



Eastern Europe
Studies Centre
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More than a year with the war,
sanctions and crisis:

The change of Eastern Partnership countries' energy dependence on Russia in 2022–2023.

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Summary:

- 2022 was a critical year of energy changes for Europe following the Russian invasion of Ukraine. It also affected the countries of the Eastern Partnership, including Ukraine, Moldova and Georgia, in different ways.
- In 2022, Ukraine completely separated itself from Russia in terms of energy. The shift away from Russia had an effect of a shock rather than a well-planned, smooth transition.
- Nuclear energy is one of the most important types of energy for Ukraine's energy sector, but the country had been heavily dependent on Russian nuclear fuel. After the war broke out, Ukraine fully switched to the import of Western fuel, and is currently planning to launch a full cycle of its production domestically.
- Before the war, Ukraine imported most of its coal from Russia, especially after Russian-backed separatists invaded important coal mining areas in the Donbass in 2014.
- Moldova is one of the most energy-poor countries in Europe, so the country experienced energy blackmail to remain dependent on Russia both before and after the start of the war in Ukraine. For this purpose, Russia is using the divisions in Moldovan society and the rise in prices of energy resources.
- Moldova lacks financial capacity and a reliable status in markets for borrowing, which hinders the development of the energy infrastructure needed to separate itself from Russia. The situation would be improved by membership in the EU, but until then it is critical to cooperate with neighbours in developing joint energy projects.
- It is equally important that Moldova continues on the path of making its energy sector more transparent. Russia's influence in the country through Gazprom-owned energy companies is significant. Transparency-enhancing measures must be a priority for Moldova, and this would also be supported by the EU.
- Georgia is not dependent on Russia in terms of energy, as the lion's share of the electricity is generated by its domestic hydroelectric power plants. Most of the natural gas is imported from Azerbaijan, while the imports of oil products are diversified.
- Even with little dependence, Georgia does not take steps to separate itself from Russia in terms of energy due to the favourable attitude

of the country's government towards Russia. That is why Georgia has not joined the sanctions against the Russian energy sector. The EU must put pressure on Georgia to make the country realize that it should support the sanctions against the Kremlin in order to become a member of the Community and urge Georgia not to develop new energy infrastructure with Russia.

Introduction

2022 was a year of critical changes in the energy sector in Europe. Europe has long relied on Russian energy resources. This was often based on the convenience that the interdependence that was to emerge from intensive trade would allow Russia to become a player abiding by international rules. This belief collapsed when the West began to impose sanctions following the Russian invasion of Ukraine. The sanctions, in one way or another, affect almost the entire Russian energy sector, from oil and natural gas to nuclear power. This collapse of the standard trade pattern forced Europe to look for alternative ways of importing energy resources: for example, to [source](#) liquefied natural gas (LNG) and oil from the United States, thus [shifting away](#) from its dependence on Gazprom and Russian oil imports. Russia was also forced to look for alternative export routes for its resources, with India and China [becoming](#) significant buyers of oil and China and Turkey buying considerable amounts of gas. Undoubtedly, changes in supply routes are an economically difficult process for both sides. In Europe, this manifested itself in rapidly rising gas and electricity prices (with a less remarkable rise in the prices of oil and petroleum products, as these resources are easier to replace on the global market). In Russia, the production volumes of the resources decreased first, and when the export markets contracted and resource prices dropped significantly, the [income](#) from them also began to decrease.

These events undoubtedly affected the countries which are not members of the EU or NATO but are seeking connections with the West and participate in the Eastern Partnership programme. Undoubtedly, Ukraine, which is experiencing Russian aggression, felt the biggest impact, but the issues of energy dependence on Russia are also felt in Moldova and Georgia. This publication will not cover the other two Eastern Partnership countries – Armenia and Azerbaijan. These two states stand out for their

geopolitical specifics and the progress of integration with the West. For example, out of the Eastern Partnership countries, applications to join the EU were submitted only by Ukraine, Moldova and Georgia, and the latter state is the only one which was not granted the status of an official candidate.

Although Ukraine, Moldova and Georgia differ significantly by their economic and political situations, they also have many common features: during the period of their independence, all the three countries experienced Russian aggression and energy pressure in one form or another, especially in the supply of natural gas. The evaluation of the development of the energy sector in each of these countries or its direction reveals the differences between them. Ukraine is a large European country that has resources of gas, coal, and metal, and has developed generating capacities of nuclear power plants. Moldova lacks any energy resources. Georgia's situation is different: the country takes advantage of its mountainous terrain, so a lot of electricity is generated in water dams. The geographical circumstances of these countries also differ. For example, Moldova is the farthest from Russia but is landlocked, which prevents it from free trade in some energy resources. There are also significant differences in infrastructure development (connection with other countries) between the three countries: Ukraine has an

