UNDERGROUND GAS STORAGE IN RUSSIA: HISTORY, OPPORTUNITIES, AND CHALLENGES OF LEGAL REGULATION

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Underground gas storage facilities in Russia are an integral part of the unique Unified Gas Supply System and have multiple purposes: the main task of underground gas storage is to compensate for seasonal and daily gas supply irregularities despite of comparatively uniform production throughout the year; ensuring gas supply to consumers under abnormal conditions, in case of extreme drops in temperature on specific days or during abnormally cold seasons; ensuring reliability of gas exports; creating a long-term reserve for emergencies. Furthermore, underground gas storage facilities can merge into the renewable energy operation system in the future. Solar batteries and wind generators cannot ensure an unchanging level of power production for objective weather-related reasons. Underground gas storage facilities can be used to compensate for fluctuations in energy production by such sources.

The legal regime of underground gas storage is established by energy laws which are multifaceted in their legal nature. Specific features of maintaining the legal regime of underground gas storage stem from, among other things, the fact that the facilities are located below the ground, meaning that laws on subsoil use apply to this regime; these are hazardous production facilities, meaning that they are subject to industrial safety laws; as fuel and energy complex facilities, they are subject to laws on security (anti-terrorism protection) of fuel and energy complex facilities, etc. Specific features of the legal regime of underground gas storage facilities as construction projects have also been established.

Currently, legal regulation of underground gas storage in Russia has many gaps. One of the reasons is that, on the one hand, this activity is very similar to gas production from the technological point of view, on the other hand, it is closely linked to gas transportation. It is far from always that legal regulations are developed considering the specifics of this activity. The article examines gaps and challenges of legal regulation of social relations associated with underground gas storage, offers conclusions on further development of legal regulation in this area.

Keywords: *energy law, legal regulation of social relations associated with underground gas storage, legal regime of gas as an object of storage relations.*

Today, we cannot imagine our lives without extensive use of energy resources. Without energy, not only industrial production, operation of vehicles, but even such routine activities and using electricity, gas stoves, home heating would become impossible.

Statistically, coal, oil, and natural gas are the most common and sought-after types of

energy resources. However, experts believe that the global demand for gas is growing, and this tendency will remain unchanged in the mid to long term. [1]

The growing demand for gas is due to the following factors:

1. A comparatively low price (gas is deemed the cheapest fuel to produce and transport);

2. Environmental friendliness:

– As evaluated by the International Energy Agency, emissions caused by the use of the current proved reserves up to 2050 will be distributed by fuel types as follows: about two thirds if the so-called carbon footprint will be caused by coal, 22% by liquid fuel, and only 15% by gas, [2]

– Considering electricity production cycle based on renewable sources (including, but not limited to manufacturing and disposal of solar batteries), emissions of carbon dioxide and other pollutants can be not lower, but significantly higher than those caused by natural gas use, [3]

– Due to major accidents at nuclear power plants that took a heavy toll on the humanity and environment, nuclear power is view negatively by population of many countries, including European ones;

3. Reduced gas production in Europe (in 2018, the production rate dropped by 3.6%, by 2040, it will decrease by 65% against 2018, from 99.4 billion m3 to 34.8 billion m3). [4]

Russia ranks first in proved reserves of natural gas globally: our country's share is 19.8% of the world reserves (35 out of 193.5 trillion m3). [5]

One of specific features of the Russian gas sector is remoteness of gas fields from the main regions of its consumption, which is characteristic of countries that occupy large territories. Thus, out of 700 proved fields, the largest gas production area is Western Siberia (Urengoy, Bovanenkovo, Shtokman, Yamburg gas fields, etc.), followed by Orenburg and Astrakhan fields. Gas is also produced in the Timan-Pechora Basin, however, it accounts for less than 1% of the total gas production volume. [6] However, main gas consumers are the Central, North-Western, Ural regions.

In addition, gas consumption is marked by seasonal and daily irregularities, whereas gas production and transportation are not subject to such apparent variations. Dedicated technologies are required to level peak loads, ensure flexible and reliable gas supply to consumers. Underground gas storage (UGS) facilities can help meet these challenges: they accumulate and store surplus gas produced and fed to the gas transportation system during peak gas consumption periods. Social relations in the sphere of gas storage are subject to energy law [7]. However, the problems of legal regulation of social relations in the sphere of gas storage were not so far the subject of a separate legal research.

What is an underground gas storage facility? It is a network of engineering structures located in reservoir beds of geological structures, mined caverns, or reservoirs in salt caverns. They include underground and aboveground facilities:

1. The underground part is one or several naturally-occurring or man-made reservoirs, as well as wells for pumping gas to/from the UGS facility;

2. The aboveground part is a gas pipeline branch (to supply gas to the UGS facility from gas mains), dust collectors (to remove dust, scale, oil particles, and other impurities from gas, which is important to maintain the well operable), a compression plant (to compress gas), a gas distribution plant (to distribute gas among wells), dust collectors (for gas withdrawal), a gas dehydration unit (to remove impurities and condensate from gas), and a gas pipeline branch (to return gas to the gas mains).

Underground gas storage facilities differ in structures they are located in. Each type has its own physical and economic peculiarities. The most common UGS facility types are created in depleted gas and oil fields, aquifers, and saline deposits. Storage facilities created in depleted gas fields are number one in the world in terms of active gas volume, they account for almost 75% of the total global UGS volume. About 12% of the global UGS volume is stored in aquifers, about 7% and 6% in depleted oil fields and saline deposits, respectively. [8]

The widespread use of storage facilities in depleted fields is due to lesser additional costs of their construction, since the reservoir has already been created by nature, and the costs of conversion of the existing production wells into injection and withdrawal wells are often lower than those of building new ones.

