



The Value of Natural Gas Infrastructure To Consumers and the Nation

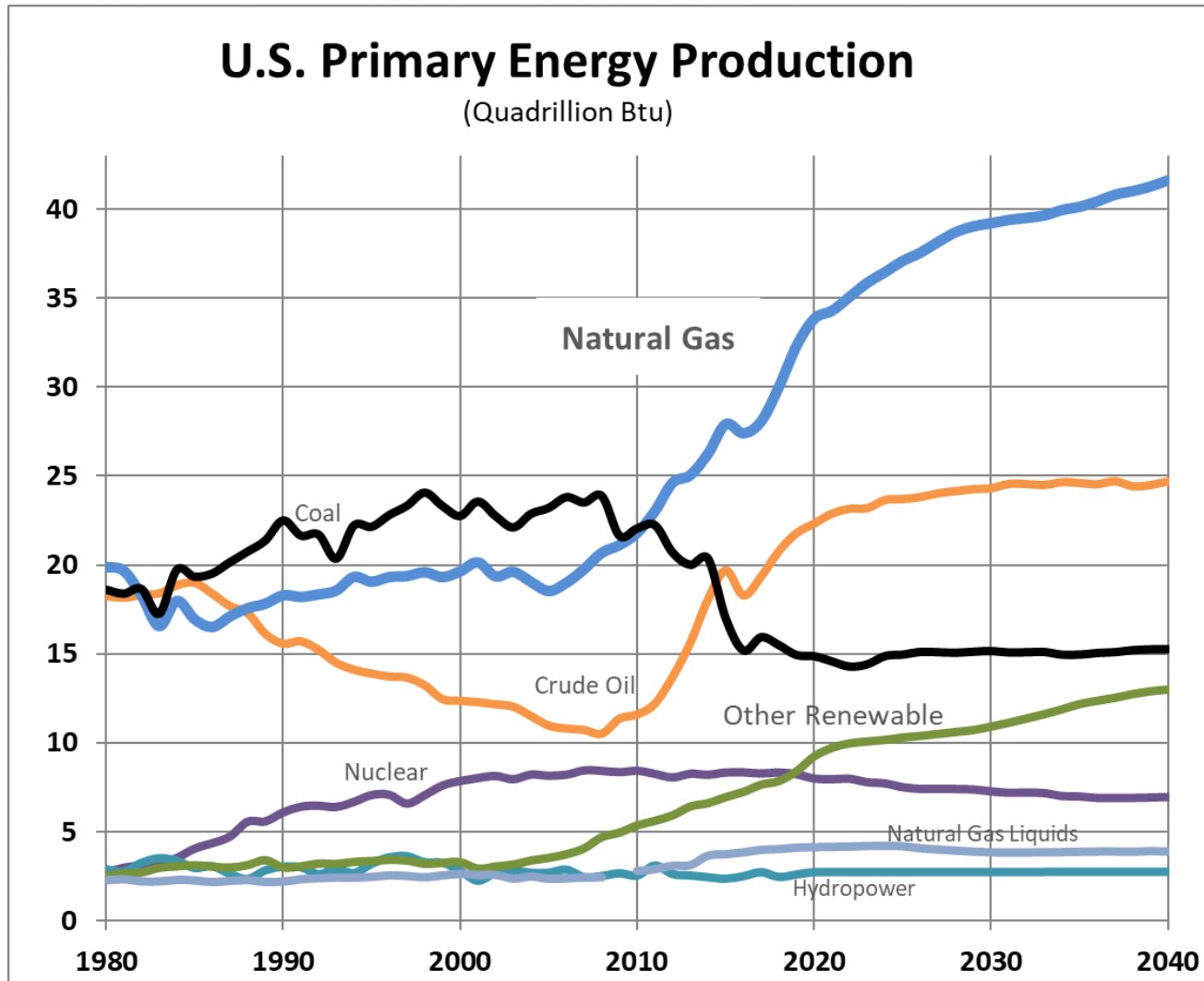
Presented to NARUC Natural Gas Subcommittee, Feb 2019