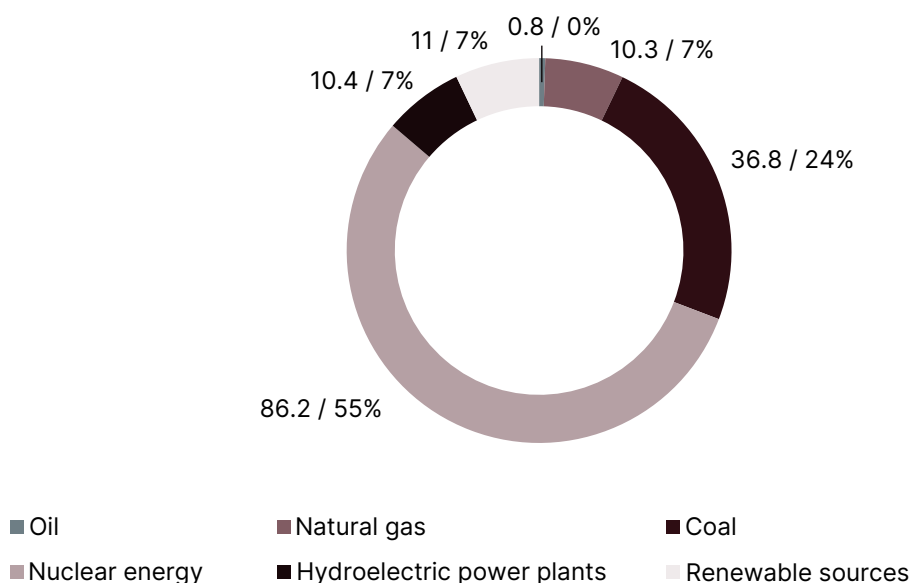
extensive cross-system infrastructure, but it was disrupted during the Russian war; Moldova lacks connections with foreign countries; Georgia is just starting to develop such connections with the EU but has gas and electricity links with Azerbaijan and other neighbours.

Therefore, it is important to look at the changes in the dependence of these countries on Russia. In 2022–2023, the world's established trade routes with Russia were disrupted. Therefore, this study will deal with the impact of this disruption, following assessments of the resources that these countries have, their generation capacities, connections with third countries, infrastructure development, the political/economic situation and possibilities for further strengthening their energy independence from Russia.

Ukraine: the necessity of change against the background of the war

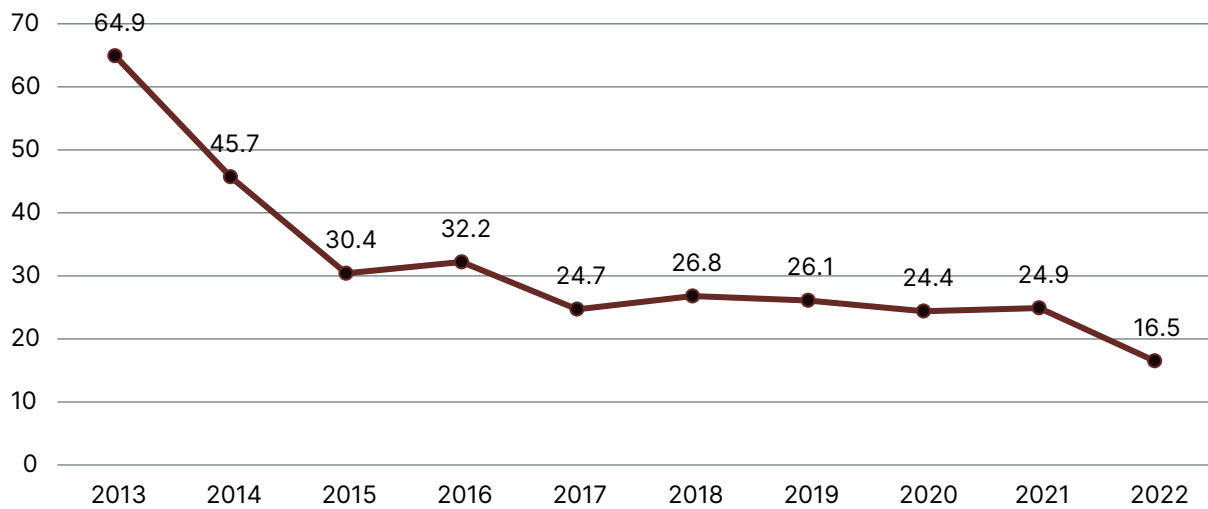
Ukraine, which has been at war with Russia since 2014, has been seeking to reduce any trade with the aggressor. However, taking into account Ukraine's

Electricity production in Ukraine 2021, TWh/%



Graphic 1: Ukraine's electricity production by types of sources in 2021 (TWh/%). [Data](#) from the Energy institute statistical review 2023, 72nd edition, page 52.

Ukrainian coal production (million tons)



Graphic 2: Ukraine's coal production (million tons). [Data](#) from the Energy institute statistical review 2023, 72nd edition, page 39.

position as a transit country for Russian oil and natural gas to Western Europe, as well as the lack of determination of the EU countries to reduce energy dependence on Russia and long-term energy infrastructure links, much trade in energy sources still took place in Ukraine (in some cases indirectly) until the beginning of the invasion. It is worth noting that Ukraine's need for primary energy sources was quite diversified, and the country was not heavily dependent on a single specific resource. According to [data from](#) the International Energy Agency, coal accounted for 30%, natural gas for 28%, and nuclear energy for 24% of primary energy in the country in 2018. The remaining 18% was made up of oil, renewable resources, biofuels, etc. However, nuclear energy dominated the country's electricity production, as more than half of the electricity was produced in nuclear power plants.

