SoCalGas

SoCalGas® provides natural gas to **21 Million Customers**

5.8 million meters

1 Trillion cubic feet (Tcf) of natural gas delivered annually

5% of US gas deliveries

135 Billion cubic feet (Bcf) of natural gas storage capacity

3% of US storage capacity

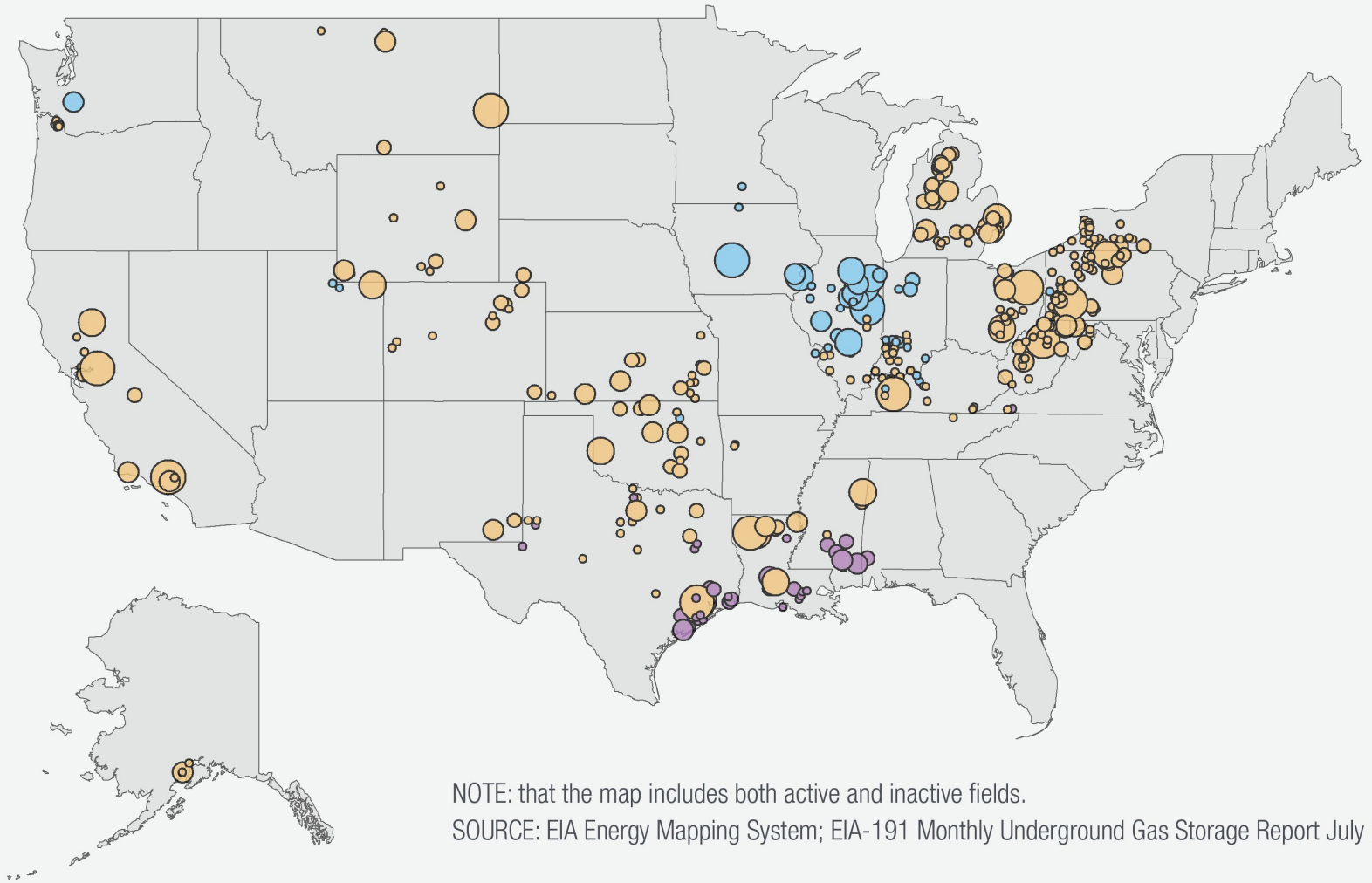
Serving customers for over **140 Years**

