



SUPPORTING THE AMERICAN WAY OF LIFE



THE IMPORTANCE OF
NATURAL GAS STORAGE

WHERE NATURAL GAS STORAGE IS LOCATED?

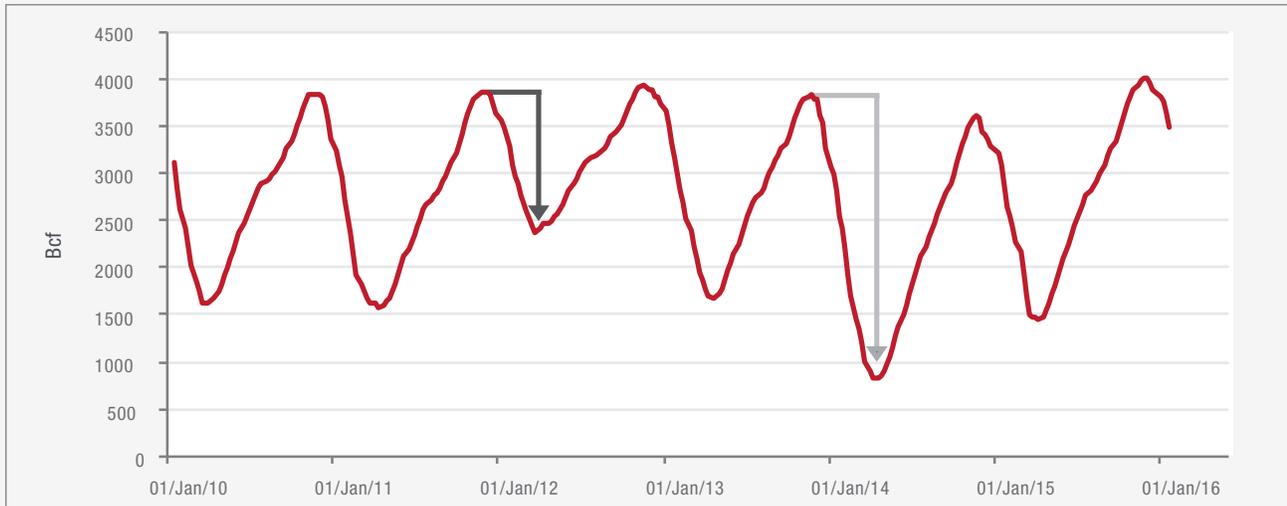


Underground storage of natural gas is an integral component of the nation's energy system, and our nation's significant storage capacity enables utilities to offer clean natural gas to consumers throughout the year with reliable service and prices.¹

This use results in significant seasonal variations in which natural gas consumption is highest during the winter time and lowest during mild-weather months. Natural gas storage enables supply to match demand on any given day throughout the year.

Natural Gas Working Storage Levels

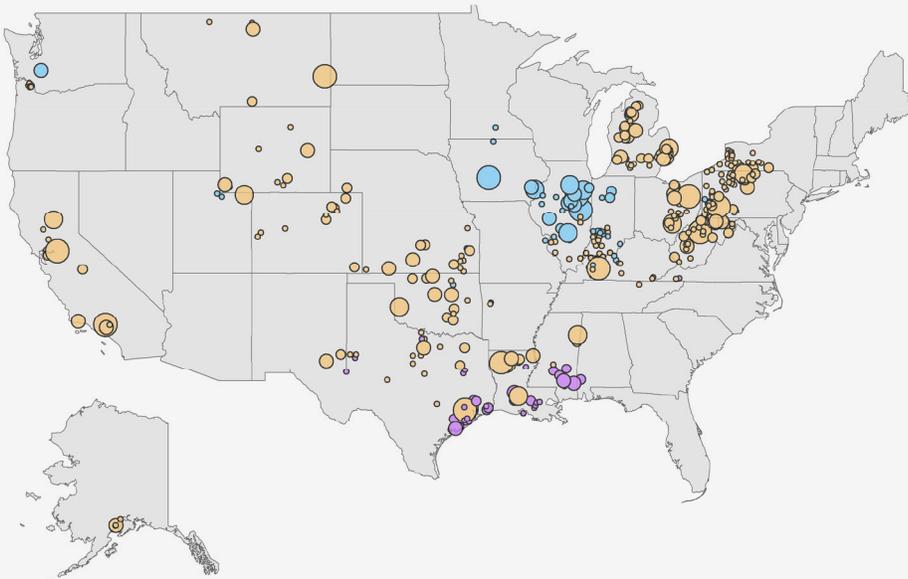
Energy Information Administration, "Weekly Natural Gas Storage Report, History," January 8, 2016.



The chart above shows how storage fluctuates with the weather. During the mild winter of 2012, the gas withdrawn from storage was far more moderate (see black arrow). In contrast, in 2014, the year of the Polar Vortex, natural gas storage was "drawn down" sharply (see grey arrow). But even in the mildest of winters, such as 2012, natural gas withdrawals from storage were vital to meeting winter natural gas demand.

Where Natural Gas Underground Storage Fields are Located

Type of Storage and Total Field Capacity, July 2014



Type of Storage

- Depleted Fields
- Salt Formations
- Depleted Aquifers

Total Field Capacity (Billion Cubic Feet)

- Less than 14.5
- 14.5 to 37.8
- 37.8 to 73
- 73 to 122
- Greater than 122

¹ Energy Information Administration, "Natural Gas Explained, Use of Natural Gas," accessed January 15, 2016, http://www.eia.gov/energyexplained/index.cfm?page=natural_gas_use

NOTE: that the map includes both active and inactive fields.

SOURCE: EIA Energy Mapping System; EIA-191 Monthly Underground Gas Storage Report July 2014.