The supply and transit of Russian natural gas to other European countries was one of the most important energy issues for Ukraine. It is important to note that at the end of 2015, Ukraine [stopped](#) direct purchases of natural gas from Russia, eventually sourcing the lacking amount of gas from EU countries. However, although natural gas was purchased from EU countries, a major portion of it was simply resold Russian gas. Ukraine was not heavily dependent on Russian gas: [according to](#) the U.S. Energy Information Administration, about 70% of natural gas was extracted by the country itself. Historically, the country has had a well-developed gas production and

storage infrastructure (Ukraine can store about 30 billion cubic meters in underground gas storages), and significant natural gas reserves remain. Ukraine is [estimated](#) to have the 3rd largest natural gas reserves in Europe, following Russia and just slightly behind Norway. The amounts of these resources could be even larger, but the problem is that a considerable part of them is located in the occupied [territories of Donetsk](#) and [the Black Sea shelf](#). Russian occupation of the Donbass and military actions that are taking place in eastern Ukraine since 2015 have certainly [stopped](#), and continue to restrain, the development – or at least more thorough exploration – of resource extraction opportunities.

The invasion of the Donbass has also stopped Ukraine's coal mining industry. In Ukraine, coal still occupies a very significant place in the energy sector. Most of the country's coal mines are located in the east, in the Donbas region. After the breakout of the conflict in 2014, coal production in Ukraine fell rapidly and maintained a downward trend until the Russian invasion in 2022.

As for nuclear energy, Ukraine is capable of extracting uranium because it has uranium mines and produces uranium concentrate. However, the country cannot produce nuclear fuel and, until 2022, sent the resources needed to produce fuel to Russia, from where it later imported the finished product, i.e. nuclear fuel. After the annexation of Crimea, trade in fuel produced by the US-based Westinghouse

intensified, but Russian fuel still accounted for 70% of all imports of this resource. This reflects Ukraine's situation with many other resources intended for electricity generation. The country has always had sufficient generation capacity to provide itself with electricity, as well as a considerable amount of resources that it can extract itself. However, the dependence on Russia remained because the extraction amounts of the required primary raw materials were not sufficient, they were not processed to the required level, and there was a lack of alternative sources of trade.

After the full-scale Russian invasion in 2022, Ukraine took strict steps to completely discontinue trade with the aggressor. It is clear that the war caused a significant drop in energy consumption in all business areas that are not directly related to the military industry or the general support of the army. However, at the same time, Russian's attacks on the territory of Ukraine, especially those directly aimed at energy infrastructure, made it extremely difficult for Ukrainians to maintain reliable operations of the electricity system: there were a number of planned and unplanned blackouts, and in addition, the need for energy resources of military units increased.

It goes without saying that countries at war cannot maintain normal energy exchanges. Significant changes took place in nuclear fuel imports: already at the beginning of the military invasion, the Ukrainian company Energoatom, the operator of the country's nuclear power plants, announced that it was suspending trade in Russian nuclear fuel. As mentioned, most of the electricity in Ukraine is generated by nuclear power plants, and Russian nuclear fuel accounted for the vast majority of all purchased fuel. Energoatom also announced future plans to secure its nuclear fuel production capacity, expecting to ensure the entire cycle of nuclear fuel production in the country from 2026.

Before 2022, Ukraine also did not buy natural gas from Russia directly. However, changes have taken place in the area of indirect imports from Russia as well, as almost all EU countries are actively seeking to reduce or stop trade in Russian gas. On the other hand, Ukraine's consumption of natural gas fell to 20.1 bcm, or by about a quarter in 2022 compared to 2021, while the production decreased slightly, to 18.5 bcm. As a result, the country was able to cover more than 90% of its demand for natural gas from its own resources. However, the transit of gas from Russia to the EU through Ukraine remained, although by now it has significantly decreased. In 2023,

imports of Russian gas through Ukraine accounted for 5% of EU gas imports and just a third of the pre-war volume. This is a significant change because Russia no longer has the opportunity to supply gas to the EU via Nord Stream or through Poland (from Belarus), and the only routes remaining are Ukraine, the TurkStream gas pipeline, and LNG terminals. It is the last two import options that are almost unaffected by the war and are used as much as before. Moreover, Ukraine also does not intend to negotiate with Russia on the extension of the transit agreement after it expires (31 December 2024), which was the basis for continuing Russian gas supplies to the EU even during the war. Therefore, in 2025 Kiev will even further separate itself from indirect links with the Russian energy sector.

Probably the most painful changes occurred in coal imports, as about 75% of all Ukrainian coal imports came from Russia in 2021. In 2022, the overall level of coal imports into Ukraine fell 3.5 times, and all coal imports from Russia that year happened in the first three months. However, in the yearly statistics, Russian coal still accounted for as much as 38% of all coal imported into Ukraine. The possibilities for sourcing larger quantities of coal from other sources were limited by the blocking of Ukrainian ports and hostilities in the coal-mining regions. On the other hand, the need for power generation by coal-fired power plants intensified after Russia cut the crucial Zaporizhzhia nuclear power plant from the Ukrainian transmission grid.

