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Moldova's Energy Future

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A Report of the CSIS Project on Prosperity and Development

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Introduction

Russian gas flowed into Moldova via Ukraine from the fall of the Soviet Union (formally 1991) until the 2022 Russian invasion of Ukraine. Historically, this arrangement gave Russia an annual opportunity to seek Moldovan concessions or have the country suffer the consequences in both gas prices and the volume of gas supplied. This ongoing struggle provides a window into Moldova's complex and layered relationship with Russia and with the Moldovan breakaway region of Transnistria, as well as Moldova's internal challenges with institutional effectiveness.

Examining Moldova's energy sector also reveals the country's significant growth and reform over the past several years.¹ As of 2023, Chisinau (the capital of Moldova) no longer purchases gas from Russia's Gazprom.² However, this does not mean that Chisinau has freed itself from Russia's malign hand on the thermostat. Russian gas still flows into Transnistria and the majority of Moldova's electricity is still supplied via the electrical plant in Transnistria, which is run on Russian gas.³

This ongoing struggle provides a window into Moldova's complex and layered relationship with Russia and with the Moldovan breakaway region of Transnistria, as well as Moldova's internal challenges with institutional effectiveness.

Figure 1: Gas Pipelines in Moldova



Note: This map reflects gas pipelines across Moldova (depicted in white) with Transnistria (depicted in dark gray).

Source: "Moldova: Political Pressure In The Gas Pipeline," Media Reforms Center, November 22, 2021, <https://www.stopfake.org/en/moldova-political-pressure-in-the-gas-pipeline/>.

To fully understand the current energy situation in Moldova, it is essential to explore the history of the country’s post-Soviet Union energy supply system. Moreover, in order to explore the long history of discounted gas from Russia, as well as Transnistria’s current supplying of most Moldovan electricity, one must inevitably look at Tiraspol, the capital city of Transnistria. But more than a look backward is needed to understand the future of gas, electric, and alternative energy sectors; accordingly, this piece goes beyond that, offering an overview of the current international aid efforts underway, as well as how EU accession is likely to affect this industry. Most importantly, this piece includes potential and crucial solutions to continue progressing toward Moldova’s energy independence.

Background on Post-Soviet Moldovan Energy

Since Moldova's independence in 1992 and until 2022, the majority of Moldovan gas has come from Russia.⁴ As of 2018, Chisinau was only meeting 20 percent of its energy demand domestically, instead relying almost entirely on imports. Until 2014, most of this imported energy consisted of natural gas coming from Russia via Ukraine.⁵ The Moldovan populace felt the Russian hand reach in and turn down their thermostats in the winters of 2006 and 2009, when the energy giant Gazprom shut off gas to Moldova.⁶ While such measures are not unheard of in Moldova, the country has largely been shielded from Russian shut-off threats at least partially because the Balkan gas supply ran through Moldova.⁷

Russia has long used energy as a coercive tool, especially against post-Soviet states, in particular targeting Ukraine, Belarus, Georgia, and Moldova.⁸ While Russian efforts to leverage energy flows as a coercive tool across the post-Soviet world often yield acquiescence in the short term, in the longer term such effort pushes clients to diversify their supply, as has been the case in both Ukraine and Lithuania.⁹ Moldova's tempestuous history with Russia—as played out in the latter's unreliable supply and pricing of energy, among other avenues—eventually pushed Moldova to diversify its energy supply in earnest in 2022.¹⁰

Until recently, Moldova's long-standing efforts to develop and reform its energy sector have produced minimal results. In 1997, the Moldovan government established the National Agency for Energy Regulation (ANRE), a body tasked with, among other duties, regulating and monitoring the energy sector.¹¹ But like much of the Moldovan bureaucracy, the agency was not provided with sufficient independent authority to effect this oversight.¹² Without such power, the energy industry

has remained a political and profitable tool for internal and external forces. ANRE has also been accused of placing unnecessary challenges on private sector engagement in the marketplace, including delays in permitting, licensing, and anticompetitive tariff setting.¹³

Until recently, Moldova’s long-standing efforts to develop and reform its energy sector have produced minimal results.

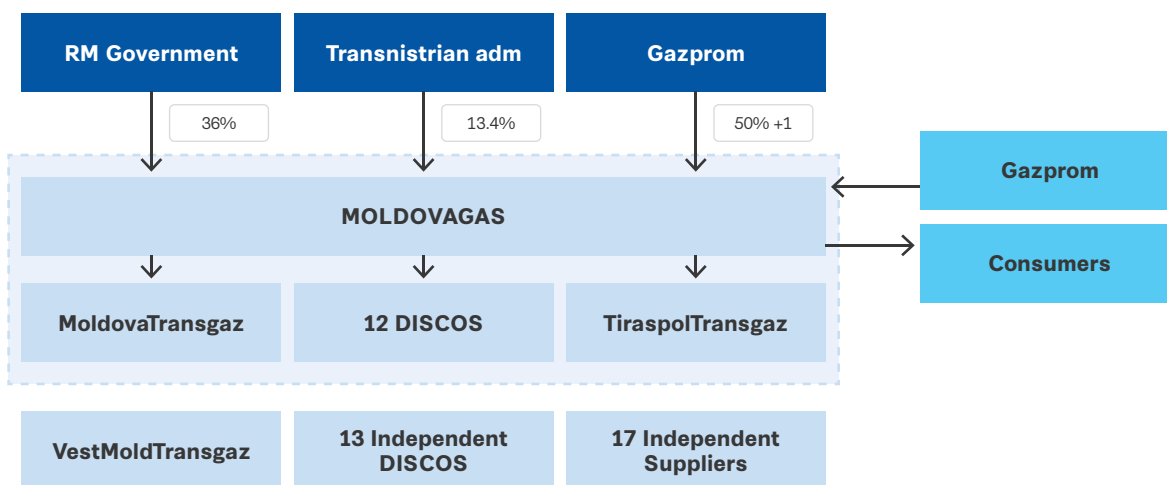
Moldova’s efforts toward energy diversification, if not full energy independence, have gone the way of so many Moldovan reform efforts—progressing in fits and starts and plagued by corruption and bureaucratic missteps. In August 2014, the Iasi-Ungheni gas interconnector between Romania and Moldova was commissioned, becoming notionally operational in 2015.¹⁴ However, the entire pipeline was not finished, including connecting Ungheni to Chisinau, until 2021. Moreover, gas did not even begin to flow through this pipeline until 2022.¹⁵ There was a 2017 attempt to move Moldova’s electrical supply to a Ukrainian firm, but that ultimately failed, with some alleging corruption as the culprit.¹⁶ Even in the fraud cases investigated by ANRE, prosecutions and fund recovery have been slow.¹⁷

Perhaps the largest corrupt bureaucratic maneuvers occurred between 1995 and 1998, when the gas networks in Moldova were privatized.¹⁸ Throughout the privatization process a number of dubious, and likely corrupt, schemes were evident, including the undervaluation of assets and the overvaluation of Moldovan government debt.¹⁹ These debt and asset valuations led to the Russian state-owned Gazprom obtaining a 50 percent ownership stake in Moldovagaz as repayment for the debts.²⁰ The remaining ownership of Moldovagaz rests with the Moldovan government in Chisinau (35 percent) and the government in Tiraspol, the capital of the Moldovan breakaway region of Transnistria (15 percent).