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GTI

Natural Gas Is The Number One Energy Source Produced In The U.S



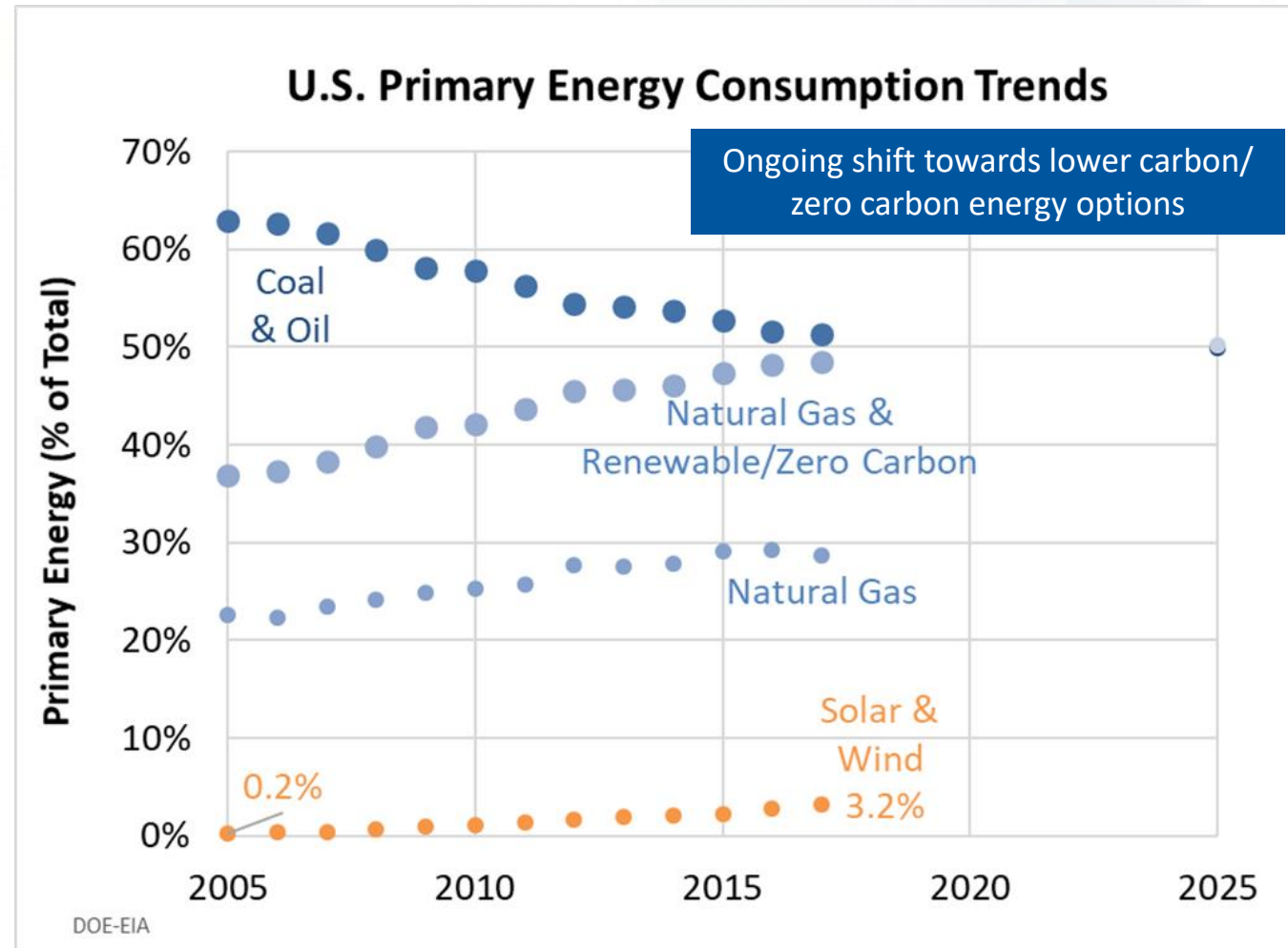
Source: DOE EIA

U.S. Natural Gas Infrastructure: Most Extensive Gaseous Energy Delivery Network In The World

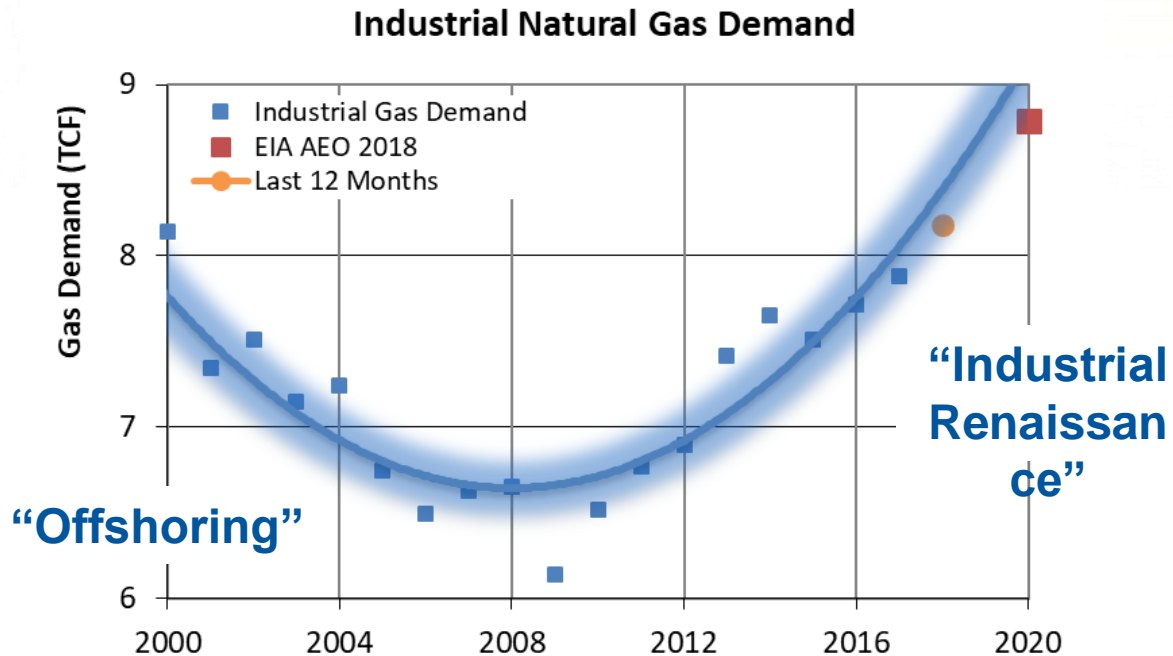
- Approximate Asset Value: \$335 billion
- Natural Gas Transmission Pipelines: 300,650 miles
- Natural Gas Distribution Pipelines: 2,223,000 miles (mains and services)

U.S. Energy Situational Assessment

- U.S. energy picture fundamentally shifted starting around 2005
 - Revolutionary shift to natural gas shale resources, growing wind & solar generation
- Shale gas is a major benefit to the nation and natural gas consumers
 - Over \$50 billion annual energy savings
→ more spending power
- World-leading CO₂ reductions (offset coal); 28% reduction in power sector emissions



U.S. Industrial Renaissance Fueled By Natural Gas



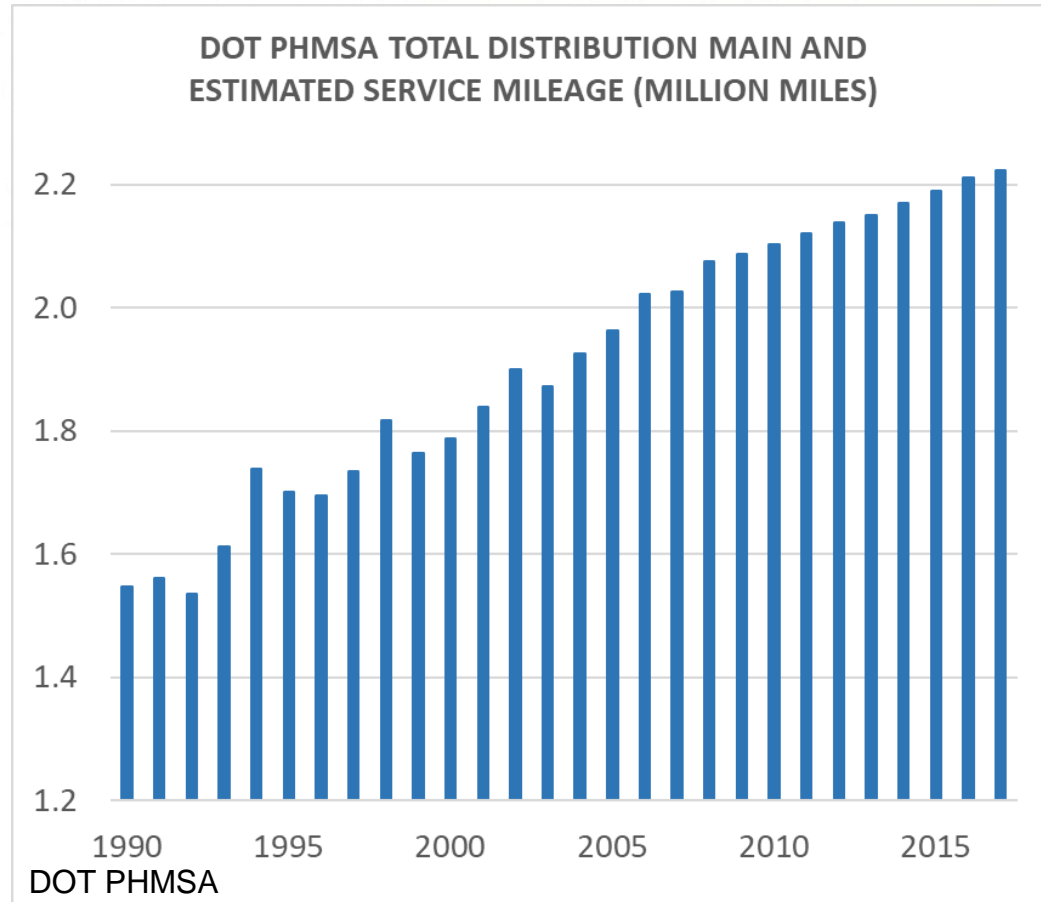
Source: DOE-EIA

“Offshoring” ended a decade ago with start of shale gas revolution. Robust industrial rebound and manufacturing job growth.