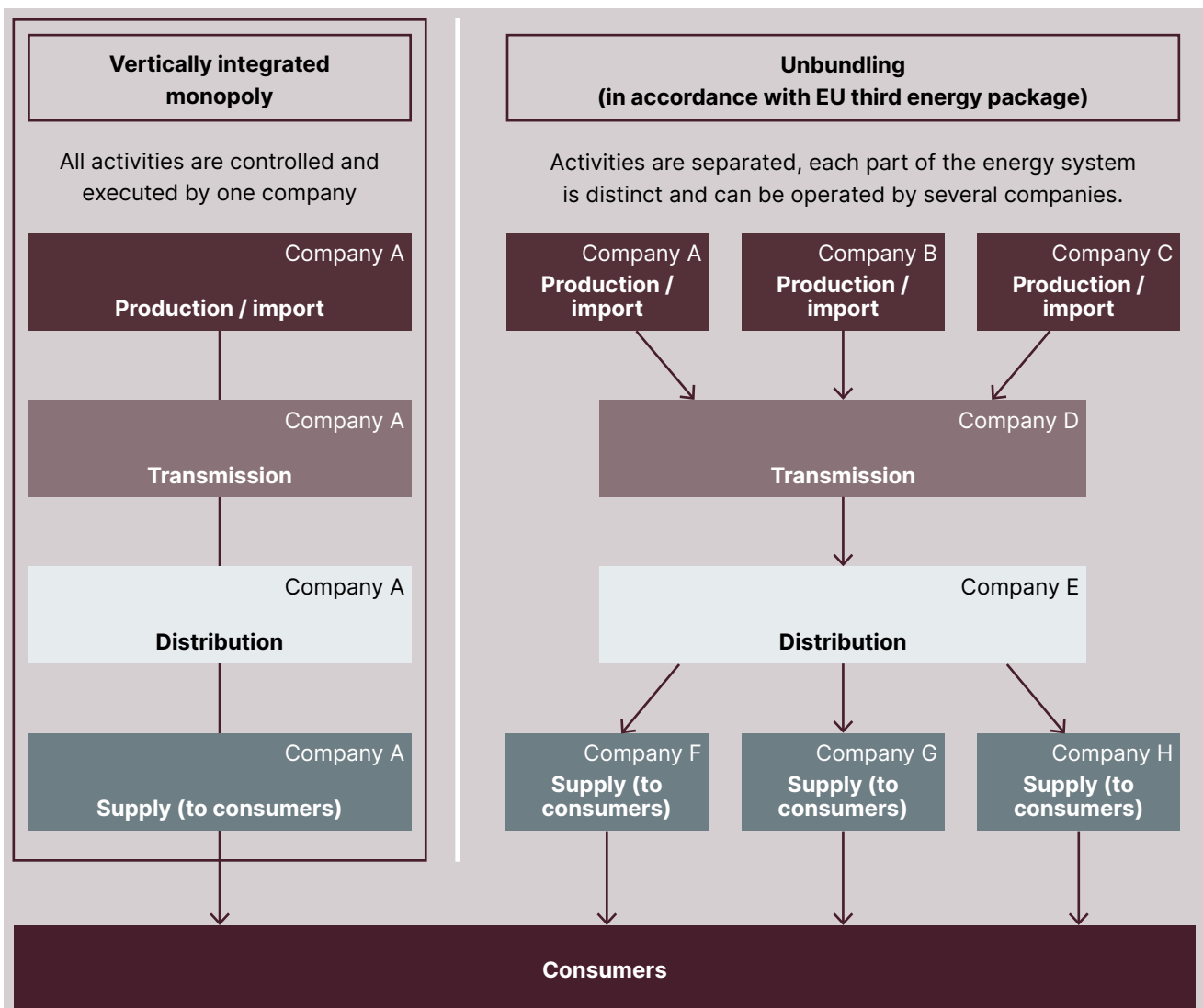
In summary, developments in the energy situation from the beginning of the full-scale war in Ukraine until now are ambivalent. On the one hand, Ukraine is no longer fully dependent on Russia because it does not import any energy resources from the country. For example, already in March 2022 the electricity grids of Ukraine and Moldova synchronized with those of continental Europe. On the other hand, the war has caused not a gradual, well-planned energy separation, but rather a shock to the entire Ukrainian energy sector, further aggravated by hostilities as the Kremlin has been seeking to destroy and damage critical energy infrastructure. As a result, it would be incorrect to consider Ukraine's energy security situation as having improved since the outbreak of the war, as it has only been stabilized after the shock. It can be said that the situation continues to improve and more and more ways are found to ensure an adequate and constant supply of the country with the necessary energy resources. However, as long as the war is going on, it is difficult to talk of comprehensive energy security. Russia can and will likely continue to

take action, especially during the winter months, to destroy Ukraine's energy infrastructure. Therefore, a critical task for the Ukrainians will be to ensure the uninterrupted operation of the facilities being destroyed, and this will depend not only on engineering capabilities, but also and especially on the operation of air defence systems and their ability to cover the country's most important infrastructure facilities.

Moldova — the target of Russian blackmail

In 2022, before Russia's invasion of Ukraine, Moldova's energy security situation was probably the worst among the Eastern Partnership countries covered by this study. Natural gas accounted for more than 50% of the country's primary energy and was

supplied almost exclusively from Russia. In addition, until recently the country had a vertically integrated monopoly in the gas sector: the main activities of gas import, transmission, distribution and supply were carried out by MoldovaGaz, a company in which Gazprom owns 50%, the government of Moldova 36.6%, and the administration of separatist Transnistria the remaining 13.4%. Moldova lacks energy resources and the ability to process them, and the country's financial capacity for large-scale infrastructure projects is also very limited. In addition, the country had debts to Gazprom for natural gas. The debts increased especially in 2021, after the beginning of the energy crisis, when Russia sharply raised the prices of natural gas. The debts further complicated Moldova's situation and increased its dependence on Russia, which undoubtedly gave Russia leverage not only in the energy system, but also in the divided Moldovan society.