Russian Gazprom was created in 1989 when the Soviet Gas Ministry was privatized.²¹ In 2005, the Russian state became the majority owner of Gazprom. Until 2022, the company was one of the top producers and exporters of natural gas in the world.²² (Since the 2022 Russian invasion of Ukraine, Gazprom’s revenue has decreased sharply; it reported its first net loss in 20 years.²³) By law the sole exporter of Russian gas, Gazprom has leveraged this supply to obtain diplomatic concessions from not only post-Soviet states but western Europe as well.²⁴

Gazprom’s ownership stake in Moldovagaz provides another avenue for the Russian government to manipulate the Moldovan energy sector, which it has already done. For example, in 2021, it was only after a contentious negotiation period that the contract between Moldovagaz and Gazprom was renewed for five years. Two days before the deal was set to be signed, Gazprom tripled the pricing model for Chisinau, leading to a hold in negotiations during which the Moldovan government proved successful in diversifying its energy sources, if only for a short period.²⁵ The European Union played a role in this process, not only through financial assistance to aid Moldova in keeping the lights on, but also by publicly calling out Russia’s use of energy as a geopolitical tool.²⁶

Figure 2: Moldova Gas Sector before Unbundling



Note: This chart also reflects Moldovan gas supply prior to Chisinau divesting from Russian sources.

Source: “Moldova Energy Profile: Market Design,” International Energy Agency, <https://www.iea.org/reports/moldova-energy-profile/market-design>; and “European Union High Level Advisers’ Mission 2019–2021,” European Union, <https://www.eu-advisers.md/mission-2019-2022/>.

The 2021 negotiations centered around three main challenges that have long plagued Moldova’s energy industry. The first involves the debt that Chisinau supposedly owes and the repayment schedule, both of which are contested.²⁷ The second is the pricing model and its flexibility, as well as Russia’s commitment to supply. The third challenge involves the restructuring of the energy sector, including the unbundling that Moldova has committed to as a part of the European Union’s Third Energy Package.²⁸ While progress has been made on each of these challenges since 2021, none are yet resolved. All three of these challenges are discussed in greater depth later in this paper.

The 2021 deal and the overall lack of progress in the energy sector since independence left Moldova still largely dependent on Russia for energy when Russia invaded Ukraine in early 2022. Russia’s invasion and continued attacks on infrastructure meant that Ukraine was no longer able to supply Moldova with electricity, a gap which Romania stepped in to fill.²⁹ Most likely in response, Russia announced it was reducing gas supplies to Moldova—including to Transnistria—by 30 percent.³⁰ Tiraspol then announced cuts of over 50 percent in the amount of electricity it could supply to Chisinau.³¹ Combined, this left Moldova with the worst energy crisis since its independence.³²

The crisis led to the government in Chisinau asking citizens to reduce their energy usage; protests against the pro-western government followed.³³ The European Bank for Reconstruction and Development (EBRD), the United States, and the European Union provided aid in the form of grants, loans, and funds aimed at subsidizing bills for the poorest Moldovans.³⁴ While efforts to diversify energy suppliers had been made prior to 2022, the crisis pushed them into high gear.³⁵ By 2023, none of the gas supply flowing to Moldova (aside from Transnistria) was imported from Russia.³⁶

However, despite this apparent independence from Russian gas (and therefore influence), since Moldovagaz controls gas flow, and Gazprom owns 50 percent of Moldovagaz, the Russian

government is still involved in and profiting from Moldova's gas sector.³⁷ Furthermore, while none of the right bank of Moldova's gas is imported from Russia, the entirety of Transnistria's gas is still being provided by Russia, and it has been provided free of charge for the last fifteen years. The cost of this "free" gas—worth approximately \$9 billion—is billed by Gazprom to Moldovagaz.³⁸ In 2023, an independent review found that Moldova's current debts were significantly lower than Russia had alleged.³⁹ And so, disagreements over debts that Moldova, or more specifically Moldovagaz, owes to Russia for gas continue.⁴⁰

Regardless of the debts owed and who might owe or pay them eventually, the Transnistrian economy has long been reliant on discounted ("free") gas from Russia, including to run one of the largest electrical plants in the region, the Cuciurgan Power Station (MGRES), which itself is owned by a Russian company.⁴¹ This plant currently provides approximately 80 percent of Moldova's electricity, revealing yet another way in which Moldova remains under Russia's thumb for its energy.⁴²

Currently, Russian gas flows to Transnistria via Ukraine, but Ukraine has indicated that it will not extend that contract with Russia when it expires in December 2024.⁴³ The Moldovan government has indicated that there are alternative ways for Russian gas to flow to Transnistria following the ending of the Russian-Ukrainian contract.⁴⁴ But questions remain: Will Russia continue to provide this free gas? Who will pay transit fees? And, will this affect the price of electricity provided to Chisinau?

Moldova's pathway to energy independence has continued to develop in leaps and bounds. In 2024, Moldova joined with other European partners in supporting the security of the energy supply for Ukraine, including efforts to integrate Romanian, Moldovan, and Ukrainian electrical systems.⁴⁵ These efforts, among others, not only support Ukraine's energy supply, but also further diversify Moldova's energy flows.

In May 2024, the United States committed additional resources to Moldova to support energy development, among other cross-sector collaborations including but not limited to cyber security.⁴⁶ This follows significant U.S. government investments in Moldova's energy sector.⁴⁷ Furthermore, the continuing support from the European Union, the World Bank, and other foreign partners is essential for Moldova's energy future.⁴⁸

Despite this progress toward energy diversification, the higher energy prices have negatively impacted the Moldovan economy. This means that energy remains not only a physical resourcing issue but also a political one, as pro-Russian candidates can (and do) use the promise of a return to lower prices as a part of their platforms. While Moldova is solidly on the path to energy diversification, its road to long-term energy independence and having an efficient energy sector free from corruption and Russian influence is going to take time, support, and smart, collaborative policy solutions.

The Transnistrian Equation

Transnistria, a territory wedged between Moldova and Ukraine, has existed as a breakaway region with Russian troops stationed there since 1992.⁴⁹ The Russian “peacekeepers” arrived at the end of kinetic conflict and are tasked with patrolling the territory as a part of the agreement that ended the fighting. While Moldova agreed to the “peacekeepers,” it never agreed to the additional Russian forces tasked with protecting a large Soviet-era weapons depot.⁵⁰ The presence of these troops and the weapons depot serve as reminders of Moscow’s power to exert influence on Chisinau one way or another.⁵¹

Prior to the 2022 Russian invasion of Ukraine—in fact, since 2005—both governments (Chisinau and Tiraspol) engaged in negotiations via the 5+2 format.⁵² This group originally included Moldova, Transnistria, Russia, Ukraine, the Organization for Security and Co-operation in Europe, the European Union, and the United States; since the 2022 Russian invasion, Ukraine has refused to continue negotiations in this format, but Russia and Transnistria have asked for their continuation.⁵³ While a reinstatement of the 5+2 format is unlikely, Chisinau has expressed a commitment to working closely with Tiraspol, as it is in the former’s interest for the situation in Transnistria to remain stable.⁵⁴

Russia has attempted to exert influence over Moldova through manipulating energy prices and flows or by threatening to do so.⁵⁵ An argument frequently raised in these aggressive negotiations is Moldova’s gas debt.⁵⁶ This debt—the total of which is still being contested—includes the amount that Moldova owes Russia both for the “free” gas being provided to Transnistria and the gas provided to the rest of the country.⁵⁷

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As a part of the 2021 Gazprom, Moldovagaz, and Moldovan government negotiations, an independent review of the debts was conducted.⁵⁸ The review found that the Moldovan government owes Russia approximately \$8 million, not the more than \$700 million that Russia claims.⁵⁹ The difference is partially due to noncompliant expenses including salaries, office renovations, and interest accumulation on the debts owed.⁶⁰ Furthermore, this review found that the distribution of gas transit costs over the last twenty years had been overpaid by Chisinau and underpaid by Tiraspol to the tune of \$250 million.⁶¹ Some portion of discrepancy may be due to Gazprom not providing financial documentation in support of this review. Of note, this review was only conducted in relation to the debts for Moldovan territory and did not include those relating to Transnistria.

