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Got Growth? Defining US Gas Utility Growth in an Era of Efficiency and Natural Gas Resource Abundance

Introduction

Natural gas consumption in the United States is growing. In fact, there are many ways to define and recognize local gas utility core market growth as part of this national phenomenon. Clear and well defined data show that natural gas customer counts and other measures have grown significantly over recent decades.

- More homes and businesses use natural gas today than ever before and the numbers continue to increase.
- Infrastructure has also expanded as gas utilities have grown the geographic footprint of natural gas service.
- Dollar contributions to innovative energy efficiency programs have increased, consistently, and now support about \$1.1 billion in annual investments for commercial building and home applications.
- Companies and regulators are recognizing the growth potential for natural gas as a greenhouse gas emissions reduction tool.
- Local gas utilities also support conversions from heating oil, propane and electricity, which may lower consumer costs, while reducing energy consumption and emissions.

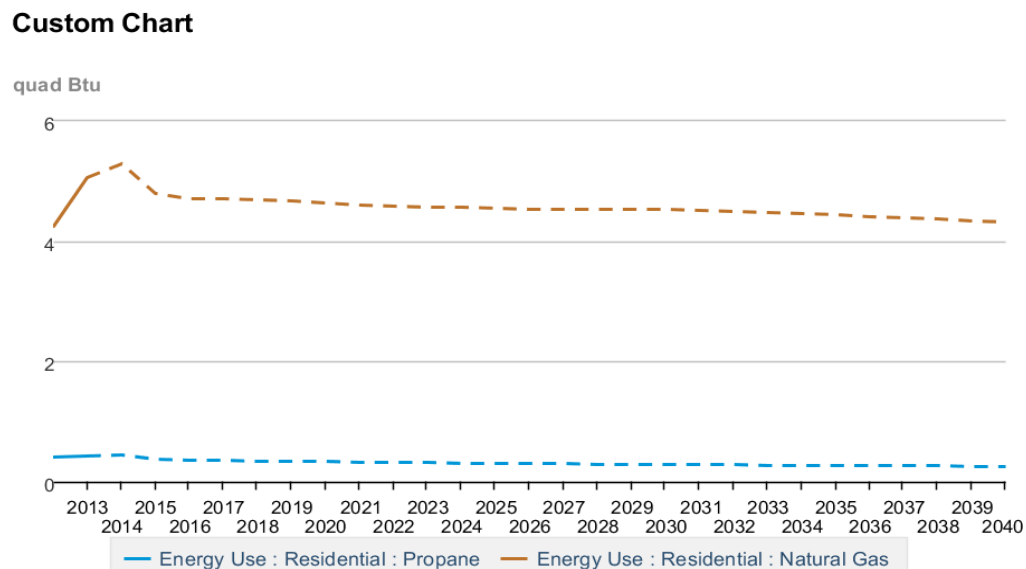
Natural gas demand is growing rapidly in other sectors as well. Volumes for gas-fired power generation have surged in recent years and the large-volume industrial sector has increased consumption, also – all supported by an enormous natural gas resource endowment, production efficiencies and growing infrastructure. Many analysts believe that additions to US gas demand for the next 25 years may continue to come primarily from these sectors, as well as the natural gas export market.

With that said, much of this new natural gas demand may bypass local gas utilities. A fair question emerges from this reality – are natural gas utilities growing, and if they are, will they continue to do so? What of core local gas customers (primarily residential and small commercial natural gas users) and what metrics are appropriate for discerning both past and future growth potential in smaller-volume gas applications?

Many energy market analysts expect that volumes delivered to residential customers, in particular, are likely to remain flat or decline in aggregate over the long-term, even with customer growth in these sectors. For example, the Energy Information Administration’s Annual Energy Outlook for 2015 projects a decades-long slow decline in residential natural gas consumption (see Figure Intro-1 representing projected natural gas and propane consumption). Space and water heating, cooking and other applications fired by natural gas will continue to be an efficient, cost-effective energy application, but are unlikely to result in large volumes of aggregate additional demand over time due to efficiency gains. Does this mean that gas use in homes and businesses will be without noticeable market dynamics—not growth oriented? Actually, nothing could be further from the truth.

