

# Underground Natural Gas Storage

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## Gas / Electric Partnership 2017

Kinder Morgan Pipelines  
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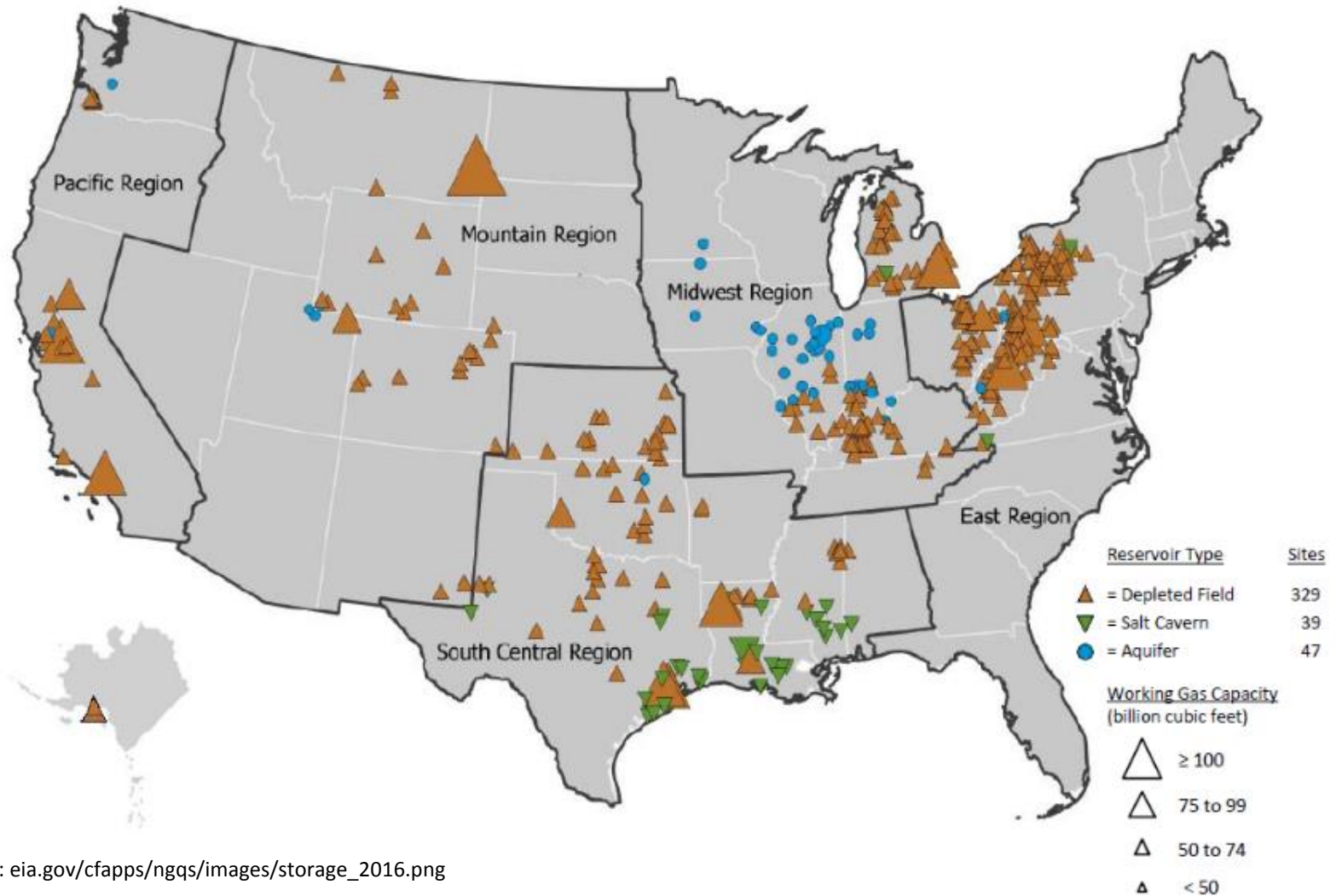
# Executive Summary

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- Underground natural gas storage provides vital economic and physical flexibility to the power generation market.
- Gas can be stored for months or years when prices are low and then diverted within minutes to meet sudden demands in price or from outages such as power plant trips or supply interruptions
- Pipelines experienced record power demand in the N.E. and S.E. USA attributed to low gas prices and above average ambient temperatures<sup>1</sup>. Storage fields used to manage pipeline demand swings in excess of 1 Bcf/d.
- While many storage facilities in the U.S. were at record levels Salt Caverns inventories dropped 7 Bcf in August 2016 primarily because of peak power demand.