The import contract between Gazprom and Moldovagaz stipulates that gas is to be provided to Transnistria, with Moldovagaz holding the debts.⁶² In a further complication of the structure between these entities, Transnistria's gas is provided via a Moldovagaz subsidiary named Tiraspoltransgaz. This company owns the gas-related infrastructure in Transnistria.⁶³ Historic ANRE inspections and their subsequent reports have noted irregularities in the accounting for Tiraspoltransgaz.⁶⁴

The gas that Moldovagaz provides to the Transnistrian-based subsidiary is then sold via an agreement with the government in Tiraspol and subsequently sold at below-market rates to Transnistrian businesses.⁶⁵ The revenue thus generated is put into an account and recorded as loans from Tiraspoltransgaz to support the region's budget.⁶⁶ This revenue makes up approximately 50 percent of the region's budget, but more importantly, the value of the gas consumed free of charge was approximately 50 percent of the entire region's GDP over a ten-year period.⁶⁷

This means that the entire Transnistrian economy, and government service provisioning, is based on a model of receiving free Russian gas.⁶⁸ If Transnistria were to no longer receive free or significantly subsidized Russian gas, there would likely be massive and swift bankruptcies of Transnistrian businesses.⁶⁹ This is not in the interest of the Transnistrian oligarchs, who hold significant political power in the region.⁷⁰ Perhaps surprisingly given Moscow's significant influence and presence, the Transnistrian government has remained neutral regarding the war in Ukraine.⁷¹ This neutrality is demonstrative of just how much sway the oligarchs in Transnistria have over Tiraspol.

Despite the December 2024 expiration of the Russian-Ukrainian gas contract, the Moldovan government is confident that alternatives exist to continue the flows of Russian gas to Transnistria.⁷² The cheapest option would be to continue using Ukrainian pipelines via a third party, but, given Ukrainian laws on signing contracts with Russian entities, any such third party would need to own the gas itself, not just be providing it on behalf of Gazprom. An alternative is to utilize the

Turkstream and Trans-Balkan pipelines, but this would be significantly more expensive, and the pipelines still pass through Ukrainian territory. Both of these alternatives are only possible if the infrastructure in Ukrainian territory remains undamaged from a Russian attack and if the pipelines in question have the capacity to carry the additional flow.⁷³ It remains to be seen if Russia will take these alternatives or request for Transnistria to pay transit fees or other costs associated with the gas delivery.⁷⁴

Of note in this discussion is the fact that Moldova's largest power plant, the Cuciurgan Power Station (MGRES), sits within Transnistria.⁷⁵ Moldova has historically been reliant on this plant's production and the pricing models provided to Chisinau, which are predicated on the free gas the plant receives.⁷⁶ Moreover, historically all Moldovan gas and electrical lines ran through Transnistria; prior to independence, Moldova was essentially reliant on its east for energy.⁷⁷ However, even if Moldova could supply all the electricity needed for all its citizens through lines from the west to Chisinau, in all likelihood, not purchasing Transnistrian electricity would lead to a collapse of the Transnistrian economy, government, or both.

If subsidized gas ceases to flow, unemployed Transnistrian citizens will likely seek support from Chisinau, creating an additional flow of refugees.⁷⁸ Chisinau, which has taken in the largest number of Ukrainian refugees per capita worldwide since the 2022 invasion of Ukraine, is not equipped to handle the numbers this would entail.⁷⁹ Moreover, as mentioned above, Transnistria is home to a contingent of Russian troops and a Soviet-era weapons depot, both of which would be affected by the instability in the region if a collapse were to occur.

This instability could force Chisinau to face the challenges a reunification process presents.⁸⁰ Alternatively, if Russia ceases to provide its "free" gas, Chisinau could stave off volatility by subsidizing the purchase of gas and electricity for both itself and the breakaway region. If this were to occur, the Moldovan government would likely need to turn to international partners for support given the costs associated with these subsidies.

It is in neither Chisinau's nor Tiraspol's interest to get into a back and forth tit-for-tat on energy, nor to let the Transnistrian energy market—and subsequently its entire economy—collapse.⁸¹ Ukraine also has a vested interest in Transnistrian stability, not only for humanitarian reasons, but also because a portion of Ukraine's electrical grid is linked to Moldova's via the hub in Transnistria.⁸² There is also the question of whether even Moscow would want a true crisis in Transnistria, especially one focused on energy, as it might break the implicit contract between Moscow, the government in Tiraspol, and the population residing in Transnistria.

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It is also in both Chisinau's and Tiraspol's interests to keep energy prices as low as possible, especially at a time when the Moldovan populace has been economically depressed since the start of the Covid-19 pandemic.⁸³ This pricing is of concern not just for Chisinau seeking alternative sources of energy, but also for Transnistria. If Transnistria were cut off from heavily subsidized gas, but alternative sources were available to Transnistria at market rates, the pricing adjustments would create a shock to the economy that would likely lead to a refugee crisis, which would not only be a humanitarian problem but also a political one as it would occur approximately six months before the 2025 Moldovan parliamentary elections.⁸⁴ Furthermore, the current electricity that Transnistria sells to Moldova is below market rate, so this arrangement also benefits Chisinau. This leaves Chisinau in the position of funding its own breakaway region for the time being.⁸⁵

Gas Sector Overview

Since the fall of the Soviet Union, Moldova has been heavily reliant on supply from Russia, specifically Gazprom, for nearly all its natural gas needs. Moldova's gas company, Moldovagaz—with Russian Gazprom holding a 50 percent stake, the Moldovan government 35 percent, and Tiraspol 15 percent—monopolizes the gas sector. This has left the country vulnerable to Russian market manipulations and influence. The power of this ownership is particularly significant as more than half of Moldova's energy supply is derived from natural gas.⁸⁶

Since it halted the direct import of Russian gas and began diversifying its gas supply in 2022, Moldova has also sought sources outside of Moldovagaz. Chisinau now uses Energocom, another state-owned Moldovan company.⁸⁷ Of note, Energocom also participates in the auctions on the BRM (Romanian Commodities Exchange) gas exchange in Moldova to deliver gas to Moldovagaz. While this removed Gazprom from having ownership control, it has not created an environment that incentivizes private sector participation in the energy market. For example, the recent contracting negotiations with suppliers have been opaque at best, releasing neither volume nor pricing publicly.⁸⁸ A state-owned entity conducting business in this manner is not a recipe for accountability to the Moldovan taxpayer, nor for private sector engagement in the sector in the short or long term.

In the coming years, Moldova is expected to continue diversifying its gas sector by exploring a range of alternatives for expanding supply, including developing networks through Romania to import gas from EU markets; using Bulgarian networks to transport natural gas; and implementing the Vertical Corridor Initiative to import natural gas from the Caspian Sea and liquefied natural gas (LNG) from terminals in Greece.⁸⁹ In fact, Moldova was instrumental in the first delivery of gas from Greece

to Ukraine via the Vertical Corridor in 2023, which stored it in its underground storage space, the largest in the European Union.⁹⁰ However, while Moldova has the Iasi-Ungheni gas interconnector operational and available as an alternative gas supply if the current main route—the Trans-Balkan pipeline—is unavailable, that option is significantly more expensive.