Graphic 3: Difference between vertically integrated monopoly and separation of activities – compiled by the author.

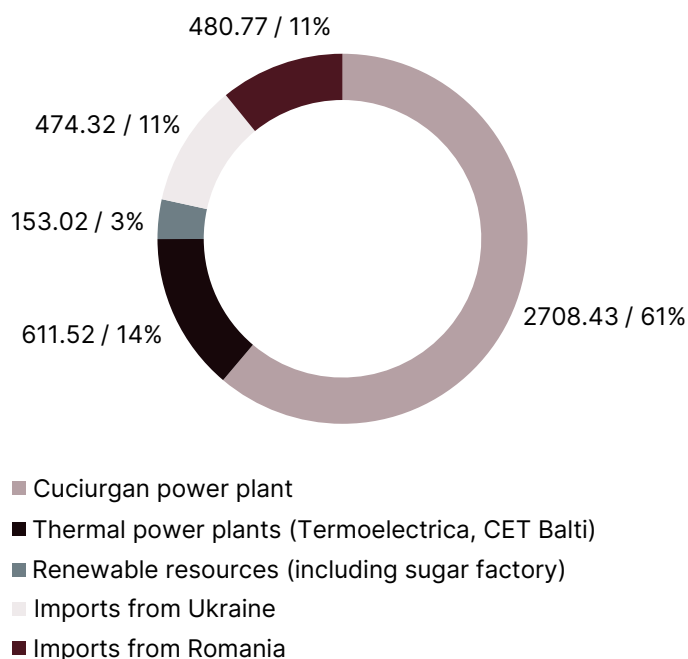
Sharp price jumps and energy instability pose the most threats to this country because the most important elements of energy security – i.e. reliability of supply and affordable prices – are not ensured. Russia's influence on certain Moldovan political factions poses challenges to the country's European integration, and any actions that potentially raises energy prices could easily affect society and fuel frustration with the government. Russia made good use of these levers both before and during the invasion of Ukraine. For example, Russia began artificially raising the prices of natural gas in Europe even before the invasion, in the winter of 2021–2022, and tried to push Moldova to abandon reforms and closer ties with the EU in exchange for a new contract on cheaper natural gas.

The winter of 2022–2023 was difficult for Moldova. Contributing to this difficulty was the destruction of Ukrainian energy infrastructure, which was also important for the energy system of Moldova. That winter also saw the rise of protests backed by the pro-Russian and pro-Kremlin local oligarch Ilan Shor that pushed to oust President Maia Sandu. The protests arose as a result of not only the generally high prices of energy resources, but also Russian blackmail with natural gas: Russia limited the supply of gas to Moldova, which promoted internal turmoil in the country. These examples once again illustrate

the armament of Russia's energy resources for political purposes. Using dependence on Russian energy resources, the Kremlin provoked civil discontent and pressured the Moldovan government to take a pro-Russian stance.

Another big challenge for Moldova is posed by the separatist region of Transnistria, where one of the country's most important energy facilities, the Cuciurgan power plant, operates. The plant is the country's main electricity generating facility (producing 61% of Moldova's total electricity needs in 2022), but it is fully controlled by Russian-backed separatists and has debts to Gazprom, which supplies the plant with natural gas. The importance of the power plant became even more prominent in the winter of 2022–2023, when the Transnistrian regime began to limit the supply of electricity to Moldova after Gazprom reduced the supply of natural gas. Until 2022, about 70% of Moldova's total amount of electricity was produced at the Cuciurgan power plant, while the rest was imported from Ukraine. This makes the security situation extremely difficult: all gas comes from Russia, the most important source of electricity generation is also practically controlled by Russia, and the most important source of electricity imports, Ukraine, is constantly exposed to missile attacks that destroy the electricity generation and transmission infrastructure. It is not surprising that in

Electricity supplied to the Moldovan transmission grid by sources in 2022, GWh/%



Graphic 4: Electricity supplied to the Moldovan transmission grid by sources in 2022, GWh/%. Data from Moldeletrica.

2022, Moldova also faced complete blackouts, even though it was not directly involved in the war. Since Moldova lacks alternative generation capacity and alternative sources of electricity supply, the war in Ukraine causes a great concern for the country. In some cases, the country's energy security situation can be regarded as worse than that of Ukraine.

Nevertheless, Moldova has taken steps to stabilize the security of the energy system in future and ensure the greatest possible resilience from Russia. First, after the outbreak of the war, Moldova, together with Ukraine, synchronized its grids with those of continental Europe. Such a move ensures frequency control independent of the Moscow-controlled electricity transmission system. Imports of electricity through connections with Romania also began to increase. As Russia began to limit the supply of natural gas, at the end of 2022, MoldovaGaz purchased some of its gas not only directly from Gazprom, but also from Energocom, a company fully controlled by Moldova, which bought natural gas not only from Gazprom, but also from Slovakia – a member state of the EU. Finally, in May 2023, the Prime Minister of Moldova Dorin Răcean announced that the country was no longer buying Russian gas and electricity. However, this statement is only partially accurate. The Cuciurgan power plant in Transnistria is still receiving Gazprom gas and supplies the electricity generated there to Moldova. Therefore, while it can be said that Moldova itself does not technically use Russian natural gas, it is done by Transnistria, which is outside of its control. Although Moldova, similarly