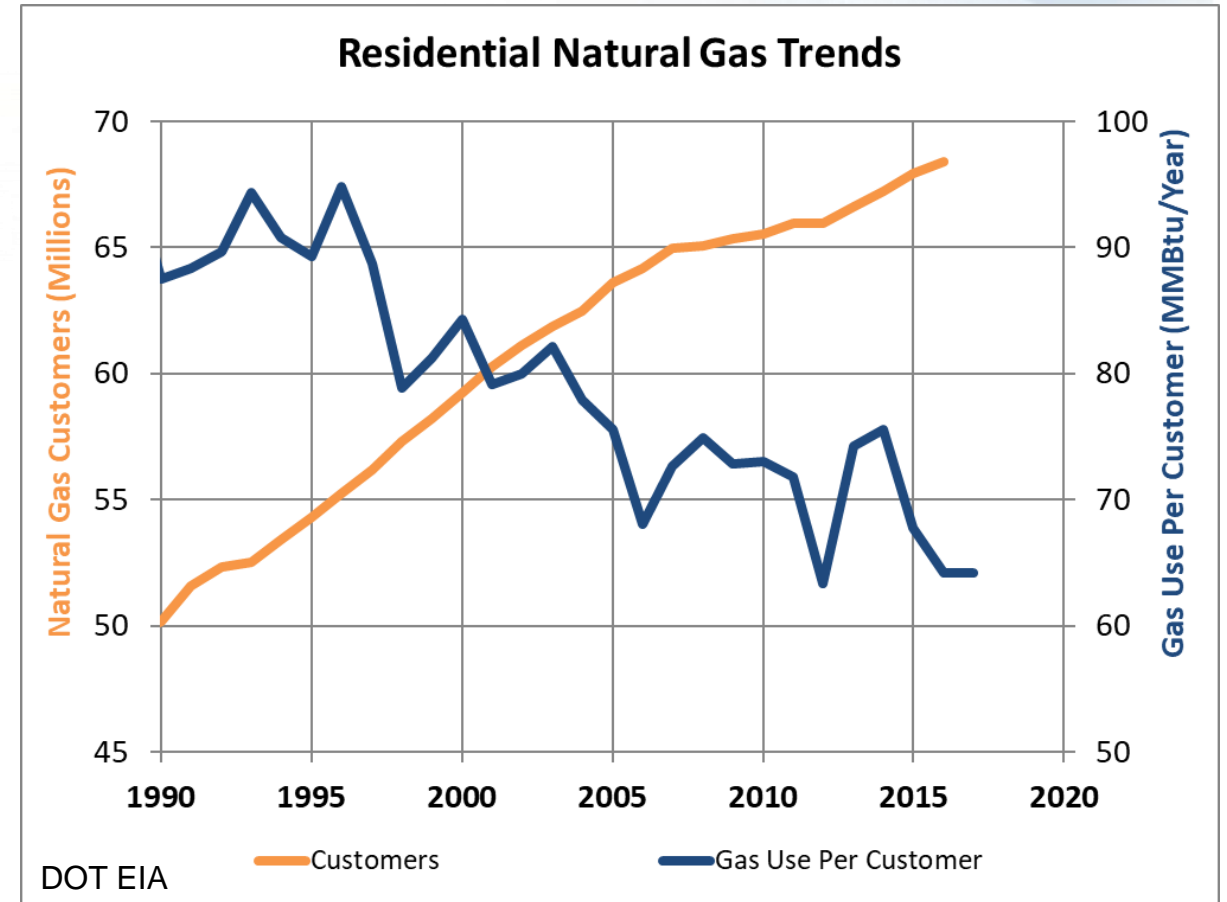


American Chemistry Council

Expanding The Value Of Natural Gas To Consumers

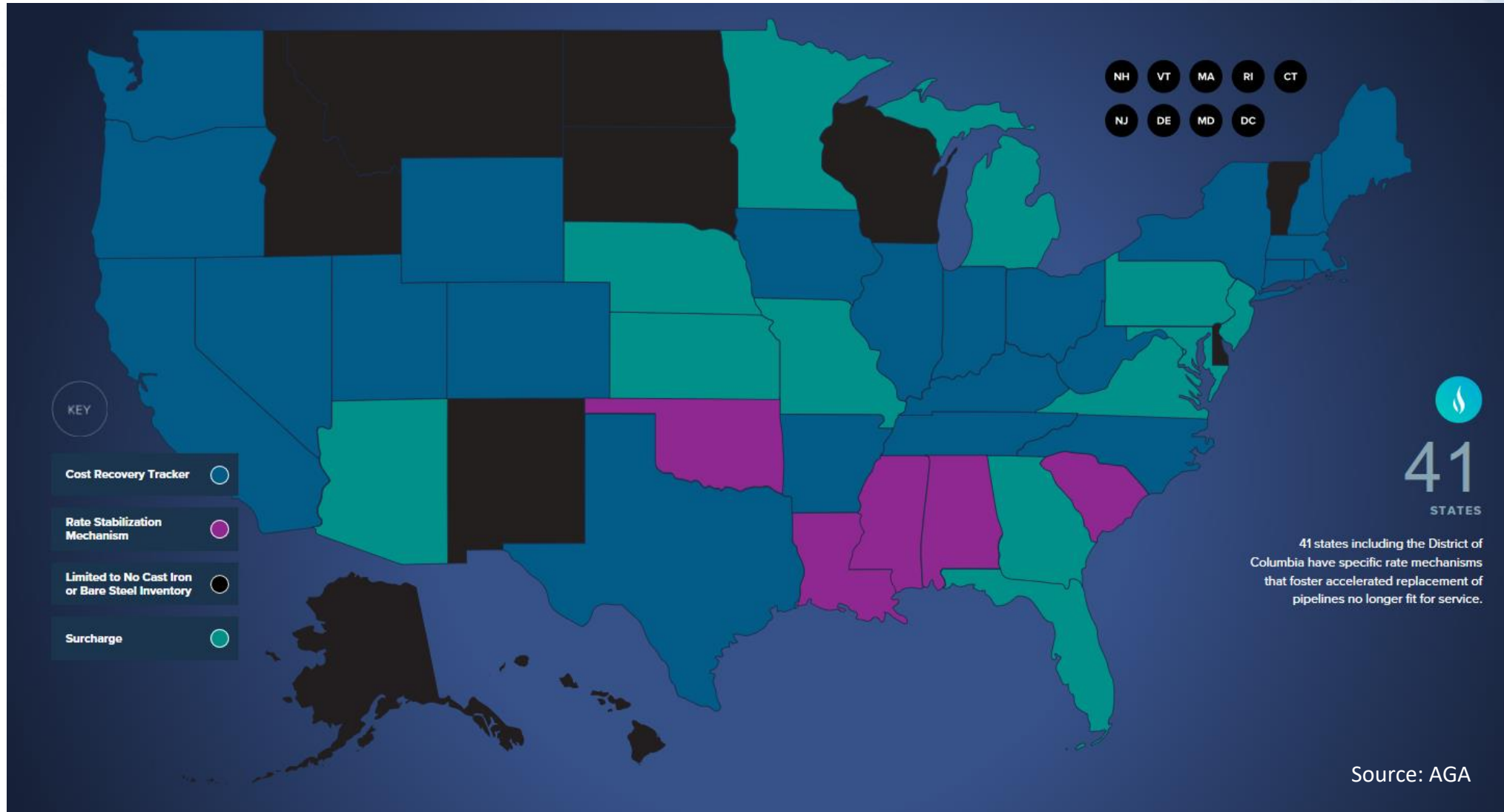


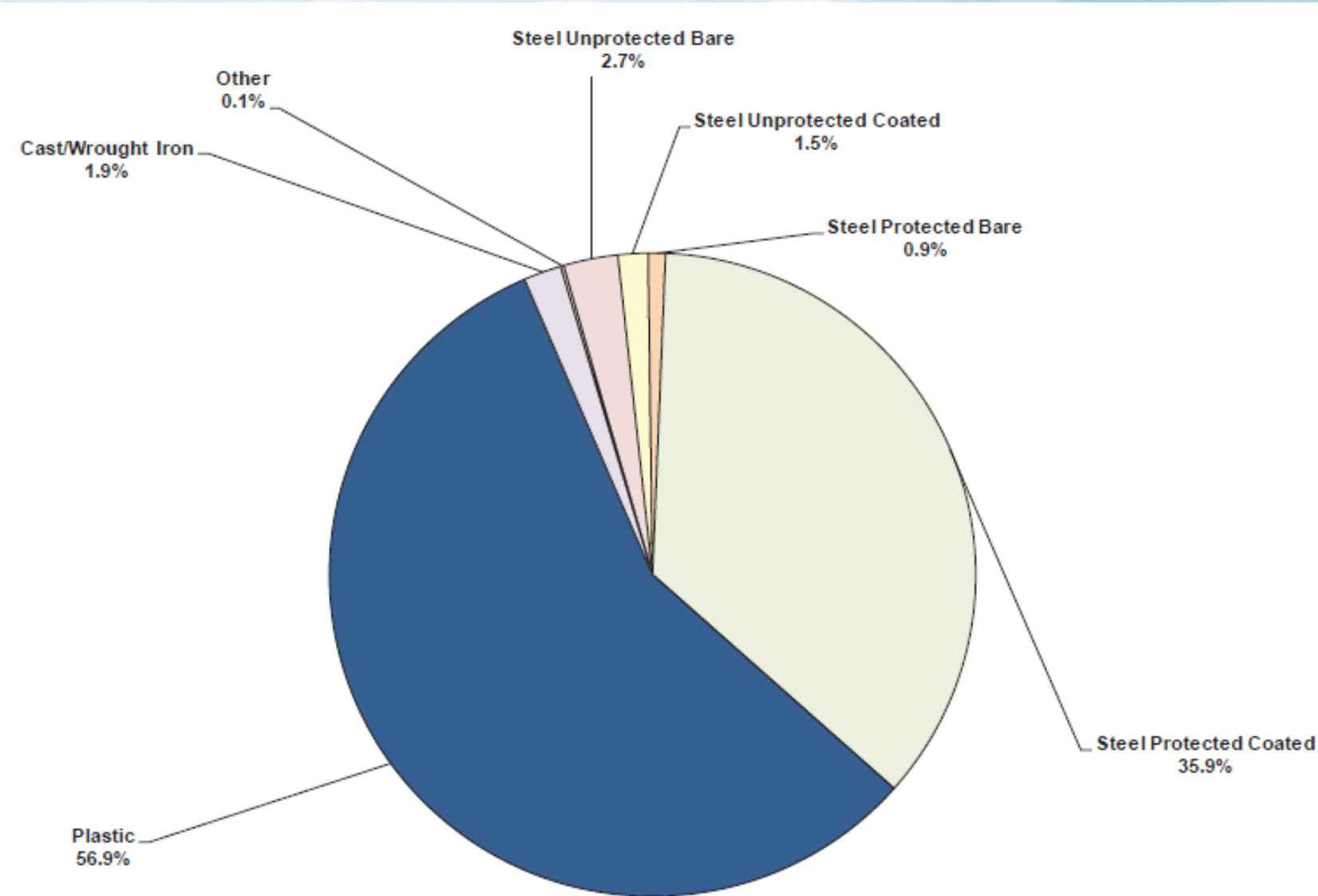
43% increase in natural gas mains and service distance – enabling more consumers to benefit from using natural gas.



38% increase in number of residential natural gas consumers and over 25% decline in gas use per home due to more efficient equipment & more building insulation.

Vintage pipe replacement programs take time. An increasing number of states are enabling cost recovery approaches that help accelerate modernization.