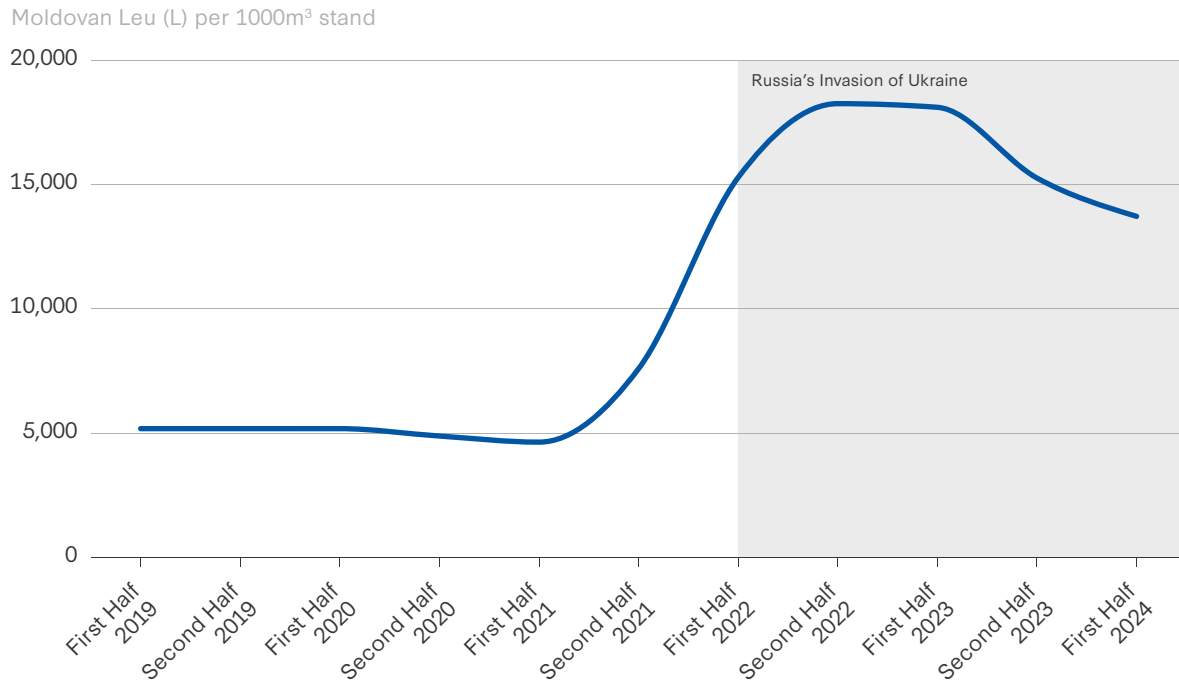
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Another possibility is that Moldova could enter the global LNG market and access resources from the United States and Qatar. Additionally, Moldova could import gas from Azerbaijan or Turkey by building extensions to the Trans-Anatolian pipeline.⁹¹ While these options are costly and time consuming, Moldova will want to avoid a return to reliance on a single source of gas. The country will likely continue pursuing energy market reforms aimed at liberalizing the market, increasing competition, and reducing the power of Moldovagaz, all of which necessitate private sector participation.

Moldova will also likely continue working to improve its energy efficiency, thereby lessening the demand for energy, to a degree.⁹² Currently, many buildings use older technology for district heating, and consumers use two or three times more energy than would otherwise be required because they do not have horizontal distribution of heat with individual temperature controls.⁹³ With the help of other countries and international financial institutions such as the World Bank Group, Moldova aims to modernize its gas and energy capabilities.⁹⁴ As part of that strategy, in 2024, the Moldovan government launched a program focusing on increasing energy efficiency in residential buildings.⁹⁵ Additionally, Moldova is working toward building and utilizing the alternative energy industry, thereby further reducing its reliance on natural gas and aligning with the European Union Clean Energy package and standards for a green economy as part of its EU accession aspirations.⁹⁶

It is important to note that the situation of Moldova's gas sector overall is contingent on the outcomes of Moldova's next presidential and parliamentary elections, as well as the trajectory of Russia's illegal war in Ukraine. If pro-Russian government officials are elected in Moldova, the gas sector may revert to its historic dependency on Russian gas supply. But even if a pro-European government is elected and able to hold power, this will not be enough. It is essential that Moldova continue the challenging process of unbundling its energy sector, not only to comply with EU requirements but also to ensure that Moldova has an energy sector that is sufficiently diversified to withstand market and geopolitical fluctuations. This includes ensuring an environment that is sufficiently private sector friendly to not be so reliant on Western aid.

Figure 3: Gas Prices for Households in Moldova



Note: This figure depicts costs of gas for Moldovan households from 2019 to 2024. Prices are reflected in lei per 1000 cubic meters, and prices are inclusive of all taxes. Additionally, these numbers reflect an average of the D1 and D2 band costs.

Source: "Stocks, inputs and natural gas consumption, monthly, 2015–2024," Statistica Moldovei, https://statbank.statistica.md/PxWeb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica__15%20ENE__serii%20lunare/ENE010400.px/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802.

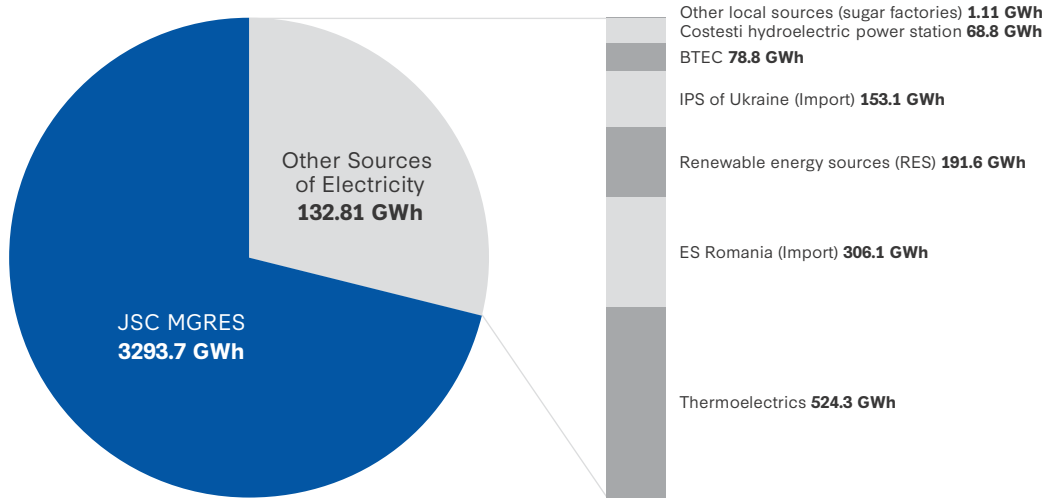
Electricity Sector Overview

The electrical systems of the Eastern European region were designed under the assumption of a unified region, specifically under the control of the Soviet Union. Now, Moldova and Ukraine must manage fragmented pieces of a larger energy puzzle. After the Soviet Union collapsed, Moldova and Ukraine stayed connected to the Eastern European electrical system known as the Interconnected Power Systems, while Romania connected with the Western European system.⁹⁷

