reducing reliance on Russian energy supplies by enhancing the resilience and adaptability of the energy system. Aggregation flexibility involves consolidating small-scale energy resources, including renewables like solar and wind, demand response capabilities, and storage solutions, to function as a cohesive, larger entity. This aggregation enables these diverse resources to participate in the energy market more effectively, offering both supply and demand-side solutions that contribute to grid stability and efficiency.

One of the key benefits of aggregation flexibility is its ability to smooth out the variability of renewables. By pooling resources from various locations and types, aggregators can offset times when one source might be underproducing due to weather conditions or other factors. This not only enhances the reliability of green energy but also allows for

a more significant displacement of fossil fuels, including those imported from Russia, with cleaner alternatives¹.

Furthermore, aggregation flexibility facilitates the integration of distributed energy resources (DERs) into the energy system, empowering consumers to become prosumers – both producers and consumers of energy. This transition is supported by the development of advanced digital platforms such as DataHubs and Energy Management Systems (EMS), which enable efficient data exchange and management of energy flows within the grid. These technologies are crucial for optimising the use and distribution of energy, reducing wastage, and improving the overall efficiency of the energy system.

The deployment of aggregation flexibility, supported by technological advancements, offers Central European countries a strategic pathway to diversify their energy sources, enhance grid resilience, and reduce dependency on Russian energy imports. By investing in and promoting these technologies, these nations can accelerate their transition towards a more sustainable, secure, and autonomous energy future.

DataHub and Energy Management Systems (EMS) are cornerstone technologies in the modernisation of energy networks, playing a pivotal role in enhancing energy efficiency and facilitating the transition towards sustainable energy sources. These technologies are especially crucial in the context of Central Europe's efforts towards energy derussification, as they enable more sophisticated control

¹ *New study: Energy flexibility aggregation can accelerate the growth of renewables*, Nano Energies, 25.10.2022, <https://nanoenergies.eu/content/new-study-energy-flexibility-aggregation-can-accelerate-the-growth-of-renewables> [26.03.2024].

and optimisation of energy flows, thereby reducing reliance on external energy supplies, particularly from Russia.

DataHub is a centralised digital platform that aggregates data from various entities within the energy sector, including consumers, producers, and grid operators. It serves as a crucial component in the energy market, providing a secure and efficient means of managing and exchanging energy data. By facilitating real-time data sharing, DataHubs support the integration of renewables, enhance grid stability, and enable innovative services such as dynamic pricing and demand response. This comprehensive data exchange capability is essential for creating a more responsive and flexible energy system that can adapt to changing energy demands and supply conditions².

Energy Management Systems (EMS), on the other hand, are advanced software tools designed to monitor, control, and optimise the generation, distribution, and consumption of electrical energy. EMS technology is integral to both microgrids and larger utility-scale networks, enabling operators to make informed decisions based on real-time data analysis. These systems can predict energy demand, manage renewable energy integration, and optimise energy storage to improve grid reliability and efficiency. Furthermore, EMS facilitate significant reductions in energy costs and carbon emissions by ensuring that energy production aligns closely with consumption patterns, thus minimising wastage and enhancing the sustainability of the energy supply³.

² *What is DataHub?*, Energinet, <https://en.energinet.dk/energy-data/datahub/> [25.03.2024].

³ Ch. Arthur, *What is an energy management system?*, UNIDO, 9.11.2021, <https://www.unido.org/stories/what-energy-management-system> [25.03.2024].

The deployment of DataHub and EMS technologies is vital for Central European countries striving for energy independence and sustainability. These technologies not only support the derussification of energy supplies by reducing dependency on non-renewable energy imports but also play a key role in the broader transition to a greener, more resilient, and self-sufficient energy ecosystem. Through the strategic implementation of DataHub and EMS, these nations can achieve greater control over their energy futures, fostering innovation and resilience in their energy networks.

Interconnectors

Interconnectors play a crucial role in enhancing the energy security and sustainability of Central European countries, particularly in their efforts towards energy derussification. These are high-voltage cables that facilitate the transfer of electricity across borders, linking the energy grids of different countries. By enabling the exchange of power, interconnectors help balance supply and demand across regions, allowing countries to import electricity during shortages and export when there is a surplus. This not only improves grid stability and reliability but also promotes the integration of renewables by distributing variable renewable energy production more evenly across the continent⁴.

The strategic deployment of interconnectors supports Central Europe's transition towards a more diversified and resilient energy system, reducing dependence on single

⁴ S. Hansen, *The Growing Strategic Importance of Interconnectors: a Look at the North Sea Region*, Rabobank, 8.06.2023, <https://www.rabobank.com/knowledge/do11369901-the-growing-strategic-importance-of-interconnectors-a-look-at-the-north-sea-region> [22.03.2024].

external sources, notably Russian energy imports. By enhancing cross-border energy cooperation, interconnectors contribute to the creation of a more connected and integrated European energy market. This interconnectedness fosters competition, leading to lower energy prices and encouraging investment in sustainable energy projects, ultimately supporting the region's goals for energy security, market efficiency, and decarbonisation.

Nuclear energy

Nuclear energy plays a pivotal role in transitioning towards sustainable and secure energy systems, particularly in Central European countries, where efforts to minimise dependence on fossil fuels and enhance energy security are intensifying. This region is witnessing significant advances in nuclear technology projects, reflecting a collective move towards cleaner energy sources and the diversification of energy supplies.

In Poland, a significant stride towards nuclear energy was made in October 2022 when the country announced its collaboration with Westinghouse Electric Company to build its first nuclear power plant. This landmark project consists of a three-unit plant, with construction slated to begin in 2026 and the inaugural reactor expected to be operational by 2033. This initiative marks Poland's strategic pivot towards leveraging nuclear energy to bolster its energy independence and sustainability⁵.