The first UGS facility in the world was constructed in 1915 in a depleted field in Ontario, Canada.

Russian history of underground gas storage dates back to 1957, when the USSR Council of Ministers adopted Decree No. 1673 on Measures to Ensure Reception of Stavropol Gas by Moscow Consumers dated September 12, 1955, directing to explore structures suitable for underground gas storage in the Moscow district by the 2nd quarter of 1957. The first UGS facility in the USSR was commissioned as early as 1958, the Bashkatovo UGS facility in Orenburg (Kuybyshev) Region based on a depleted field.

Currently, 23 UGS facilities are being operated in Russia. [9] The total volume of active gas exceeds 65,000 million m^3. According to the official data of Gazprom, PJSC, one of the company's objectives is to provide UGS facilities in Russian regions of deficiency with capacities, as well as develop the existing peak UGS facilities (Kaliningrad, Volgograd) and create new ones (Novomoskovsk, Bednodemyanovsk, Arbuzovka, Shatrovo UGS facilities, Udmurt reserve complex). [10]

Underground gas storage facilities in Russia are an integral part of the unique Unified Gas Supply System and have multiple purposes:

1. The main task of UGS is to compensate for seasonal and daily gas supply irregularities despite of comparatively uniform production throughout the year;
2. Ensuring gas supply to consumers under abnormal conditions, in case of extreme drops in temperature on specific days or during abnormally cold seasons;
3. Ensuring reliability of gas exports;
4. Creating a long-term reserve for emergencies.

Furthermore, underground gas storage facilities can merge into the renewable energy operation system in the future. Solar batteries and wind generators cannot ensure an unchanging level of power production for objective weather-related reasons. Underground gas storage facilities can be used to compensate for fluctuations in energy production by such sources.

The existing Russian UGS system provides up to 25% of annual and up to 40% of daily consumption by Russian consumers, up to 7% of the export volume. One of the important achievements of the underground gas storage system is creation of a regional gas supply system provided with gas from UGS facilities during winter. [11]

The legal regime of underground gas storage is established by energy laws which are multifaceted in their legal nature. Specific features of maintaining the legal regime of underground gas storage stem from, among other things, the fact that the facilities are located below the ground, meaning that laws on subsoil use apply to this regime; these are hazardous production facilities, meaning that they are subject to industrial safety laws; as fuel and energy complex facilities, they are subject to laws on security (anti-terrorism protection) of fuel and energy complex facilities, etc.

Specific features of the legal regime of UGS facilities as construction projects have also been established.

Currently, the legal regulation of underground gas storage in Russia has many gaps. One of the reasons is that, on the one hand, this activity is very similar to gas production from the technological point of view, on the other hand, it is closely linked to gas transportation. It hardly ever the case, that the legislator considers the specifics of this activity.

Similarly to gas production, underground gas storage activities are related to the use of subsoil and require relevant licenses (license for operation of an underground gas storage facility).

Gas storage activities include two main processes: gas injection and withdrawal (removal from the subsoil). Gas withdrawal from a UGS facility is almost identical to gas production from the technological point of view, however, there is a fundamental difference in terms of the legal regime of the withdrawn gas: gas recovered during production is a mineral, whereas the gas withdrawn from a UGS facility is a product deposited for storage. In practical terms, this difference can create legal uncertainty in utterly unexpected situations.

For example, according to Article 22, Clause 5, of Law of the Russian Federation No. 2395-I on Subsoil Resources dated February 21, 1992 (hereinafter referred to as the Law on Subsoil), subsoil users may restrict development of mineral deposit areas within their mining allotments.

As per Article 25 of the Law on Subsoil, construction of permanent facilities on land plots located outside populated areas, installation of underground structures outside populated

areas are only permitted if the relevant national minerals center issues a conclusion on absence of subsoil mineral deposits under the proposed construction site.

Considering that, as mentioned above, gas injected into the underground storage facility is not a mineral, it would appear that there are no mineral deposits within the mining allotment allocated for UGS operation Therefore, restriction of development activities within this mining allotment is impossible, leading to risks for both the UGS facility operator and the general public.

Meanwhile, this approach to legal regulation is by no means reasonable. The main idea behind the subsoil user's right to restrict development in the mining allotment area is to ensure safety: the subsoil user is aware of the stratification depth, other spatial and qualitative parameters of underground structures and their contents, and can assess the danger (or safety) of construction of proposed aboveground facilities not related to subsoil use. It is evident that, in terms of industrial safety, it makes no difference whether the gas located in the subsoil area is a mineral or a "product". Therefore, the existing regulations on restriction of mining allotment area development fail to ensure safety to the full extent, thus complicating the activities of UGS facility operators.

As for the technological link between gas transportation and underground storage, a striking example of virtual non-existence of specific legal regulations on UGS is the Gas Mains Security Rules approved by Decree of the Government of the Russian Federation No. 1083 dated September 8, 2017: according to Clause 2 of these Rules, underground gas storage facilities are gas mains, even though they represent a separate technological complex and, as stated above, have fundamentally different characteristics.

These are only some examples evidencing that the regulatory framework of underground gas storage activities needs to be improved.

Considering the strategic importance of UGS facilities for the Russian consumers and national security, the future increase in the global need for UGS volumes, as well as the important role of UGS in gas exports accounting for substantial budget receipts, legal regulation improvement, creation of a legal framework stimulating the UGS system development are becoming crucial factors shaping performance and future development of both UGS and the entire gas industry in the long run. ■

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