Built in 1964, the Cuciurgani power plant (MGRES) in Transnistria was the only power plant capable of meeting Moldova’s electricity consumption demands.⁹⁸ Consequently, all electricity transmission infrastructure in Moldova was built around this plant. For many years, Gazprom has supplied the gas needed for electricity generation in Transnistria for “free” while billing Moldovagaz (and thus the Moldovan government in Chisinau) for the costs. This enabled the breakaway region to sell the electricity to Chisinau and to Transnistrian businesses at below market rates. This process continues today and is critical for Transnistria’s economy.⁹⁹ Currently, approximately 80 percent of Moldova’s electricity is generated by the Cuciurgani power plant (MGRES), with the remaining portion either imported from Ukraine or produced domestically.¹⁰⁰ Despite efforts by pro-European Moldovan politicians to reduce dependency on Russian energy, initiatives are often reversed by pro-Russian Moldovan officials.¹⁰¹ Implementing reforms also has been difficult due to a lack of investment in infrastructure.¹⁰²

In March 2022, in part due to Russia’s illegal invasion of Ukraine, Moldova and Ukraine conducted an energy synchronization with the European Network of Transmission System Operators for

Figure 4: Sources of Electricity for Moldova



Note: This pie chart reflects the amount of electrical energy supplied to the transmission grid of Moldova from a variety of sources in 2023.

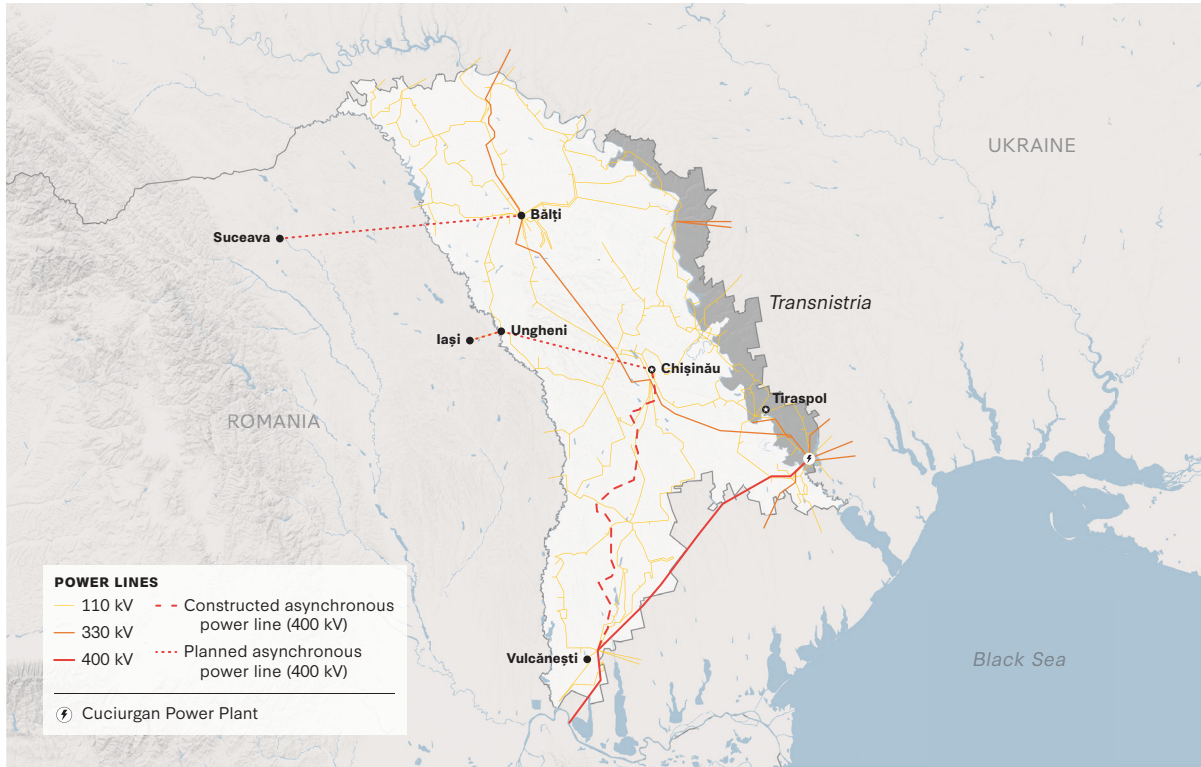
Source: "Technical and Economic Indicators," Moldelectrica SE, https://moldelectrica.md/ru/network/annual_report.

Electricity.¹⁰³ This gave both Moldova and Ukraine the ability to import electricity from EU markets. When Ukraine was forced to halt electricity exports due to Russian bombardments of its energy infrastructure, Moldova initially turned to Romania, at a more expensive rate.¹⁰⁴ As a result of the increased costs, the Moldovan government chose to continue purchasing electricity from Transnistria on a short-term basis.¹⁰⁵ To ensure long-term energy security, Moldova is currently working to increase grid stability and to build additional power lines—that do not pass through Transnistrian territory—in order to connect the country to the EU market. With the support of the European Investment Bank, lines between Vulcanesti-Chisinau and Balti-Suceava are expected to be operational in 2025 and 2028, respectively.¹⁰⁶

While Moldova may have secured alternative sources of electricity starting in 2025, the questions surrounding Transnistrian electrical production and the gas supply to support it remain. If Russian gas ceases to flow into Transnistria or if Chisinau no longer purchases Transnistrian electricity, the effects to Transnistria will be devastating. The region’s electricity sector will have to look to Chisinau for help, and the breakaway region may have to purchase gas at market rates, which would be shocking and devastating to its economy. Tiraspol would also likely be pressured to integrate its energy infrastructure with Moldova. To adapt to these potential changes, Moldova will need to continue looking for new sources of electricity, increasing storage capacities, and exploring alternative energy possibilities. Additionally, as it currently stands, electricity even from Romania must transit through either Ukraine or Tiraspol before reaching Chisinau, further complicating the situation.

In the coming years, Moldova’s electricity sector is expected to make significant progress in diversification and integration with the EU energy market. Upon the completion of the Vulcanesti-Chisinau and Balti-Suceava power lines, Chisinau will be able to supply electricity

Figure 5: Electrical Map of Moldova



Note: This map reflects gas pipelines across Moldova (depicted in white) with Transnistria (depicted in dark gray).

Source: "The Moldovan Gas Crisis: Causes and Consequences," The Polish Institute of International Affairs, November 26, 2021, <https://www.pism.pl/publications/the-moldovan-gas-crisis-causes-and-consequences>.

without relying on Transnistria; a power line between Straseni-Iasi is under consideration as well.¹⁰⁷ But further development of the electrical sector requires the government to implement reforms that align with EU standards in the electricity sector and modernize its grid. To incentivize private sector participation, Moldova must also improve its rule of law and ensure a stable environment for energy-market competitiveness and investments.¹⁰⁸

