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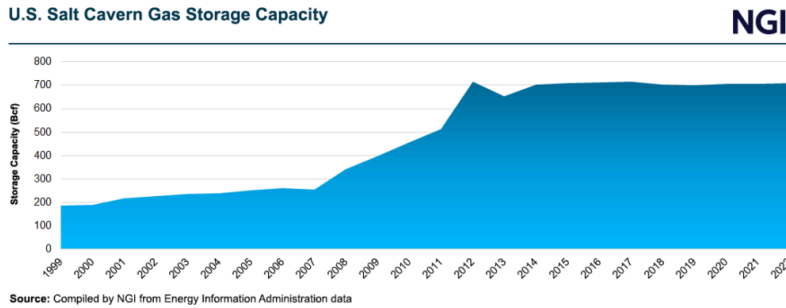
U.S. Natural Gas Salt Storage Projects Stage Comeback as LNG, Renewables Drive Demand



BY CHRIS NEWMAN
 March 5, 2024

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More than a decade after its last large build-out, natural gas salt dome storage is undergoing a revival along the Gulf Coast as LNG exports and renewables raise demand and prices for the flexible storage option.



In February, **Gulf Coast Midstream Partners LLC** (GCM) filed with Texas regulators to build the region’s first greenfield salt dome in years. The Freeport Energy Storage & Sequestration Hub (FRESSH), in Fort Bend County near Houston would have a first phase of 12 Bcf working gas capacity.

In Mississippi, **Enstor Gas** is seeking to double the number of caverns at its 22.4 Bcf Mississippi Hub to six for an additional 33.5 Bcf of working gas capacity. The company plans to start the approval process with FERC by the end of March and anticipates a startup in 2028.

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The projects come amid a jump in prices for salt storage as demand has caught up with supply from liquefied natural gas exporters, power generators, pipeline operators and traders.

“Demand for salt storage in particular is rising in general because increased natural gas price volatility is becoming a more systemic part of the

Chat

industry,” according to NGI’s Patrick Rau, director of strategy and research. “Salt domes provide multiple injection and withdrawal cycles that better enable players to capture those price swings. They also provide critical backup service to renewables.”



With the Gulf Coast home to a majority of the country’s current and future LNG export capacity, LNG trading houses and portfolio players are taking a larger portion of that capacity “and will look to capitalize on emerging price and time spreads, both here and abroad,” Rau said.

Rates Go Higher

“It’s a revival of the gas storage business...because basically the industry went idle for a number of years,” Enstor’s Peter Abt, senior vice president of origination, told NGI.

In the last round of storage additions in the early 2010s, many projects were financed with monthly storage rates in the mid-teens cents per Dth, Abt said. “As soon as the projects were placed into service, the market fell out and we bottomed out in the low single digits.”

That decade of depressed storage rates and limited natural gas price volatility has moved to the rearview mirror. Abt said salt storage rates have increased to at least 20 cents/Dth, a level that is required now to build new capacity. In addition, customers are signing up for 10 to 15 years compared with previous contracts of one or two years, according to Abt. Banks require the commitments to cover the term of the loans, which have typically been seven or eight years, he said.

“I think a case can be made for rates eventually going higher than where they are now,” GCM Chief Commercial Officer Edmund Knolle told NGI. The varied demand profiles of renewables and LNG exports were not an issue in the past, but now they are here and growing, and peak gas demand is also going higher, he said.

Customers pay higher prices the more cycles they want in a contract, Knolle said. FRESSHE could provide 10 or more storage cycles annually, while a reservoir storage facility might just have two cycles per year, according to Knolle.

To explain the flexibility, Knolle gives a quick primer: Salt domes are essentially large pillars of solid salt. “Think of it like the Empire State Building sort of, but it’s bigger than that. It’s thousands of feet deep and it comes almost to the surface,” he said. Large diameter wells are drilled into the salt to create the caverns and then it’s “like putting gas in a coke bottle and taking it out.”

Storage Wave

Momentum for new storage capacity has been building over the past year.

Enbridge Inc. is moving ahead with an expansion of its **Tres Palacios** salt storage facility after approval in December by the Federal Energy Regulatory Commission. The **Cavern 4 Expansion Project** would add 6 Bcf to an existing 35 Bcf of working storage.

Nearby, Kinder Morgan Inc. has leased an additional 6 Bcf of salt storage at the **Markham Storage** salt facility in Matagorda County, TX. That expansion began partial service in November, and full commercial service is expected in June, with it fully subscribed under long-term agreements, a company spokesperson said.

Also in December, midstream giant Williams became the biggest operator of salt storage in the Lower 48 after buying **Gulf Coast storage assets** owned by Hartree Partners LP. The deal included 92 Bcf of salt domes in Louisiana and Mississippi.

In addition, Golden Triangle Storage LLC is seeking to add two salt caverns with 14 Bcf storage capacity to its existing salt storage facility near Beaumont southeast of Houston. The company started the permitting process in September and anticipates completing the project in 2026.

Non-salt projects in the South Central region with fast deliverability are also in demand. Trinity Gas Storage is building the region's first greenfield reservoir gas storage facility in years, a 24 Bcf facility near Dallas set to come online in the third quarter. A planned second phase would raise its total deliverability of gas to more than 1 Bcf/d.

'It's Not A Mystery'

Storage needs extend beyond the Gulf region. Enstor, the country's largest independent storage owner and operator, is expanding its Mississippi Hub expansion to serve not only LNG customers but also power generators and gas distribution companies in the Southeast, according to Abt.

Enstor's salt and reservoir facilities in Mississippi and Alabama are at the crossroads between South Central gas supply and Southeast consumer markets. Customers include those on Williams' Transcontinental Gas Pipe Line Co. LLC and Kinder's Southern Natural Gas Co. LLC systems.

In the past, pipelines had more capacity to provide flexibility, but because production has outpaced pipeline investment, the system "is pretty stressed," Abt said.

Renewables are less of a driver of storage demand in the Southeast with wind's more challenging economics and the loss of forests a hurdle for solar in the region, Abt said. However, Florida, which generates most of its power from gas, is beginning to hit the level where its installed renewable generation would require more storage services, Abt said. That level is generally when renewables reach around 5% of a service territory's generation share, he said.

Williams CEO Alan Armstrong quantified the investment shortfall for pipelines and storage during an investor’s day last month. Over the past 10 years, Lower 48 demand for gas rose 43%, while pipeline infrastructure expanded by 25% and storage capacity grew by only 2%, he said.

Williams is already seeing the impacts on its pipeline systems, Armstrong said. “It’s not a mystery...This is a pretty simple story for us in terms of what the drivers are of this demand.”

The New Volatility

For those paying higher prices for salt storage, the value proposition is different from the old model of storing gas and selling it when the forward curve was more expensive, Knolle said. “That model worked day in and day out for a decade” amid lower storage rates and low volatility, he said.

Going forward, the value for salt storage tied more to short-term dislocations in physical cash markets, Knolle said. Supply and demand can change daily, and even within the day in hourly flows and bid-ask spreads for prices, he said.

In his comments last month, Armstrong also said to expect volatility in LNG feed gas flows. A 100% load factor for the Gulf Coast’s LNG terminals “is not where markets wind up,” he said. “They wind up at an 85% to 90% load factor because people are going to overinvest a little bit to capture those peaks in an efficient market.”

As LNG demand fluctuates and terminal operators have outages, storage will be required.

“They lose a train, you’ve got 2 or 3 Bcf you’ve got to find a home for,” Armstrong said. “People are going to really start to understand the value of storage.”

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