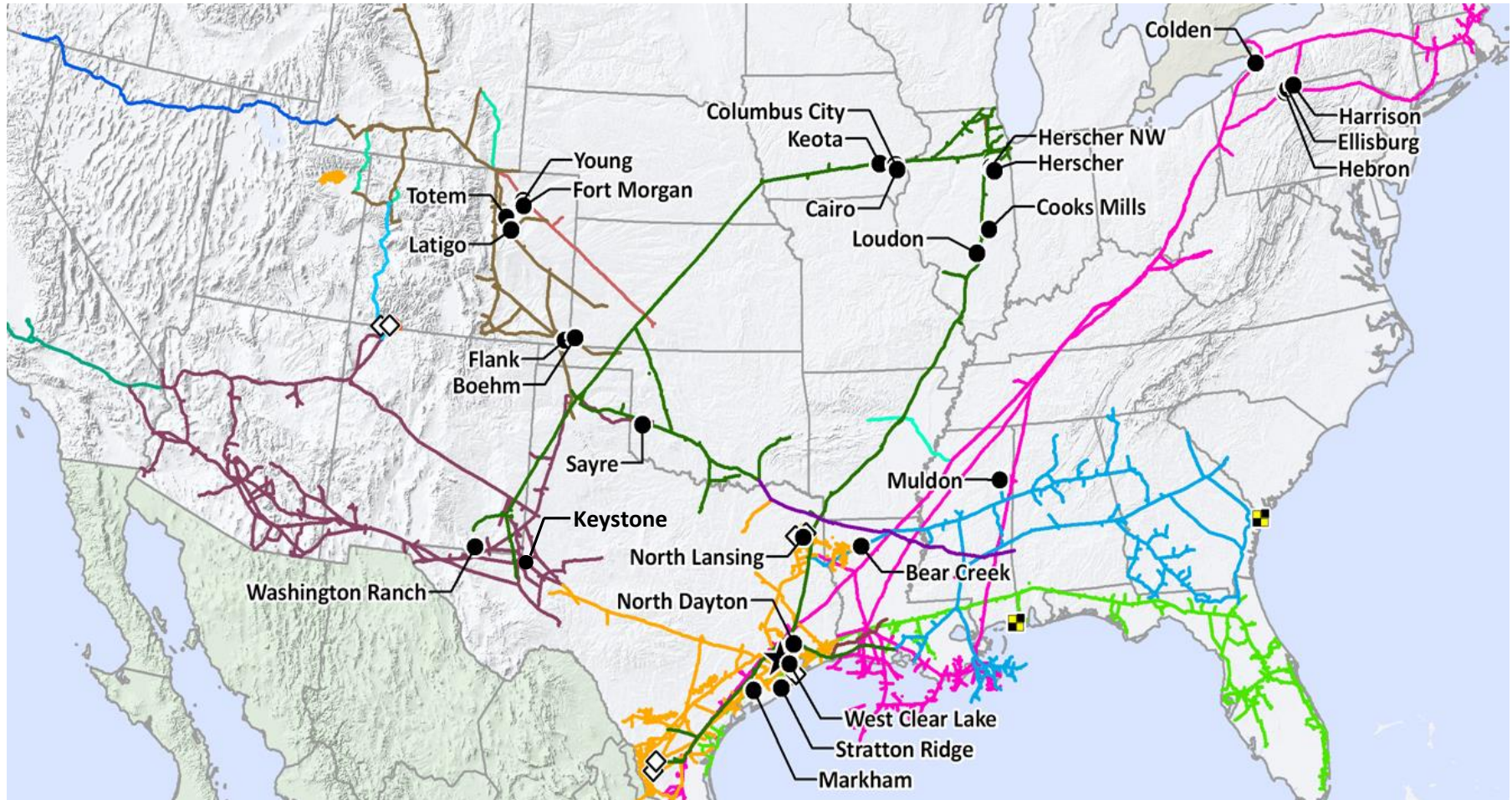
<sup>1</sup><http://www.eia.gov/naturalgas/weekly/> EIA Statistic indicate a 2 degree F above average ambient temperature