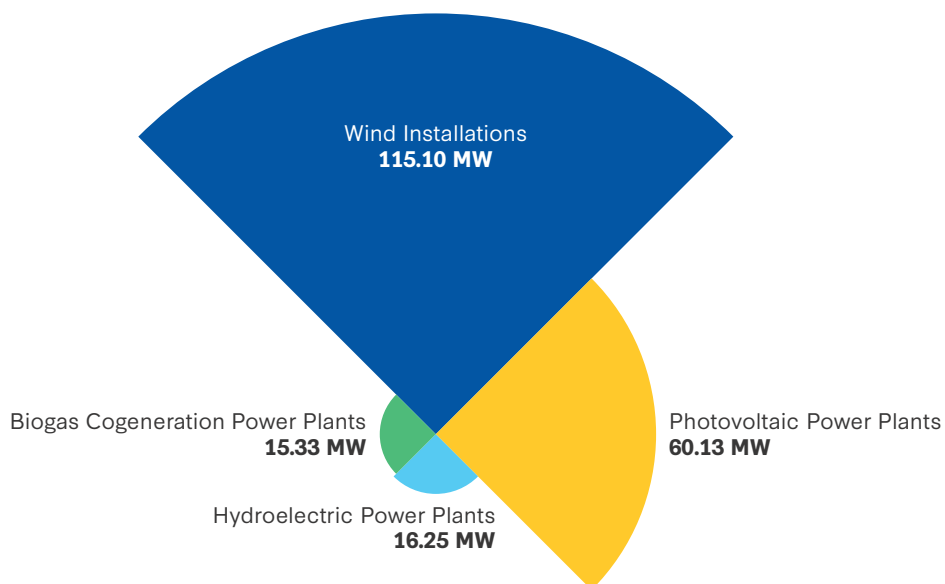
Alternative Energy Sector Overview

In 2020, renewable energy represented 25 percent of gross energy consumption in Moldova, with biomass serving as the primary resource. Moldova's biomass sector has been long under development, and the resource is utilized for heating purposes as well.¹⁰⁹ Although Moldova's alternative energy market is not as developed as that of some of its neighbors, the country has significant potential for alternative energy to play a major role in its energy production.¹¹⁰ While the country is attempting to expand its solar energy and wind energy sectors, it faces limitations in integrating generated energy into its grid due to the consumption patterns of its population and the lack of flexibility in the existing grid. The United States Agency for International Development (USAID)'s BESS (battery energy storage system) and ICE (internal combustion engines) investment will increase Moldova's grid stability and flexibility.¹¹¹

The Renewable Energy Promotion Law, which became active in 2018, created support mechanism schemes aimed at promoting the alternative energy market, including net metering, feed-in tariffs, and tendering.¹¹² Net metering allows consumers who generate their own electricity from renewable sources to receive credit for the surplus electricity they feed back into the grid. Feed-in tariffs entail guaranteed payments, access to the grid, long-term contracts, and other incentives for entities developing renewable energy projects in the country. In January 2024, this was replaced by net billing, which allows individuals or companies who are generating electricity to feed surplus energy produced back into the grid.¹¹³ Although feed-in tariffs and net billing have already been implemented, the Moldovan government recently initiated its first renewables auction.¹¹⁴ The government allocated 165 megawatts of total capacity for wind and solar energy, reflecting the

structure of consumption, generation, and grid availability. Moldova expects to see 190 million euros in associated investments.¹¹⁵

Figure 6: Existing Capacities of Renewable Electricity Production



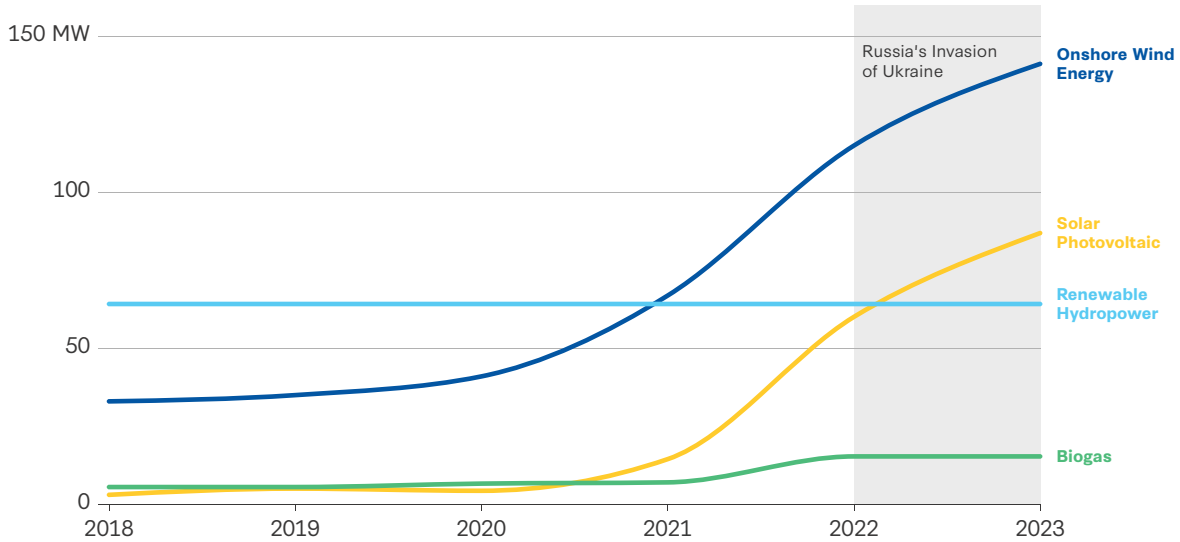
Note: This reflects these capacities as of January 2023. According to the United Nations Development Programme, as of 2023 only 6 percent of total electricity consumption represented renewable energy.

Source: “Renewable Energy,” Ministry of Energy of the Republic of Moldova, <https://energie.gov.md/en/content/renewable-energy>; and “How much renewable energy is there in Moldova and how much could it be?,” UNDP, December 20, 2023, <https://www.undp.org/moldova/news/how-much-renewable-energy-there-moldova-and-how-much-could-it-be>.

Despite these advancements, barriers to total renewable energy success persist. Sufficient wind and solar generation, grid stability, and functioning power plants are necessary to meet energy consumption demands. Unfortunately, Moldova’s largest power plant is in Transnistria, and this makes Moldova’s electricity supply dependent on both the Transnistrian government and the flow of “free” Russian gas. In 2022, in response to the Russian invasion of Ukraine, the Moldovan government introduced energy balancing to the market through relatively expensive and unplanned energy exchanges with nearby countries.¹¹⁶ Moldova’s current infrastructure is not yet capable of supporting large amounts of renewable energy generation. Many potential investors are deterred by these factors, as well as unstable rule of law.¹¹⁷

By 2030, Moldova plans to increase the role of renewable energy in its electricity production by 30 percent.¹¹⁸ Not only is the transition to alternative energy better for the environment, but it also reduces dependence on Russian gas and electricity from MGRES, the Transnistrian electricity plant. To achieve this, Moldova will need to explore all available options, including developing new infrastructure for solar and wind energy. Since Moldova’s overall energy consumption is low, and its existing energy system is relatively small (the country mostly relies on imports), it does not have to dismantle any large-scale systems and can build from a relatively fresh slate.¹¹⁹

Figure 7: Installed Capacity of Renewable Sources



Note: This chart reflects wind, solar, hydropower, and biogas capacities from 2018 to 2023.

Source: "Power Capacity and Generation," IRENASTAT Online Data Query Tool, International Renewable Energy Agency, https://pxweb.irena.org/pxweb/en/IRENASTAT/IRENASTAT__Power%20Capacity%20and%20Generation/.