Nearly **100,000 Miles** of distributions mains and service lines

Over **3,500 Miles** of natural gas transmission lines

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

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

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

Geologic Storage Options for Hydrogen

Salt Caverns

- Already used for underground hydrogen storage
- Geographically limited

Depleted Oil & Gas Reservoirs

- Geographically well-dispersed
- Residual fluids will remain

Aquifers

- Large volumes
- Potential migration

Hard Rock

- High Cost
- Can store ammonia

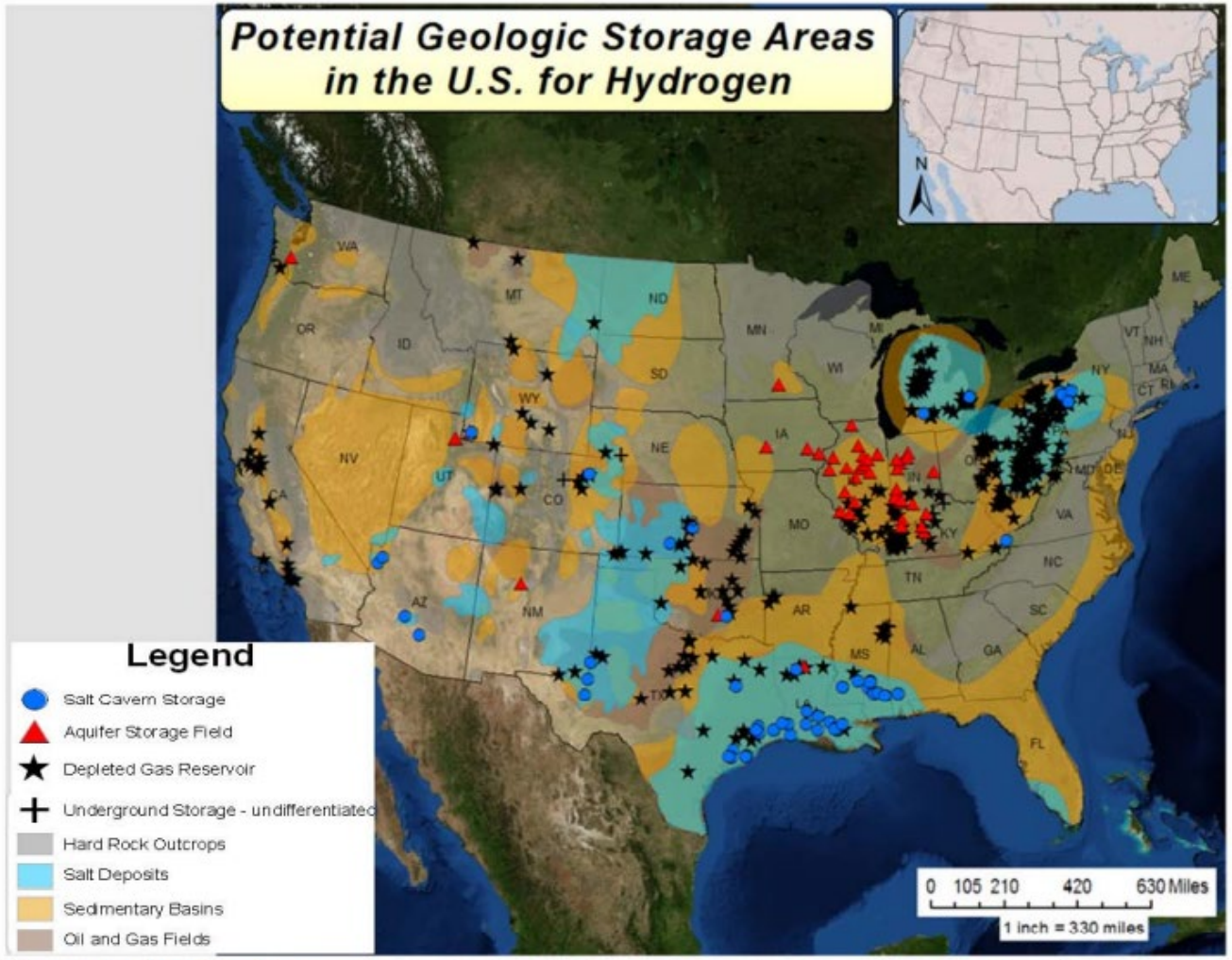


Figure 4. ArcReader map displaying U.S. geology that may have potential as underground storage as well as existing natural gas geologic storage facilities.

From Sandia National Laboratories "A Life Cycle Cost Analysis Framework for Geologic Storage of Hydrogen: A User's Tool" Anna S. Lord, Peter H. Kobos, Geoffrey T. Klise, and David J. Borns

SoCalGas A Sempra Energy utility®

‘The effects of hydrogen injection in natural gas networks for the Dutch underground storage’

Table 11: Summary of the feasibility of hydrogen injection into underground gas storages of the Netherlands

- feasible
- feasible but specific investigations recommended
- insufficient knowledge further research needed
- not feasible

	0.5 % H2		10 % H2		100 % H2	
	Pore	Cavern	Pore	Cavern	Pore	Cavern
Tightness and hydraulic integrity of the cap rock						
Geochemical and microbiological reactions	be aware for energy losses					
Changes in transport mechanisms					dissolution cushion gas	
Technical integrity / steel alloys						
Technical integrity / cementation						
Technical integrity / elastomers						
Surface equipment and operational effects					existing facilities	existing facilities