Distribution Mains

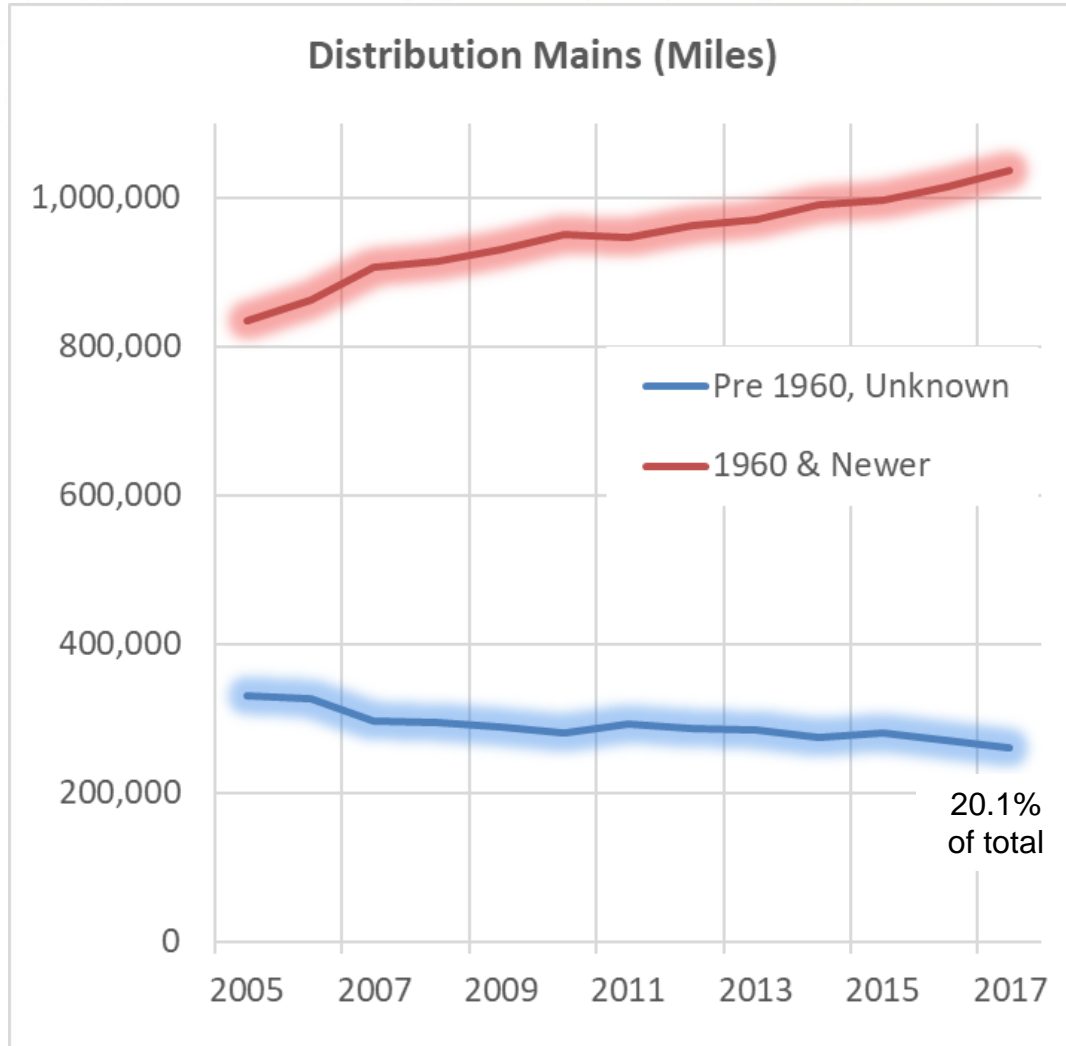
Numerous utilities undertaking accelerated asset replacements to modernize gas infrastructure.

Significant progress replacing older infrastructure such as cast iron and unprotected bare steel.

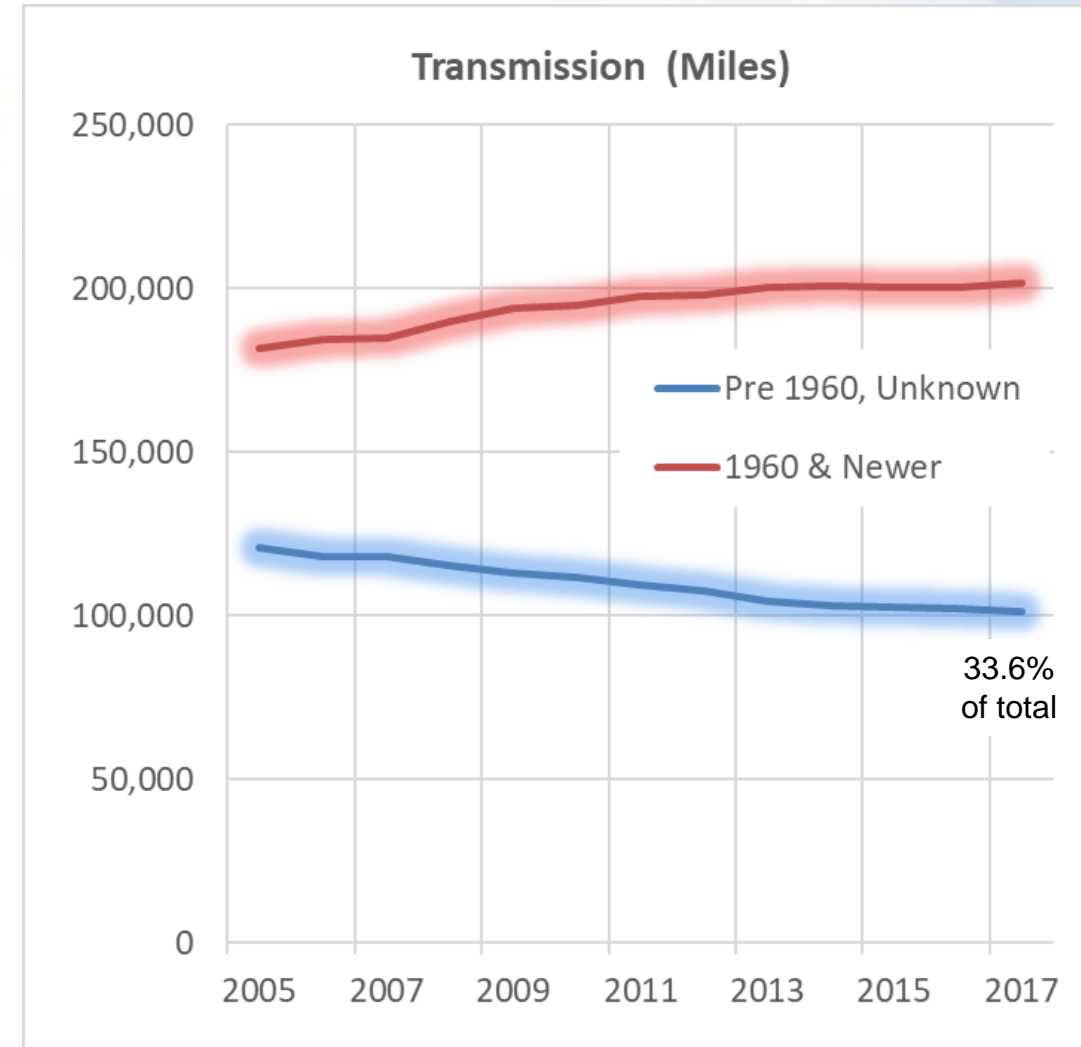
Over 95% is plastic pipe or protected/coated steel.

Source: AGA

Major Overhaul Underway To Reduce Vintage Distribution Mains & Transmission Use (2.5X Greater Capital Spending Since 2005)



Decrease of 21.4% since 2005.