In the next five to ten years, Moldova is likely to increase its power system capacity and flexibility. This includes managing demand and investing in battery storage.¹²⁰ Additionally, the country will need to attract investors in order to become less dependent on international aid. This will require Moldova to expand its renewable energy market and to ensure all market standards are aligned with the European Union regulations. Moldova will need to implement reforms streamlining bureaucratic processes, improving the transparency of technical guidelines, and ensuring fiscal stability; without such reform, private sector investors will shy away from the market. For example, Moldova recently opened an auction of renewable energy that was met with a tepid response from the investor community.¹²¹

It is in the country's best interest that the government ensure all resources are being developed and are used efficiently, including hydropower, biofuel, and geothermal energy. Currently, Moldova has only one operational hydro installation, the Costesti-Stinca hydropower plant.¹²² The government will likely attempt to expand this sector to meet investors' interests. Moldova could also develop a biofuel sector and utilize both liquid and solid biofuels to leverage its existing agricultural industry.¹²³ To manage all of these renewable energy sources, Moldova will have to stabilize its current energy grid and supply. Ultimately, Moldova's focus will likely extend beyond merely expanding renewable energy infrastructure to maximizing the development of all potential renewable resources.

European Union Accession and Foreign Aid

In December of 2023, following their 2022 candidate status, the European Union opened formal accession talks for both Moldova and Ukraine.¹²⁴ This was a recognition of the progress that both countries individually had made on the reform recommendations provided. Moldovan president Maia Sandu has indicated a goal of 2030 for EU membership, but there are structural challenges within the European Union to Moldova becoming a member.¹²⁵ These challenges are unrelated to the many reforms Moldova must complete, including but not limited to reforms in the energy sector, before it is eligible for full membership.

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Regardless of the timeline for Moldova's notional EU membership, progress is being made across sectors. Even before EU candidate status was granted, Moldova was already engaged with the European Union on several fronts, including but not limited to energy. In 2010, Moldova became a member of the Energy Community, a group of EU and non-EU members in southeastern Europe who have committed to adopting parts of EU energy-related legislation.¹²⁶ As a part of this

membership, Moldova agreed to reform its energy sector to comply with EU directives and antitrust laws; while several pieces of legislation have been adopted as of 2024, the process is ongoing.¹²⁷

In 2014, Moldova signed an Association Agreement with the European Union in which it committed to implementing the legislation by which all EU member states are bound, including legal and regulatory provisions related to the energy sector.¹²⁸

At the fifth EU-Moldova High-Level Energy Dialogue in 2024, both sides endorsed a roadmap that included a timeline for EU accession.¹²⁹ The reform agenda and associated timeline are aggressive and Moldova is continuing to struggle to reach its commitments on the timeline; commitments include, among other things, increasing the energy efficiency of infrastructure and the use of renewable sources.¹³⁰ Additionally, Moldova has committed to having 27 percent renewables by 2030.¹³¹

One of the key reforms in the EU package is the unbundling of the electrical and gas sectors. Unbundling refers to the separation in ownership of supply, generation, and transmission across a sector, in this instance specifically gas. During the 2021 negotiations between Moldovagaz and Gazprom, Moldova agreed not to proceed with unbundling the gas sector until the debt issue was resolved.¹³² As discussed previously, an independent review was conducted on Moldova's debt, the results of which Russia is contesting.

The EU-required unbundling includes the separation of supply and generation from transmission operators for natural gas, thus bolstering incentives for private sector competition, particularly around gas infrastructure.¹³³ As currently structured, Moldovagaz controls almost the entirety of the Moldovan gas business, including infrastructure. As discussed above, Moldovagaz is 50 percent owned by Russia's Gazprom, 35 percent by Chisinau, and the remaining 15 percent by the government in Tiraspol. Moldovagaz's ownership structure is further complicated by a Moldovagaz subsidiary, Tiraspoltransgaz, which provides gas to and owns the gas-related infrastructure in Transnistria.¹³⁴ After the European Union opened infringement proceedings against Moldova for their continued failure to unbundle in 2021, Moldova has begun to make progress in this arena.¹³⁵

Moldova's other improvements in gas sector reforms include adopting regulation around network codes and market rules.¹³⁶ There has also been significant progress in both the gas and electrical sectors with regard to regional integration.¹³⁷ For example, on the electrical side, both Moldova and Ukraine became connected to the European grid following Russia's 2022 invasion of Ukraine.¹³⁸ In October of 2023, Moldova was granted observer status in the European Network of Transmission System Operators for Electricity; to become a full member, Moldova must implement the Catalogue of Measures, work which is supported by USAID.¹³⁹ And when the Chisinau-Vulcanesti line is completed (which is projected to be in 2025), electricity will flow into Moldova without passing through Transnistria. These are not the only reforms needed on the pathway to a free and fair energy sector in Moldova; more on this is discussed in the recommendations section of this paper.

EU support for Moldovan energy development has included grant funding to individuals making improvements in their homes to increase energy efficiency, as well as ongoing energy subsidies

for economically disadvantaged populations within the country.¹⁴⁰ While the European Union has provided significant development assistance to Moldova's energy sector, it is far from the only donor in this space. The United States has supported Moldova's energy development across the interagency portfolio; for example, the Development Finance Corporation has provided millions of dollars to support political risk insurance for energy projects.¹⁴¹ The U.S. State Department and USAID have been working on projects funded through a \$394 million investment in support of energy sector development.¹⁴² This includes a focus on developing the country's power grid, as well as supporting foreign investments in the energy sector, especially in renewable energy sources.¹⁴³ The U.S. government is one of the main donors providing capacity building to key energy sector entities and supporting legal-regulatory reforms required as a part of the European Union's energy directives, regulations, and provisions in Moldova.

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Support has also come in from a variety of multilateral institutions. The United Nations Development Programme and the government of Japan have funded development of the biomass sector, as well as additional energy development in partnership with Switzerland.¹⁴⁴ NATO and the International Monetary Fund (IMF) have also supported the continued growth of Moldova's energy security.¹⁴⁵ The EBRD has been a key source of support for Moldova's energy development.¹⁴⁶ The World Bank recently launched an initiative that includes support for renovating public buildings and heating.¹⁴⁷ Support has come bilaterally across Europe from countries including but not limited to Bulgaria, Germany, France, Lithuania, and Romania.¹⁴⁸

This outpouring of aid must not disincentivize the development of a robust energy private sector in Moldova. This requires donating countries to not only bear this potential for market disruption in mind when providing aid but also to hold the Moldovan government accountable for the commitments and progress it has made as a part of energy sector development. It is essential that future support for Moldova be contingent on continued development and reform of the energy sector, including but not limited to the solutions outlined in the following section.

Ensuring a Bright Future

Moldova's energy picture is complex and largely rooted in the country's history—not only regarding reliance on Russian gas, but also the very structure and ownership of its state-owned gas company, Moldovagaz, which still leaves Russia with a controlling interest. There is also, of course, the reliance on Transnistria—with its close ties to Russia—for electricity, not only in terms of the current production but also as all power lines presently run through this breakaway region. Over the past few years, significant progress has been made toward a more independent and secure future for Moldovan energy, but more work is needed.

This growth has been aided by partners and allies across the globe. And efforts driven by the need to meet EU requirements have the potential, if done correctly, to continue this trajectory. There is still much to be done in order to achieve not only Moldovan energy independence, but also a Moldovan energy sector that is based on free-market competition and rule-of-law principles. Outlined below are six key recommendations for ensuring a bright energy future for Moldova.

1. Domestic Electrical Connectivity and Production

While sources of natural gas have been diversified for Moldova, the same is not yet true for electricity. Most of the electricity generated for Moldova is via the plant in Transnistria; all the physical lines supplying Moldovan electricity run through Transnistria. This will change when the Chisinau-Vulcanesti line is operational, as this line will not run through Transnistria. However, this line is unlikely to be able to provide all electricity needed to supply both Moldova and Transnistria at peak usage.

