



GECF Expert Commentary

The Role of Gas Storage in Balancing Gas Markets in the E.U. and U.S.

Dr. Aydar Shakirov, Gas Transportation and Storage Analyst, Gas Market Analysis Department

Natural gas storage has become a fundamental component of the global natural gas supply chain. The mature markets, first of all the E.U. and U.S., are a bright example of how gas underground storage (UGS) plays a major role in balancing gas markets, with various factors driving gas storage development in these regions.

It is difficult to overestimate the role of the E.U. and U.S. on the global gas storage market. The global gas storage capacity amounts to 421 Bcm, with the shares of U.S. and E.U. reaching 32% and 25%, respectively. There are 662 underground storage facilities in operation in the world, with the U.S. and E.U. accounting for 58% and 21% of them, respectively. The global maximum withdrawal rate is at 7.3 Bcm/day, with the U.S. and E.U. representing 46% and 28% of this level. Other major gas storage market players, such as Russia, Ukraine, Canada and China, lag behind the U.S. and E.U.

Ensuring security of gas supply is a key rationale for gas storage development in the E.U. and U.S., with market operators striving to hedge against the risks of gas supply disruptions and fluctuations of gas demand. The seasonal factor dominates in both regions, which are famous for notable winter and summer seasons. Gas demand from residential and commercial sectors increases for heating purposes in winter seasons (from November to March) and it falls in summer seasons. Meanwhile, gas demand rebounds a little bit from June to August due to the growing consumption in power sector for cooling purposes. In the E.U., geopolitical factor also plays an important role due to the growing import dependency of the region, caused by the decline in domestic gas

production. In the U.S., the geopolitical factor has lost its eminence since the country became self-sufficient in gas supply.

Exploiting winter-summer gas price spread is the other crucial rationale for gas storage development. Gas storage enables to ensure the efficiency of commercial cycles in the gas industry and improve the economics of gas supply, since it gives a chance to purchase cheaper gas at off peak periods and sell it later during peak shaving periods. The analysis of the dynamics of TTF gas price over the last five years shows that summer-winter price spread dominates in most years, with the years 2017 and 2019 being bright examples. In 2019, TTF gas price fell from 7.30 USD/MMBtu in January to 3.57 USD/MMBtu in June and then rebounded to 5.11 USD/MMBtu in November. Meanwhile, the year 2018 is a good example for the U.S. In 2018, Henry Hub gas price fell from 3.87 USD/MMBtu in January to 2.80 USD/MMBtu in May and then rebounded to 4.04 USD/MMBtu in December.

Gas storage plays a crucial role in balancing the E.U. and U.S. gas markets, smoothing out annual fluctuations in gas demand and supply. Gas storage is capable to absorb incremental gas supply or make up for a deficit of supply. As such, natural gas stock variations enable to equalize supply and demand. In the E.U., the highest level of net injections at 12 Bcm was registered in 2011, when domestic gas demand fell by 52 Bcm compared to the previous year, and gas storage absorbed abundant amount of natural gas. The highest level of net withdrawals at 10 Bcm was registered in 2010, when domestic gas demand increased by 39 Bcm compared to the previous year, and gas storage made up for a deficit of supply. In the U.S., the highest level of net injections at 33 Bcm was registered in 2001, when domestic gas demand dropped by 42 Bcm compared to the previous year. The highest level of net withdrawals at 23 Bcm was registered in 2000, when domestic gas demand increased by 30 Bcm compared to the previous year.

Besides, gas storage smooths out seasonal fluctuations in gas demand and supply. The amount of gas available for the domestic market in the E.U. and U.S. is not able to meet the growing demand in winter seasons, while abundant amount of gas, not supported by demand, is available in summer seasons. In this context, gas underground storage enables to balance the market. The amount of gas in storage fluctuates in accordance with seasonal trends. As a

result, net gas storage changes move from net withdrawals to net injections throughout a year. In 2018, gas withdrawals from European UGS were higher than gas injections into UGS in January-March and November-December, while gas injections exceeded gas withdrawals in April-October. Net withdrawals reached the highest level of 20 Bcm in February, while net injections achieved the highest level of 13 Bcm in August. Meanwhile, net withdrawals from the U.S. UGS reached the highest level of 26 Bcm in January, while net injections achieved the highest level of 12 Bcm in May.

The most critical indicator in the gas storage industry is the storage-to-consumption ratio, which represents correlation between effective working gas storage capacity and gas consumption. Currently, the ratio is at 22% in the E.U. and at 16% in the U.S., while the global one is at 11%. It implies that the E.U. and U.S. have 80 and 58 days of gas storage cover, respectively, while the global level is at 39 days.

Gas storage capacity development in the E.U. and U.S. has influence on the global gas market. Depending on the market conditions, their gas demand may increase driven by the need to replenish gas storage, or it may drop because of the high volume of gas in storage. As such, high level of gas in storage in both the E.U. and U.S. may lead to the declining regional and global gas prices, while low level of gas in storage may underpin prices. Besides, with gas storage available, the E.U. and U.S. do not intensively use other peak shaving mechanisms, such as purchasing spot LNG. As a result, gas demand on the global level is smoother throughout a year, and regional gas prices are not as volatile as they could be, if the E.U. and U.S. did not develop gas storage capacity.