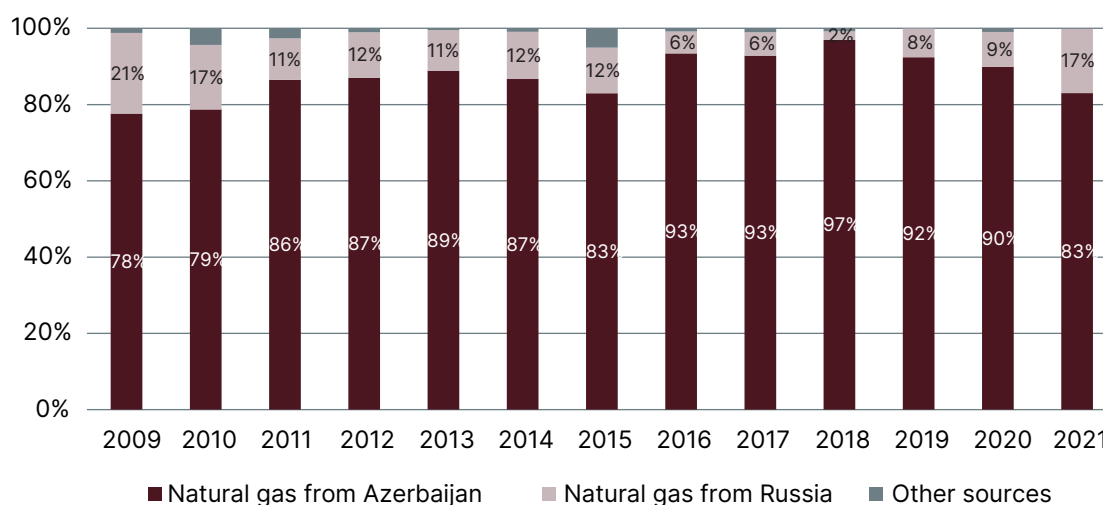
to Ukraine in the past, has managed to reduce its direct dependence on Russian supplies, its actual dependence remains high.

Georgia: *status quo ante bellum*

Georgia's energy security situation is favourable in the sense that the country has always had access to the natural gas markets of both Russia and the neighbouring Azerbaijan. This allowed the state to diversify gas imports and choose more favourable supply conditions. Data from 2009 show that Georgia has always bought significantly more natural gas from Azerbaijan than from Russia, although in recent years, before the Russian invasion of Ukraine in 2022, trade with Gazprom began to grow noticeably. Therefore, in analyzing the level of dependence on natural gas supply, Georgia could be considered more dependent on Azerbaijan than on Russia.

Georgia makes good use of its mountainous terrain for electricity generation: most of its electricity is produced in hydroelectric power plants. The available capacity is able to supply the country with electricity, so the need for imports from Russia is low and, if necessary, could be replaced by imports from Turkey, Azerbaijan or increased domestic generation. One of the greater potential threats is Georgia's involvement in the common IPS/UPS synchrono-

Georgia's natural gas imports by country of origin, %



Graphic 5: Georgia's natural gas imports by countries in 2009–2021, %. Source: data from Eurasia.net (from the National Statistics Office of Georgia).

us zone with Russia. Currently, despite the war in Ukraine, there are no public plans to desynchronize from Russia. On the contrary, the Georgian electricity transmission system operator's latest Ten-Year Network Development Plan (2023–2033) envisages a potential project to ensure the reliability of the Georgia–Azerbaijan–Russia power ring by improving overall performance (GSE [TYNDP 2023–2033](#), page 62). The Georgian government does not appear to treat the country's involvement in the common synchronized zone as a potential threat factor. The strengthened synchronization with the much larger Russian system is considered as a factor that increases the security of the state.

After the Russian invasion of Ukraine, Georgia did not take any security steps to reduce the influence of the Russian energy sector. On the one hand, there is no great need for this because the country is not very dependent on Russia in terms of energy. On the other hand, the imports of natural gas from Russia continues to grow in 2023, with Russian gas [accounting](#) for 24% of natural gas consumption in Georgia in the first half of 2023. The increase in imports from Russia is likely to have been caused by the loss of the EU market, but it still remains a small portion of Georgia's energy sector.

From the point of view of solidarity with the EU and Ukraine, the actions of the Georgian government in the energy sector in recent years could be evaluated critically. As the West tries to limit Russia's ability to trade in energy resources, a Georgian political contribution to the sanctions would be consistent with a pro-European orientation (especially considering Georgia's efforts to obtain the official status of EU candidate). Additionally, it would cost the country almost nothing, as energy trade with Russia is obviously minimal, and its loss would not cause an energy crisis. The only energy resource in respect of which this Caucasian state is dependent on Russia is coal, but coal accounts for a small share (less than 5%) of total need for energy resources. Georgia has possibilities for [obtaining](#) oil and petroleum products from other countries, and Russia's market share is only 16%. Therefore, the decisions of Georgia's politicians not to quit energy imports from Russia are either politically motivated, or they are motivated by a fear of entering into a confrontation with Russia due to the rather favourable, or at least neutral, attitude of the current government towards Moscow.