This means that capacity needs to be further increased. The essential capacity needs to not only be supplied by lines that do not pass through the Transnistria hub, but also should be used as an opportunity for Moldova, outside of Transnistria, to generate its own electricity, and not simply import from either Romania or other allies and partners. Among other collaborations in process between Ukraine and Moldova is the exploration of a gas-to-electricity exchange in which Moldova would build the capacity to produce electricity (outside of Transnistria) and Ukraine would supply gas, which it continues to produce.¹⁴⁹ Moldova, Ukraine, and Romania must work to get their lines out of Transnistria and to integrate their systems.

2. Impartial Oversight and Support for Unbundling and Deregulation of Gas Sector

The process of unbundling the gas sector is still in its early stages and faces many hurdles, including the ongoing contestation of the debts owed and Gazprom's majority ownership stake in Moldovagaz. In practice, this means that Gazprom can vote against many of the changes needed to move forward. It is essential that Russia's proxy Gazprom be removed from this industry entirely.

There must be oversight, transparency, and technical support throughout all elements of the unbundling process. This will not only ensure free-market best practices are leveraged, but also that the process is free from both actual and apparent corruption. Transparency and oversight will also provide the ability to shine a public light on any tactics Gazprom may employ to delay or divert the process.

The United States, its partners, and its allies should extend on-the-ground, technical, expert-staff augmentation to support the development of regulations both for the gas sector and for the entirety of the restructuring process. This staff augmentation is especially important given Moldova's challenges with personnel capacity across all sectors.¹⁵⁰

3. Create a Secure and Enabling Environment for Investments

The process for investment in the energy sector must be clear, transparent, and provide ease of access for potential investors. This is important to increase the volume and types of investments that come not only from within Moldova, but also from the diaspora and other investors across the globe. There must also be foreign investment limitations, including effective and as-transparent-as-possible investment screening to ensure that malign actors, including but not limited to Russian state-owned or affiliated enterprises, cannot bid. These clarity and screening processes need to be in effect prior to unbundling, thereby continuing to ensure that the overall process is done freely, fairly, and securely.

While Moldova's geographic location—less than four hours from the frontlines of Ukraine—and investors' concerns over stability are impediments to capital investment, they are not the only ones.¹⁵¹ There is also the history of corruption across all Moldovan sectors, as well as bureaucratic ineffectiveness and challenges with consistent rule of law.¹⁵² The combination of these factors means

that there is a need for structural changes within the law—and therefore, to some degree, election proof—to align incentives for investors to put money in Moldova.

One such change is the creation of formal, government-sanctioned advisory boards for Moldovan gas, electricity, and alternative energy sectors, at least. These boards must include representation from the European Union, the U.S. government across the government agencies with stakes in these efforts, and private industry from across the globe. It is essential to include a varied group in order to ensure that these recommendations are not designed with a singular interest in mind but instead are long term.

Both the selection process for members of these advisory boards and their work should be made public on an ongoing basis. This is of critical importance as state-owned enterprises have long been a magnet for corrupt interests in Moldova.¹⁵³ With Moldova's commitments to the IMF, the country has agreed to the creation of corporate governance structures and the review of appointees.¹⁵⁴

These boards should work with the energy ministry and make recommendations for policies and practices that are needed to stimulate investment in the energy sector in the short and medium term. These groups should provide specific solutions, timelines, and resources associated with decisions to implement. Foreign donors seeking to help the Moldovan energy sector must work with these boards to provide a long-term, sustainable pathway for the development of a robust energy private sector.

4. Reforming Corporate Governance Structures and ANRE

There is a need to revisit myriad corporate governance structures, starting with Moldovagaz and moving across the entire energy sector. The development of updated structures and new processes for appointments or reappointments need to be done publicly and with monitoring from development partners to ensure scrutiny and to limit kickbacks or even the appearance of impropriety. There also needs to be a careful vetting of all current holders of these roles, as well as senior leadership at ANRE. This would align with the ongoing and proposed vetting happening elsewhere across Moldovan government.¹⁵⁵ In order for any system or industry to function, there should be a natural tension between stakeholders, including but not limited to regulators, private sector entities, oversight bodies, and agencies; this is healthy in any free-market sector. To help ensure there is tension, rather than collusion, between these groups, there must be ethics regulations, including gift limitations, in place prior to the appointments or reappointments of individuals to the advisory boards and ANRE. These ethics regulations should be developed with the help of EU partners and must include methods to report violations and enforce compliance. If done thoughtfully, these ethics rules could be applied across the government and all sectors in Moldova.

5. Cybersecurity for the Energy Sector

Cyberattacks have increased in frequency and scale within Moldova and include significant cyber incursions targeting infrastructure.¹⁵⁶ It is likely that cyberattacks targeting the energy sector will increase as the negotiations with Gazprom around unbundling and with Transnistria on

issues related to energy continue.¹⁵⁷ Regardless of a short-term increase, it is of utmost long-term importance that, as new physical energy infrastructure is brought online and new private sector energy players enter, there be an integrated strategy for cybersecurity across the Moldovan energy sector. Improving cybersecurity for the energy sector is essential not only to protect publicly owned infrastructure and government agencies, but also to integrate protections across private entities within the energy sector.

While the Moldovan government has taken steps to implement best practices in cybersecurity, including their 2023 cybersecurity law (set to go into effect in 2025), there are still gaps.¹⁵⁸ This law, which will require incident reporting as well as safeguards, cooperation, and network standards, is just a first step. The Moldovan government should work with the private sector, as well as international partners and allies, to develop an energy sector-specific plan at the national level.

This sector-specific strategy must include details for energy subsectors, a focus on increasing public-private partnership, and diplomatic engagement, including shared intelligence. The strategy must be created with timelines aligned to resourcing and include not only incident response plans but also strategies to train and prepare for these potential occurrences across the sector.¹⁵⁹ Cyber and physical security must be fully integrated within the strategy and include access controls, as well as the screening and vetting of associated personnel.

6. Transnistrian Reintegration in Energy

As Russia continues its hybrid warfare against Moldova, it could focus on energy as part of its continued cyber-assault.¹⁶⁰ Moreover, it is near certain that pro-Russian candidates will continue to leverage energy-focused narratives—including what the pricing would look like were they to be elected—against pro-Western candidates and parties.¹⁶¹ These narratives are especially important in Transnistria, where the majority of the population are Russian speakers, because, whether causal or not, consuming Russian media is correlated with higher trust in the Russian government.¹⁶²

The anticipated end of the Russian-Ukrainian gas contract in December 2024 has brought to the forefront the challenges that the Transnistrian economy, government, and people would face if Russian gas were to no longer flow there for free. Even if this gas were provided at cost, the difference in price would be so significant that it would crash the Transnistrian economy and lead to a refugee crisis. This means that it is in both Chisinau's and Tiraspol's interest to find a long-term solution to Transnistria's energy instability.

The negotiations along this pathway toward long-term energy sustainability for Transnistria, as an integrated part of Moldova, must be conducted between Chisinau and Tiraspol. Chisinau will have more leverage in 2025 than ever before; the Chisinau-Vulcanesti power line will give Chisinau the first electrical power line that does not run through Transnistria. As discussed earlier, by 2025, at a minimum, the transit method for providing Russian gas to Transnistria will have changed. These are key leverage points for Chisinau to use to bring Tiraspol leadership to the table in developing a collaborative, realistic, and time-bound plan to further reintegrate Transnistria with Moldova.

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