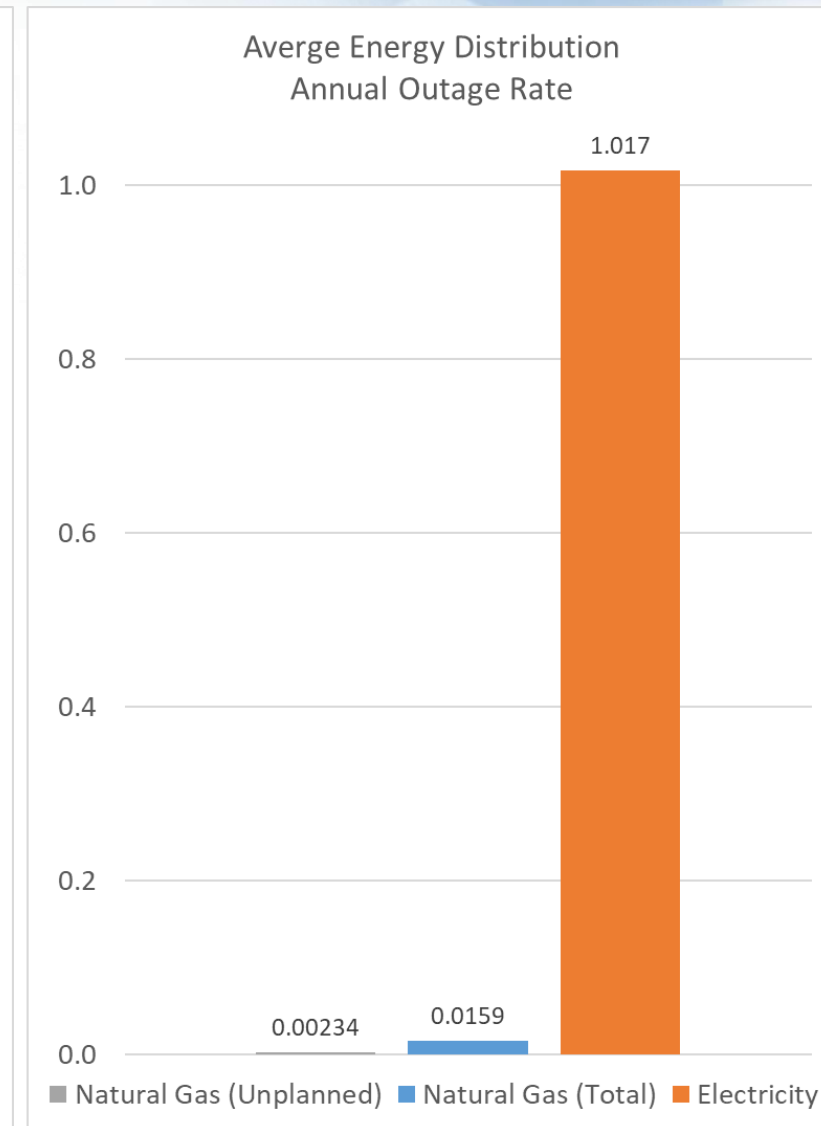
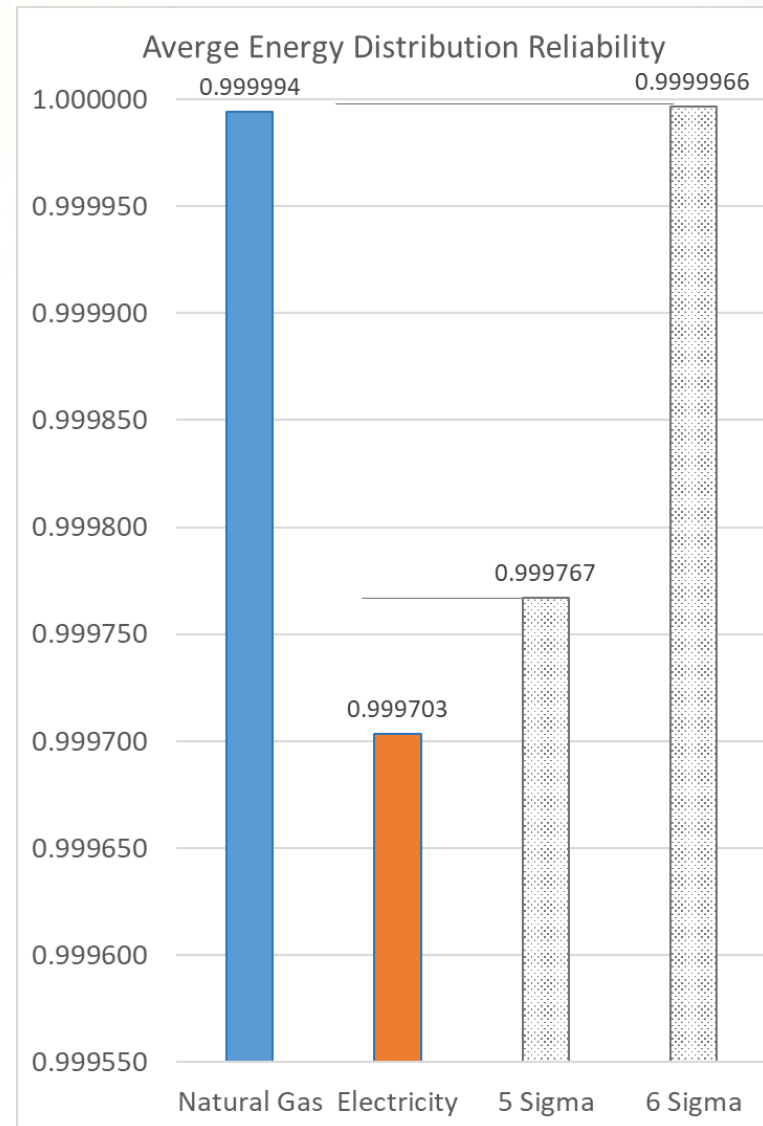


Decrease of 16.3% since 2005.