Conclusions

After the Russian invasion on 24 February 2022, the situation of the energy markets has changed throughout the European continent. It can be assumed that political pressure from Ukraine and public communication urging European countries to stop trading in any raw materials with Russia contributed to this. Paradoxically, Russia has benefited from this in the short term, as natural gas prices increased strongly in the first half of 2022. As a result, the aggressor received the same or even sometimes more revenue for smaller supplies to Europe. However, as economist Agathe Demarais has [said](#), “sanctions on Russia are more of a marathon than a sprint, and the effectiveness of sanctions will increase over time.” Therefore, the impact of the sanctions on Russia's extraction of resources starts to manifest itself only in 2023 and will probably continue to intensify.

The three analyzed countries of the Eastern Partnership programme – Ukraine, Moldova and Georgia – were in different positions energetically both before and after the outbreak of the war. Moldova was perhaps the most vulnerable due to its particularly strong dependence on Russian natural gas. Ukraine's dependence was much lower because the country has a lot of internal resources and capacities to support its energy system. However, in certain critical areas (such as the supply of nuclear fuel), dependence on Russia was significant. Georgia had the least connections with Russia and could provide itself with electricity from local generation, natural gas from Azerbaijan, and oil from several countries.

These differences in the energy security situation also led to different tactics chosen in the energy sector. For Moldova and Ukraine, the war had the effect of a kind of shock therapy, while Georgia did not take any significant steps to completely separate from Russia in terms of energy because there was simply no need for it, and it was politically decided not to annoy Russia. Moldova took steps to secure gas supplies not coming from Russia (but through intermediaries) and to provide itself with the missing electricity from Romania. It is clear that Ukraine is currently experiencing the most difficulties, as its energy infrastructure is under constant threat due to the ongoing hostilities. However, the country has diversified as much as possible and has actually completely separated from Russia in terms of energy.

Main problems identified and possible options for solution:

It should be noted that some of the identified problems may also be suitable for other countries, not necessarily only the state referred to. In fact, the proposed pathways for solutions are quite universal for all three studied states.

1. Ukraine is lacking full-cycle nuclear fuel preparation capabilities. Before the war, fuel products were imported from Russia, and after the outbreak of the war they were replaced by ones from the US.

Possible pathways for solutions:

- 1) Ukraine ought to expand their own nuclear fuel full-cycle production capacities. Ukraine is already hatching such plans and expects to have full-cycle production capacities as early as 2026, but should still develop them more extensively. It is not planned to abandon nuclear energy, as it is an essential part of the Ukrainian energy sector in the future. As the war continues, and there is no certainty as to how long it will last, own full-fledged production of nuclear fuel would allow for greater autonomy and supply security to tackle unforeseen problems. Further cooperation with US companies producing nuclear fuel should especially be expanded. Considering the current trends in the EU (even in Ukraine's neighbours, such as Poland) in developing nuclear energy, with new technologies such as small modular reactors (SMR), Ukraine may have more potential to become an important supplier of nuclear energy resources to Europe.
- 2) In the long term, Ukraine should seek to switch to more modern, Western nuclear reactors. There are such plans in the country, but their implementation was slowed down by the war. However, it is necessary to prepare for the development of such infrastructure as soon as possible. Ukraine has a large base of experts in nuclear energy, and in the long run, the transition from Soviet to Western reactors will ensure a more sustainable and safe development of nuclear energy without any

influence from Moscow. The West has been increasingly considering and aiming at investments in more modern, SMR-type nuclear power plants. The United States, with designs such as [GE-Hitachi](#) and [NuScale](#), is one of the leading countries in the development of SMR technology. The development of this technology in Ukraine could contribute to the country becoming a base for the development of US nuclear energy in Europe. However, there is also potential for cooperation in the nuclear sector with other Western countries, such as France or the United Kingdom.

2. Moldova is dependent on the supply of electricity from Transnistria, which is politically and economically dependent on Russia. Except for this region, the country was able to make decisions for distancing from Russia in terms of energy, with [strong support](#) from the EU. However, the problem of dependency still exists, because Moldova lacks the financial capacity to develop the energy sector at its own expense.

Possible pathways for solutions:

- 1) The suspension of electricity trade with Transnistria would not be an appropriate solution at the moment, when as much as 60% of electricity is produced at the Cuciurgan power plant. At the same time, it would be treated as a provocative step on the part of Moldova. Therefore, the main way to possibly ensure less trade with Transnistria is to increase competition. Transnistria's natural gas-fired power plant is quite expensive compared to the production of renewable resources. The development of such generation capacities in Moldova or the development of connections with countries that can offer cheap energy would potentially enable the out-competing of electricity produced in Transnistria. However, this would require significant investments from Moldova (if its own capacities are developed), while the Kremlin could intentionally (as it has done so far) offer natural gas to Transnistria at a lower price. Potentially, the Kremlin's influence could be reduced in the future by restricting gas transit through Ukraine as well as by importing greater amounts of electricity from Ukraine.