⁵ *Poland's Westinghouse choice 'deepens strategic relationship' with USA*, World Nuclear News, 31.10.2022, <https://www.world-nuclear-news.org/Articles/Poland-s-Westinghouse-choice-deepens-strategic-re> [23.03.2024].

Slovakia is further expanding its nuclear energy infrastructure with the completion of the third and fourth reactors at the Mochovce NPP. This development significantly enhances Slovakia's nuclear power generation, supporting the nation's commitment to reducing carbon emissions and securing a reliable energy supply⁶.

Czechia is planning a substantial expansion of its nuclear capacity with the construction of four new reactors at the Dukovany NPP scheduled for the 2030s. This project underscores Czechia's reliance on nuclear energy as a key element of its strategy to ensure long-term energy security and environmental compliance⁷.

Hungary is advancing its nuclear agenda with the Paks II project, aiming to add two new units to the existing Paks NPP. MVM Paks II submitted the construction license application to the Hungarian Atomic Energy Authority (HAEA) in June 2020. The project's ambitious timeline anticipates the first unit becoming operational by 2025, with the second unit to follow by 2030. This expansion is crucial for Hungary's efforts to reduce its dependency on energy imports and move towards a greener, more autonomous energy landscape⁸.

Together, these nuclear energy projects across Central Europe highlight the region's proactive approach to embracing nuclear power. By investing in this technology, these

⁶ *Nuclear power in Slovakia*, World Nuclear Association, 28.03.2024, <https://world-nuclear.org/information-library/country-profiles/countries-o-s/slovakia> [29.03.2024].

⁷ D. Proctor, *Czech Republic Expanding Nuclear Power Program*, Power, 1.08.2023, <https://www.powermag.com/czech-republic-expanding-nuclear-power-program/> [23.03.2024].

⁸ *Paks II Nuclear Power Plant*, NS Energy, 13.08.2020, <https://www.nsenergybusiness.com/projects/paks-ii-nuclear-power-plant/> [23.03.2024].

countries are not only working towards achieving energy independence but are also making significant contributions to the global efforts to combat climate change, illustrating the critical role of nuclear energy in the future of sustainable and secure energy systems.

Smart Grids and decentralization

Smart Grids enhance the operational efficiency and reliability of the energy system through the integration of advanced digital technologies. These technologies enable real-time monitoring and management of the energy flow, optimising the balance between electricity supply and demand. By facilitating the seamless integration of renewables, smart grids reduce the need for imported energy, thus contributing to the derussification effort. They ensure a more stable and flexible energy supply, capable of adapting to fluctuations and reducing vulnerability to external geopolitical influences and supply disruptions⁹.

Decentralisation of energy, on the other hand, shifts the focus from centralised, large-scale energy production to localised, distributed generation systems. This approach leverages small-scale renewables such as solar panels and wind turbines, promoting energy self-sufficiency at the community and individual levels. Decentralisation diversifies the energy mix and diminishes the strategic leverage held by external energy suppliers, including Russia, by promoting the use of indigenous energy sources¹⁰.

⁹ M. Drtil, *Tracking Smart Grids*, IEA 50, <https://www.iea.org/energy-system/electricity/smart-grids> [22.03.2024].

¹⁰ J. Cooper, *Decentralization and the Energy Transition*, EE Power, 6.04.2023, <https://eepower.com/tech-insights/decentralization-and-the-energy-transition/#> [25.03.2024].

The synergy between smart grids and decentralisation is transformative, enabling a transition to energy systems that are less dependent on Russian fossil fuels. This not only bolsters national and regional energy security but also aligns with global objectives of reducing carbon emissions and combating climate change. Through improved grid management, increased adoption of renewables, and enhanced local energy production capabilities, smart grids and decentralised energetics provide a solid foundation for countries aiming to achieve energy independence.

Conclusions

The quest for energy derussification in Central European countries, underscored by geopolitical challenges and sustainability goals, has spotlighted the vital role of advanced technologies in reshaping the region's energy paradigm, particularly: aggregation flexibility, DataHubs, Energy Management Systems (EMS), interconnectors, nuclear energy initiatives, smart grids, and the decentralisation of energetics. These technologies foster a transition away from reliance on Russian energy by enhancing grid efficiency, integrating renewable sources, and promoting energy diversification through nuclear projects and cross-border energy collaboration.

Central to the derussification journey are the challenges of integrating these technologies within strategic, policy, and investment frameworks. The push towards decentralisation and the development of interconnectors signify a move towards a more resilient and interconnected energy infrastructure. This transition is pivotal for not only mitigating geopolitical risks but also for supporting sustainable

development and energy sovereignty in Central European countries.

In summary, the path to a secure, sustainable, and independent energy future for Central European countries hinges on leveraging modern technologies and collaborative efforts. This shift, while complex, offers promising avenues for reducing fossil fuel dependency, enhancing regional stability, and aligning with broader environmental objectives.



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The full-scale attack by the Russian Federation on Ukraine in 2022 dramatically altered the landscape of the energy market and influenced the strategies of Central European countries. The region is progressively reducing its dependence on Russian energy sources and diversifying supply directions, employing a variety of tools to achieve this. Given the changing international conditions, there will undoubtedly be an accelerated shift away from fossil fuels, further driving the process of derussification. As a result, Central European countries face numerous challenges related to ensuring the availability of energy resources and managing the energy transition. The authors of the individual chapters in this paper have endeavored to outline ways to enhance the energy security of the region.

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