HOW IS NATURAL GAS STORED?

How is Natural Gas Stored?

Natural gas is stored underground primarily in three reservoir types: depleted oil and gas fields, depleted aquifers, and in salt beds and salt caverns. Natural gas may also be stored above ground in refrigerated tanks, as liquefied natural gas (LNG).

Types of Natural Gas Underground Storage

Depleted Natural Gas or Oil Fields

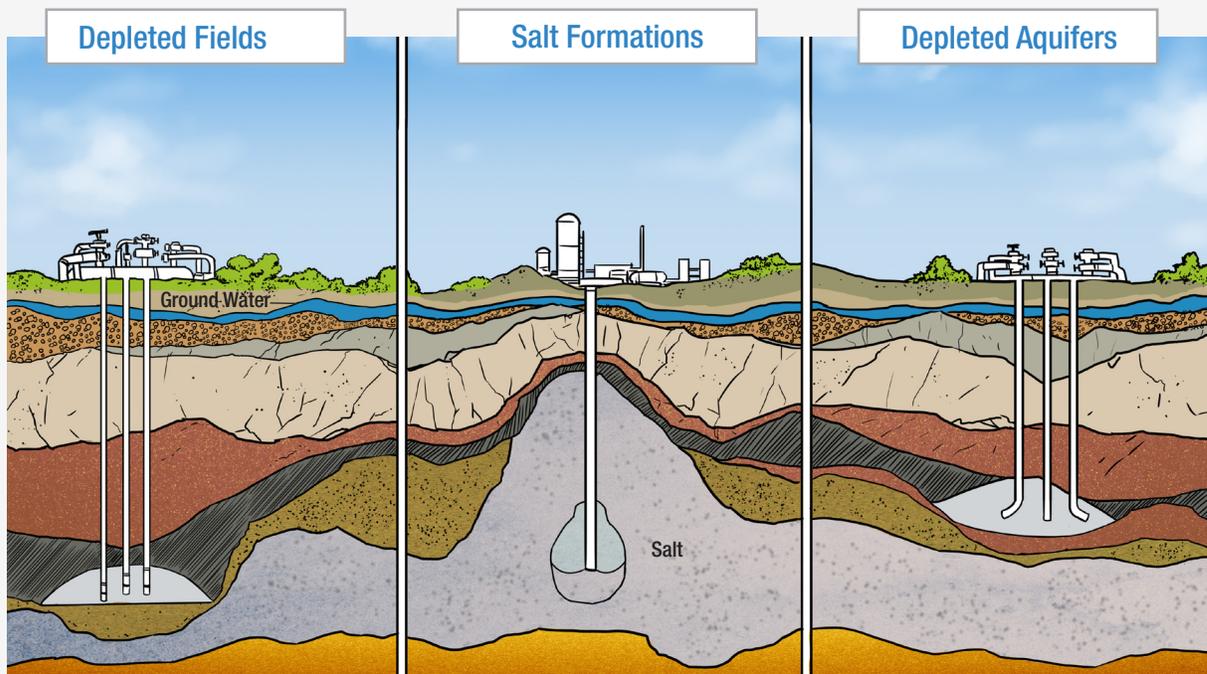
Of the approximately 400 active underground storage facilities in the U.S., about 79 percent are depleted natural gas or oil fields. Conversion of an oil or gas field from production to storage takes advantage of existing infrastructure such as wells, gathering systems, and pipeline connections. Depleted oil and gas reservoirs are the most commonly used underground storage sites because of their relatively wide availability.

Salt Formations

Salt formation storage facilities (also known as salt caverns or salt beds) make up about 10 percent of all facilities. These subsurface salt formations are primarily located in the Gulf Coast states. Salt formations provide very high withdrawal and injection rates.

Depleted Aquifers

Natural aquifers may be suitable for gas storage if the water-bearing sedimentary rock formation is overlaid with an impermeable cap rock. They are not part of drinking water aquifers and make up only about 10 percent of storage facilities.



SAFETY IN UNDERGROUND STORAGE OF NATURAL GAS



Underground natural gas storage operators are committed to ensuring the safety and integrity of their facilities. The industry's construction, operation and integrity management protocols are overseen by multiple agencies at the state and federal level with jurisdiction over underground storage facilities:

- The Federal Energy Regulatory Commission (FERC) regulates projects connected to interstate pipeline systems. FERC is responsible for authorizing the construction or expansion of storage facilities and the terms and conditions of service (i.e., open access) and the rates charged by these providers.
- The Pipeline and Hazardous Materials Safety Administration (PHMSA) is authorized to regulate the safety of natural gas transportation and storage.
- Intrastate storage may fall under the regulatory authority of various state government entities depending upon the state. For example, underground storage in Texas is under the authority of the TX Railroad Commission – Oil & Gas Division. Often state utility commissions as well as state environmental or natural resource agencies set the rules governing intrastate underground storage.

Beyond federal and state regulation, industry has taken the initiative to work with external stakeholders to develop two recommended practices (RPs)—accredited by the American National Standards Institute—for underground storage. RP 1170 and 1171 provide guidance to operators on how to design, operate, and ensure the integrity of underground storage for natural gas.

Underground Storage by the Numbers

- Approximately 400 active storage facilities in 30 states, made up of depleted natural gas or oil fields (80%), depleted aquifers (10%) and salt caverns (10%)
- Approximately 20% of all natural gas consumed during the winter is supplied by underground storage
- Underground storage capacity increased 18.2% between 2002 and 2014
- Approximately 4 trillion cubic feet of natural gas can be stored underground, or enough to meet an average states residential natural gas consumption for more than 20 years



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