# U.S. Underground Natural Gas Storage



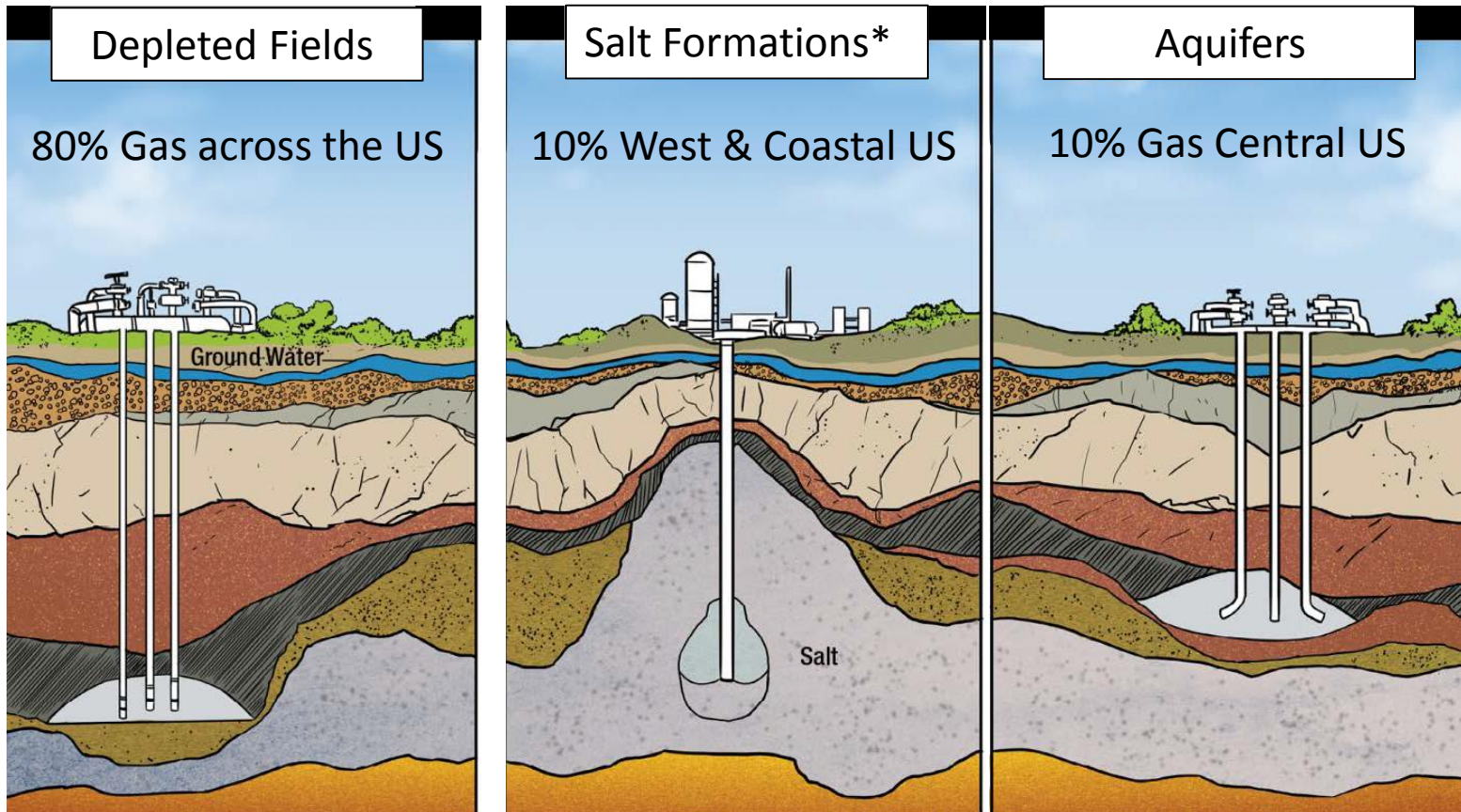
Source: [eia.gov/cfapps/ngqs/images/storage\\_2016.png](http://eia.gov/cfapps/ngqs/images/storage_2016.png)

# Kinder Morgan Underground Natural Gas Storage Facilities



1.2 Tcf of underground storage, 660 Bcf of working gas in production and market areas

# Types of Underground Gas Storage



Source: API

\*Includes Bedded salt

# Aliso Canyon Underground Natural Gas Storage Leak



<https://www.socalgas.com/documents/safety/alisofactsheet.pdf>

## SoCal Aliso Canyon Facts

- Los Angeles, California
- Depleted oil field
- 86 Bcf working gas
- 100+ wells
- 8,000 – 10,000' deep
- In service 1973
- Drilled 1953
- Serves residential and power markets
- 1.8 Bcf/d ~9,000 MW

# Value of Natural Gas Storage

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- Provide consumers with reliable gas deliveries service at a lower cost (gas is typically injected into storage when it is cheaper used months later)
- Meet seasonal and daily fluctuations in market demand, in the United States ~20% of the gas supply is met by storage
- Reduces the need for more pipelines and peak production
- Meet swing gas supply needs for electric generation
- Reliable energy backup for production and catastrophic events such as tornadoes, hurricanes, and earthquakes
- Fast supply of energy providing supply for black start of electric grid
- Provide flexibility enabling pipeline and power plant maintenance
- Perfect backup fuel for renewable energy. Equivalent battery backup for a 44 Bcf natural gas storage field is ~800,000,000 Tesla Powerwall batteries.

# Conclusion

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- Underground Natural Gas Storage Facilities are important for power generation
- Peak day winter loads



# Questions?

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- What are leading gas storage companies doing?