Energy Distribution Service Reliability

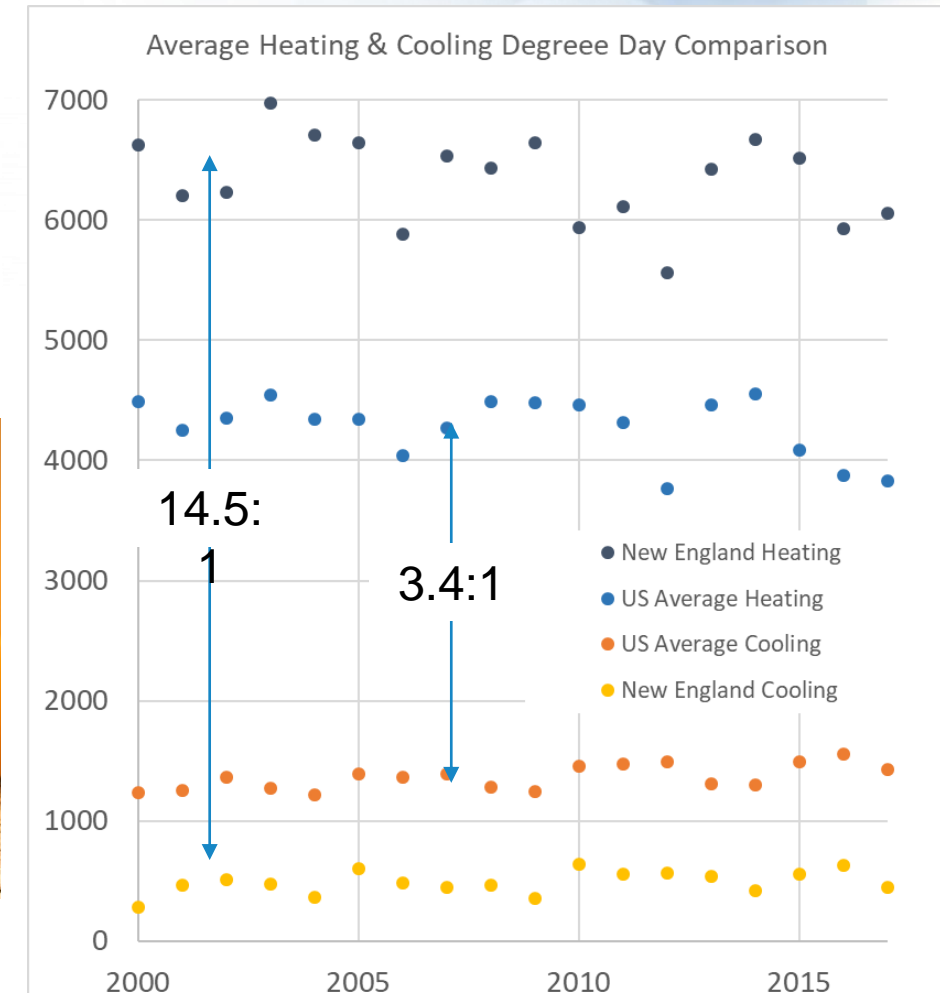
Summary of Survey Results

- Natural gas distribution achieves “**six sigma**” **reliability** levels and low outage rates
 - Mostly planned outages
- Electric distribution approaches “five sigma” reliability with higher annual outage rates
 - Mainly unplanned outages



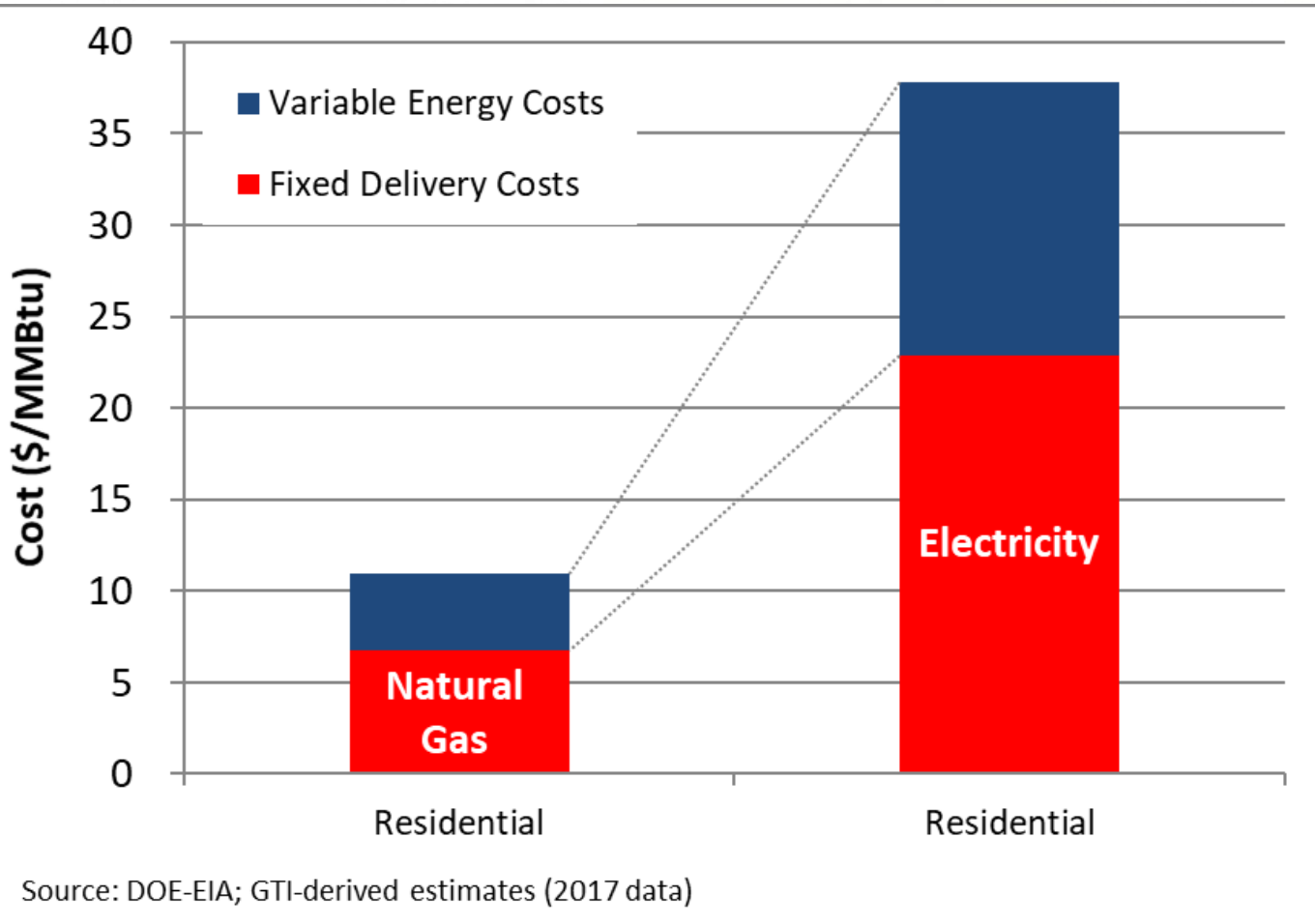
Space Heating On A Cold Day Requires Much More Energy Than Space Cooling On A Hot Day

Winter Heating from 0°F to 70°F ...is like... Summer Cooling from 125-145°F to 75°F



Home heating requirements substantially greater than cooling.

