

MidAmerican Energy Company Iowa Utilities Board

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Agenda

- MidAmerican Energy Company
- Regulation of Storage in Interstate Commerce
- Natural Gas Storage
- MidAmerican Energy Company Natural Gas Storage

MidAmerican Energy Company

- Combined Natural Gas and Electric Utility
- Natural Gas Utility
 - 705,200 customers located in four Midwestern states
 - 550,500 customers in Iowa
 - 84,700 in South Dakota
 - 65,600 in Illinois
 - 4,400 in Nebraska
 - Annual customer requirements
 - Approximately 2.3 billion cubic meters (82.9 Bcf)
 - Peak day customer requirements
 - 25.8 million cubic meters (929,000 Mcf)
 - Average temperature of minus 27 Celsius (minus 17 degrees Fahrenheit) adjusted for wind speed of 10 miles per hour

Regulation of Storage in Interstate Commerce

- The Federal Energy Regulatory Commission (FERC) regulates transmission, storage and sale of natural gas in interstate commerce.
- Storage rates may be cost-based or market-based.
- Cost-Based Storage Rates
 - Historically all storage rates had been cost-based.
 - Pipeline and storage owners are entitled to recover the cost of investment plus a reasonable return.

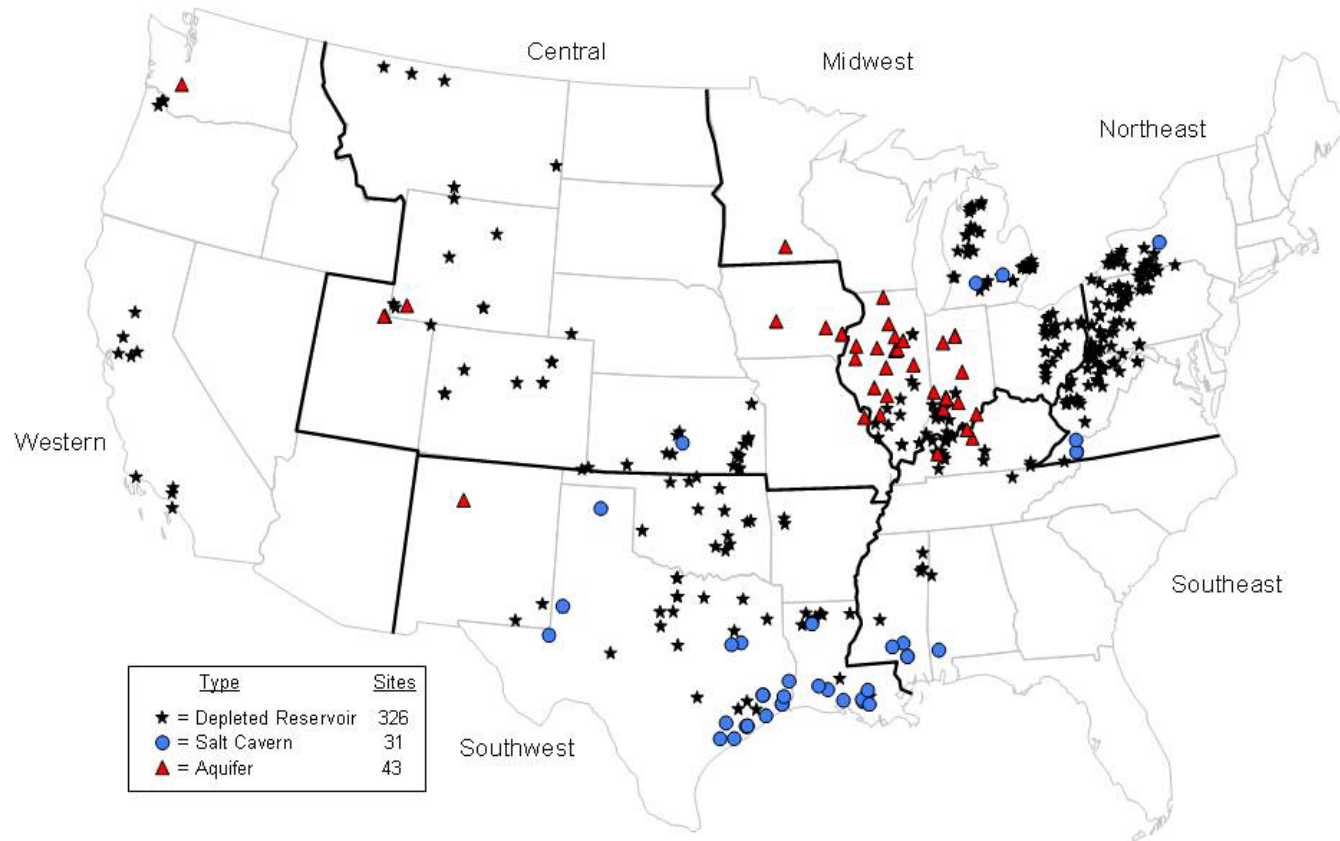
Regulation of Storage in Interstate Commerce

- Market-Based Storage Rates
 - Allowed by FERC when:
 - Necessary to encourage construction of storage capacity, or
 - Storage provider can demonstrate lack of market power.
 - FERC has begun to allow market-based storage rates for new or expanded storage facilities.
 - Storage owners have the freedom to negotiate rates at market-clearing prices.

Natural Gas Storage

- Why Store Natural Gas?
 - Flattens demand levels throughout the year
 - Allows for natural gas production during lower demand periods (e.g. summer)
 - Dependable supply source that is not subject to:
 - Equipment failures
 - Freezing of wells
 - Pipeline capacity constraints
 - Allows gas to be stored near markets

Natural Gas Storage



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division Gas, Gas Transportation Information System, December 2008.

Natural Gas Storage

- Types of Underground Storage
 - Reservoir Storage: Require controlled injections and withdrawal cycles
 - Depleted oil and/or gas fields (81% of U.S. storage fields)
 - Inject in summer/withdraw in winter
 - 50% working gas/50% cushion gas
 - Aquifer storage (11% of U.S. storage fields)
 - Inject in summer/withdraw in winter
 - High cushion gas requirement
 - Reservoir bounded by water bearing rocks

Natural Gas Storage

- Types of Underground Storage (cont'd)
 - Salt Cavern Storage: Flexible injections and withdrawal cycles (8% of U.S. storage fields)
 - Underground salt domes or salt formations
 - 70% to 80% working gas
 - High deliverability/high injection
 - Inventories can be recycled multiple times each year.
- Types of Above Ground Storage
 - Liquefied Natural Gas
 - Natural gas converted to a liquid by cooling to approximately minus 162 degrees Celsius (minus 260 degrees Fahrenheit).
 - Inventories can be recycled multiple times each year.

MidAmerican Energy Company Natural Gas Storage

- MidAmerican Energy contracts for storage provided by its pipeline suppliers
 - Reservoir storage fields located in the upper midwest
 - Mainly aquifer storage and some depleted reservoir storage
 - Pipelines operate multiple storage fields, and types of fields, on an integrated basis.
- MidAmerican Energy owns liquefied natural gas storage plants
 - Capacity is limited by tank inventory levels.
 - Typically used on very cold days when contracted pipeline capacity is fully utilized.