Instytut Europy Środkowej

IEŚ Commentaries

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No. 930 (178/2023) | 22.08.2023

ISSN 2657-6996

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Underground natural gas storage facilities in Ukraine

Keywords: security, natural gas, storage, war

Ukraine's underground natural gas storage facilities, together with its extensive pipeline network, have played an important role in ensuring the availability of natural gas in Europe over the years. However, the importance of Ukrainian infrastructure was reduced as a result of the systematic reduction of natural gas supplies from east to west following the Russian Federation's armed attack on Ukraine. Today, an increasing number of international companies are again beginning to use Ukrainian infrastructure, which could be important in ensuring the availability of natural gas in the upcoming autumn-winter season.

Storage potential. There are dozens of underground natural gas storage facilities in Europe, of which the largest, taking into account their total storage potential, is in Ukraine (31.9 bcm). Globally, larger underground natural gas storage facilities than those in Ukraine are found only in the US and Russia. In terms of location, the vast majority of storage facilities – 11 out of 13 – are located in the western and northern parts of Ukraine (94% of total storage capacity, i.e. just over 30 bcm of natural gas). In contrast, two are not controlled by the authorities in Kiev, and thus access to them is not guaranteed. These include a storage facility in the Luhansk region (ongoing hostilities) and a storage facility in Crimea, which has been under occupation by the Russian Federation since 2014.

Over the years, Ukraine has played an important role in transporting natural gas from the Russian Federation to Europe. Key natural gas pipelines ran through its territory, enabling the supply of this commodity to countries in various parts of Western and Central Europe (including Austria, Germany, Czechia, and Slovakia) as well as Southern Europe (including Romania and Bulgaria). An important role in transportation was played by underground natural gas storage facilities, which made it possible to balance the market.

Underground natural gas storage facilities, in addition to ensuring the efficiency of natural gas transportation, also serve Ukraine, as natural gas is important in total primary energy consumption (28% in 2021). This commodity is used primarily to generate heat (70%) and, to a limited extent, electricity (10%). The share of natural gas in Ukraine's economy has declined in recent years, especially after the Russian Federation began its occupation of the heavily industrialized Donbass region in 2014. At the same time, the decline in the importance of storage facilities has been associated with the process of Russia redirecting exports from natural gas pipelines in Ukraine to other export channels, most notably the Nord Stream 1 and TurkStream pipelines.

The importance of storage facilities to the energy situation in Europe. In Ukraine, functioning underground natural gas storage facilities are used for both domestic and international needs. The Russian Federation's policy of restricting the transportation of natural gas across Ukrainian territory has forced the authorities in Kiev to look for alternative customers. Therefore, in order to make full use of its energy potential, Ukraine began to make storage capacity available on commercial terms several years ago. Under the Free Trade Agreement between Ukraine and the European Union, which was concluded and became effective on January 1, 2016, access is provided on market terms. Under the mechanism offered by Ukrtransgaz, the underground natural gas storage facilities are used as bonded warehouses. Under this arrangement, international companies can maintain stocks of natural gas in Ukrainian underground natural gas storage facilities without paying customs duties for a period of three years. The tariff for storage is fixed, and access to storage facilities is not auctioned. At the same time, short-term transmission/collection is not subject to taxes. For many companies, this is an extremely attractive solution compared to the possibility of holding stocks in other Western European countries.

The Russian-Ukrainian war has caused the vast majority of countries in Europe to abandon the purchase of natural gas from the Russian Federation. Thus, there was an increase in the importing of natural gas through other channels, namely from Norway, Algeria, Azerbaijan, and in the form of LNG. In mid-August 2023, the filling level of storage facilities in Europe stood at 88.3%, 15.5% higher than at the same time in 2022 and 28.3% higher than in 2021. Under these conditions, there has been increased interest from foreign companies in storing natural gas in Ukraine, and Ukrtransgaz has offered foreign companies storage capacity totaling 10 bcm of natural gas (3-4% of annual consumption of natural gas in EU countries). As of July 2023, at least 13 entities[1] held stocks of natural gas in underground natural gas storage facilities, with the number likely to increase in the near future given the high level of filling of storage facilities in EU countries. Storage facilities in Ukraine were used, among other things, during the COVID-19 pandemic, when there was a large drop in demand for natural gas and many companies sought free storage capacity. The use of such storage facilities is purely commercial in nature and is determined by the price of natural gas on the exchanges (as well as expectations of its price in the autumn-winter period), together with the rates of transmission, storage, and the insurance costs of the transaction. Current market conditions, including expectations for the price of this commodity in winter, despite the ongoing hostilities, are favorable for such operations.

Underground natural gas storage facilities in Ukraine are beginning to play an important role not only in the market context but also in terms of ensuring the energy security of Central European countries. At the moment, the storage facilities are being used by Moldova, among others, which does not have such facilities. For several months, Moldova's state-owned Energocom company has been steadily increasing its exports of natural gas to Ukrainian storage facilities, and natural gas is coming through, among others, the Revithoussa LNG terminal in Greece (at present, Moldova has already accumulated about 500 mcm of natural gas in Ukrainian storage facilities).

Conclusions:

- Ukraine occupies a key place on the energy map of Europe. Its importance was due to the nature of natural gas transportation from the Russian Federation to Europe. For years, Russia supplied natural gas to Europe through four export channels, that is, through the Yamal-Europe pipeline (via Belarus and Poland), Nord Stream 1 (via the Baltic Sea), Ukraine, and the TurkStream pipeline (via the Black Sea and Turkey). Due to the destruction of the Nord Stream 1 and Nord Stream 2 pipelines (the certification process did not take place, so the natural gas was not transported via the pipeline) and the suspension of supplies via Poland, only two export channels are currently in operation.

- Supplies through Ukraine may naturally cease from 2025, as the contract for natural gas transit through Ukrainian territory ends at the end of 2024. Under the current conditions, it is difficult to see how the two warring countries will be able to work out a new agreement. Recent statements by German Galushchenko, Ukraine's energy minister, indicate that Ukraine will not hold talks with Russia on such an agreement. Importantly, despite the ongoing war, Russia continues to transport natural gas to Europe via Ukraine, with Slovakia remaining a large customer ("IES Commentaries," No. 831).

- Underground natural gas storage facilities play an important role in ensuring Ukraine's energy security and their importance is growing for some countries in Central Europe as well. Favorable legal and tax regulations are causing more and more companies to divert natural gas to these storage facilities. However, transmission capacity between Ukraine's neighboring countries may be a problem, as natural

[1] Naftogaz reports that a total of more than 1,000 companies from 29 countries use Ukraine's underground natural gas storage facilities.

gas connections with Poland, Slovakia, Hungary, and Romania are estimated[2] to allow the transportation of up to 2 bcm per month (physical supply of natural gas to Ukraine).

- At the moment, increasing numbers of international companies are interested in storing natural gas in Ukraine. Nevertheless, the situation may change at a time of unfavorable price conditions. Also, the ongoing military activities still pose a certain threat, which both causes concern for the storage of this commodity (attacks by the Russian Federation's troops are also taking place on energy infrastructure) and increases its costs, as a consequence of high insurance rates.

[2] B. McWilliams, G. Zachmann, *How Ukrainian gas storage can contribute to Europe's security of supply*, https://www.bruegel.org/analysis/how-ukrainian-gas-storage-can-contribute-europes-security-supply [11.08.2023].