- 2) EU membership and rapid integration with the EU should be the top priority for the Moldovan government because it would provide financial and political stability. The implementation of all reforms required and recommended for EU accession should also be pursued by the government without any exceptions.
 - 3) Moldova should expand cooperation with its closest neighbours by engaging in energy projects that are not necessarily directly related to Moldova's infrastructure. For example, the sea power cable from Georgia to Romania, which is currently being developed together with Azerbaijan, Hungary and the European Commission, would also be beneficial for Moldova. The development of similar projects could be a cheaper alternative for Moldova compared to building energy infrastructure on its own. Potential projects: the development of the production of renewable resources, storage facilities, import sources, joint operation and development in cooperation with the closest EU members and Ukraine.
3. There are problems related to transparency in the energy sector of Moldova, both in terms of publicizing information and compliance with the EU standards in the energy sector. Gazprom still has too much influence in the country, the principles of separation of activities are not fully implemented, and there is a lack of free and easy access to significant energy sector information.

Possible pathways for solutions:

- 1) One pathway is to implement the provisions of the EU's Third Energy Package regarding the separation of activities in the energy sector. Moldova needs to ensure that its electricity and natural gas transmission and distribution networks are managed by state-owned companies and that supply activities can be carried out by more entities. This would ensure a more transparent operation of the energy system and, in the long term, especially in approaching an EU membership, attracting more private investments in energy infrastructure.
- 2) Another option is to strengthen the independence and transparency of the national regulatory authority and adoption of good practices from other countries. Currently, the ANRE

energy regulator operates in Moldova. It is this institution that should be strengthened, ensuring as little dependence on the government and the parliament as possible.

- 3) The Moldovan regulator should fully cooperate with the EU regulatory authorities, and not limit this to close relations only with the Romanian regulator, but also to expand relations with, for example, the regulators of the Baltic countries, who could share institutional experience for the transition to European standards.
 - 4) Moldova should publish data about the energy system as widely and accessibly as possible for everyone – i.e. for consumers and producers, both in Romanian and in English. Now, data on the operation of the transmission system are provided to a limited extent and hardly publicly available. On the website of the operator of the Moldovan electricity transmission system, this information is provided only in the Romanian and Russian languages, not continuously (live), but only for certain reporting periods. Public and free access to energy system data is particularly important for the transparent functioning of the energy system.
4. Georgia does not join the Western sanctions against Russia due to the invasion of Ukraine and does not quit trade with Russia in energy resources.

Possible pathways for solutions:

- 1) Georgia's trade in energy resources with Russia is minimal, and their refusal and limitation of energy trade with Russia would have almost no effect on the country's ability to take care of energy resources; therefore, the country should join the sanctions on the energy sector. Joining the sanctions would demonstrate solidarity with the West, and would also hinder Russia's ability to circumvent the restrictions imposed on it and to potentially increase its influence in Georgia. In turn, the European Union should become more involved and push Georgia to quit Russian energy resources in order to become a member of the Community. For this purpose, it would also be possible to allocate more EU support for energy projects, especially those jointly

developed with EU members, as an incentive for Georgia to distance itself from Russia. Considering that Georgia's current energy dependence is not high and would not require a lot of resources for separation from Russia, it would probably not require very significant EU support. Nevertheless, it would be a clearly motivating factor for Georgia's society and politicians.

- 2) Georgia, in pursuit of EU membership, should not develop any new, auxiliary, etc. infrastructure, which would potentially increase energy trade with Russia. The Kremlin would definitely take advantage of such projects for its own purposes, and this would give more leverage to influence Georgia's policy. The EU must also push Georgia to abandon any integration projects with Russia, and possibly even treat it as a condition for joining the EU. Accordingly, Georgia's possibilities for leaving the Soviet IPS/UPS synchronized zone in which the country is now involved, and to join the Continental European grid, must be considered. The specifics of this country for synchronization are different from those of the Baltic countries, but this could be done through Turkey, which is part of the Continental European grid. This would provide the country with more independence from the Russian electricity grid and, if the need arises, it would be possible to completely terminate electricity exchanges and connections with Russia.
5. Georgia is dependent on the production of hydroelectric power plants and has future plans for the development of power plants of this generation. On the one hand, using hydro resources in a mountainous country constitutes a good use of geographical situation. On the other hand, hydroelectric power plants are quite seasonal, so during the summer, especially with the growth of energy consumption in the long term or during droughts, there may be serious challenges in supplying itself with electricity. In such cases, it may become necessary to trade in electricity (or natural gas for the generation of thermal power plants) with Russia.

Possible pathways for solutions:

- 1) Georgia should look for ways to expand electricity links with other countries. This can be helped by the planned undersea cable across the Black Sea, which will connect Georgia's energy system with Romania and other countries. However, its effectiveness in situations where it may become necessary to conduct more trade with Russia (for example, during a drought) would depend on whether those links to Russia are freely available and whether electricity generated in Russia is cheaper than in Romania.
- 2) It is recommended to focus more on the development of other renewable resources, such as wind or solar generation. Solar generation would be especially useful, for example, during summer, when hydroelectric power plants produce less energy, but there is more sunshine. It would be important to link the development of renewable energy projects with the installation of storage facilities, focusing on batteries instead of pumped storage hydroelectric plants, as this would only increase the dependence on hydro resources and their vulnerability to droughts.
- 3) The war in Ukraine has shown that the Russian side does not limit its actions to destroying energy infrastructure and can damage even large facilities such as the Nova Kachovka dam. Georgia, as a country located next to Russia that relies on the production of hydroelectric power plants, should take care of their greater security in the worst-case scenario – not necessarily in the case of a direct war, but also in the case of a hybrid conflict or a terrorist attack. At the same time, it would be useful to better prepare people living near hydroelectric power plants for accidents, even in situations where the state itself does not fully control the area of the incident.