Electric and Natural Gas Energy Systems Are Capital Intensive

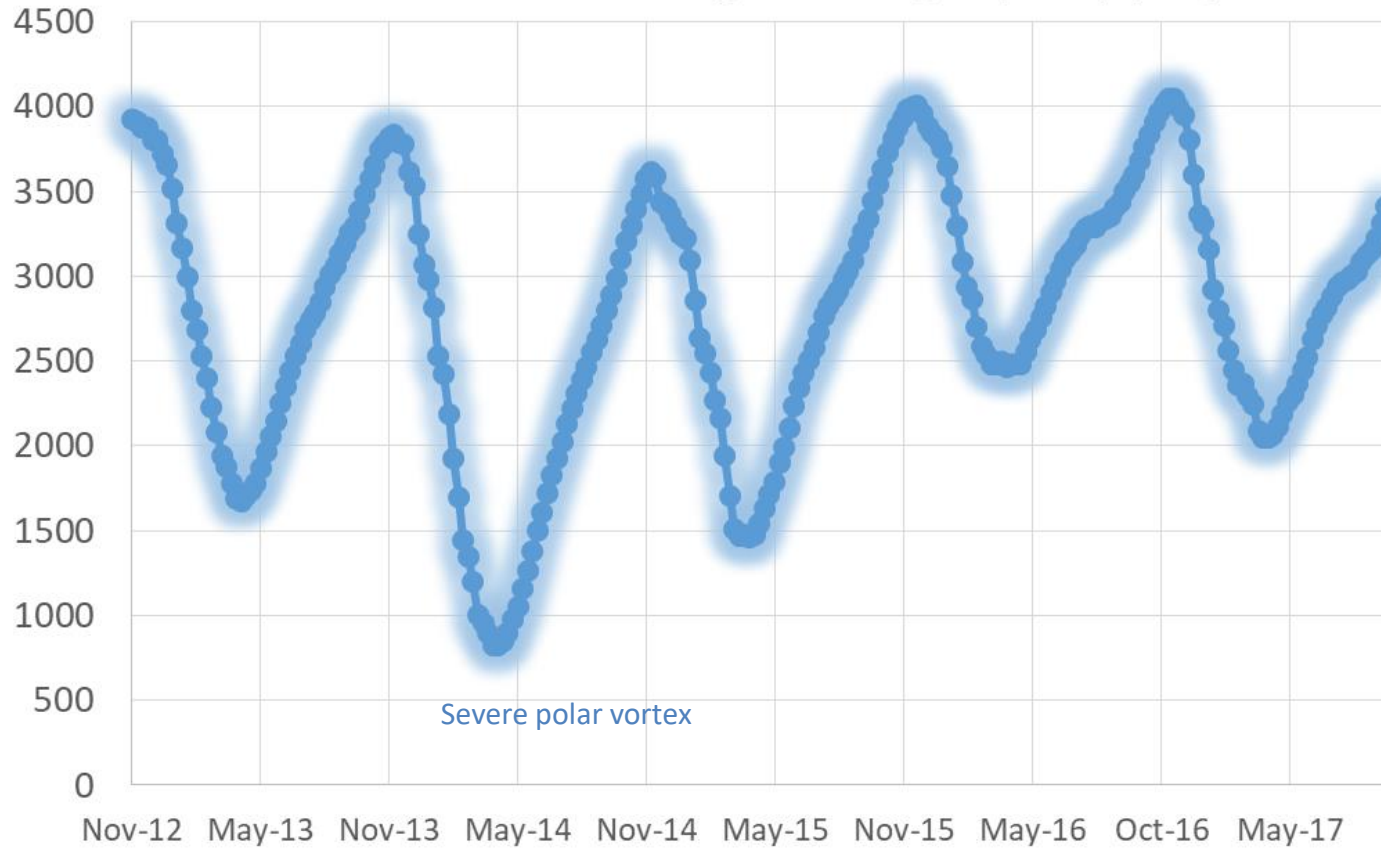


Tremendous investments for storing and delivering energy to consumers. More than half of energy prices are tied to the infrastructure.

Natural gas is a least-cost energy choice for consumers – 3.5 times lower than average electricity prices for homeowners. Gas fixed costs are 3.4 times lower than electricity per unit of site energy delivered.

Energy Storage In Context

Natural Gas Storage Working Capacity (Bcf)



Natural gas is the leader in cost-effective energy storage – equal to about 410 GW (at least 17 times larger than current electricity storage).

At an estimated cost to residential consumers of \$1.22/MMBtu (equal to \$0.004/kWh) – based on \$3.1 billion annual cost basis.*

In terms of stored energy, equals about 85 billion Tesla PowerWalls.

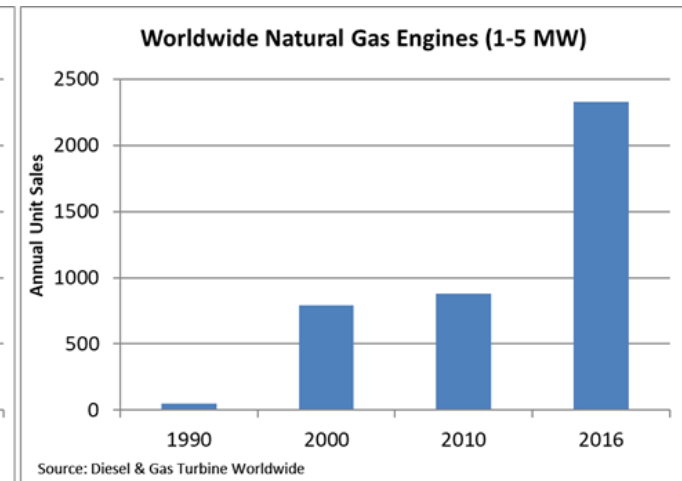
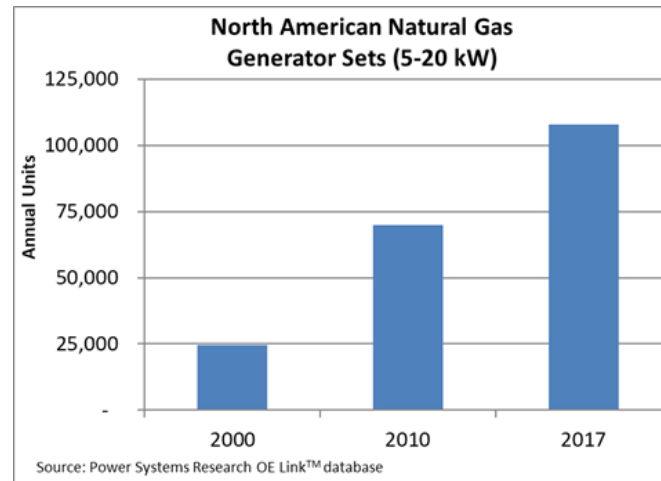
* See API Report "Benefits and Opportunities of Natural Gas Use, Transportation, and Production," (June 2017), p. 44.

Critical Infrastructure: Growing number of homes and businesses relying on the natural gas pipeline network and onsite natural gas generators to ensure their power reliability



H-E-B to install natural gas 'microgrid' as backup generators at 45 stores in Houston

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Natural Gas Generators: Grocery Store Case Study

HEB Grocery – Houston Metro Region, TX

- Onsite natural gas emergency generators provide standby power for multiple HEB grocery stores in the greater Houston area
- Provided reliable, standalone microgrid power during Hurricane Harvey
- Used for Demand Response program in ERCOT grid region to help address peak load issues
 - Alleviates strain on the electric grid and need for T&D investment
 - About 400-600 hours per year
- Expanding to additional stores



Natural Gas Generators: Hospital Case Study

MVP Healthcare - Rochester, NY

- Multiple onsite natural gas emergency generators provide 1,100 kW of onsite power
- Units ensure onsite power, particularly for sensitive health care records and other critical data center information
- Modular approach allows intrinsic redundancy to ensure high reliability
- See benefits of using natural gas due to metro area space limitations and ability for longer run times

http://www.generac.com/Industrial/GeneracIndustrialPower/media/library/Downloads/Case%20Studies/Generac-Industrial-Power_Case-Study_MVP-Health-Care.pdf?ext=.pdf



Natural Gas Generators: CHP Case Study

MIT – Cambridge, MA

- MIT has operated a 21 MW natural gas CHP system since 1995 and undertaking an expansion to double the plant size by 2020
- Meets majority of campus electricity needs while also efficiently supplying heat and cooling for buildings
- 7.6% of U.S. power comes from efficient CHP plants at industrial, institutional, and commercial sites
 - 70% of U.S. CHP plants use natural gas to meet their building power & energy needs



A number of states have adopted program approaches that allow extension of gas services to new communities.