A singular focus on demand volumes misses the less obvious metrics of growth in the local gas utility core market. This paper details eight dynamic growth elements demonstrated by local gas utilities during the past several decades by presenting a cadre of *Growth Facts*. And that, in fact, the residential and small commercial sectors provide opportunities to deliver reliable, affordable energy to customers nationwide while realizing significant growth potential.

Figure Intro-1
Residential Natural Gas-Propane Demand 2015-2040



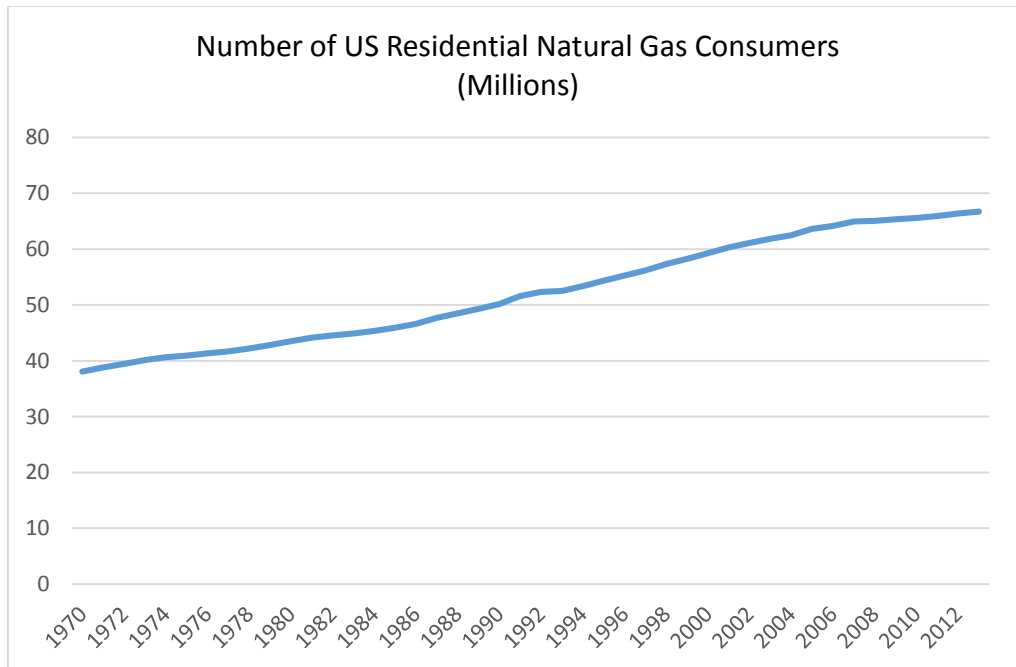
eia Source: U.S. Energy Information Administration

Growth Fact #1

The number of homes and businesses using natural gas have grown steadily for decades.

New construction and conversions of other home heating fuels to natural gas have resulted in steady growth in natural gas customers for decades.

Figure 1



Source: Energy Information Administration.

Small-volume customer growth has been substantial during the past 40 years, growing from less than 40 million residential gas customers in 1970 to more than 66 million in 2013, according to data from the Department of Energy (DOE) and the American Gas Association's (AGA) *Gas Facts*. Customer growth has come from new construction of single and multi-family households and conversions of existing home heating systems to natural gas.

Table 1 offers a sense of the pace of home heating fuel conversions (just one source of customer growth) over the past decade from a survey of residential home heating preferences conducted by AGA annually. Although only a sample, it indicates a range of 34,000 to 68,000 home heating conversions annually to natural gas from 2004 to 2013, representing 12 to more than 50 percent of customer growth for a given year, according to AGA's *Residential Natural Gas Market Survey*.

Table 1

Conversions of Existing Homes to Natural Gas Heat										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Survey Sample of Conversions to Natural Gas 1/	49,704	48,166	29,905	34,475	47,728	47,843	39,562	35,245	42,535	68,135
As of % of New Customers 2/	17%	12%	41%	18%	14%	35%	40%	40%	43%	55%
1/ AGA Residential Natural Gas Market Survey, various years.										
2/ Reported conversions from AGA survey as a percent of total new customers.										

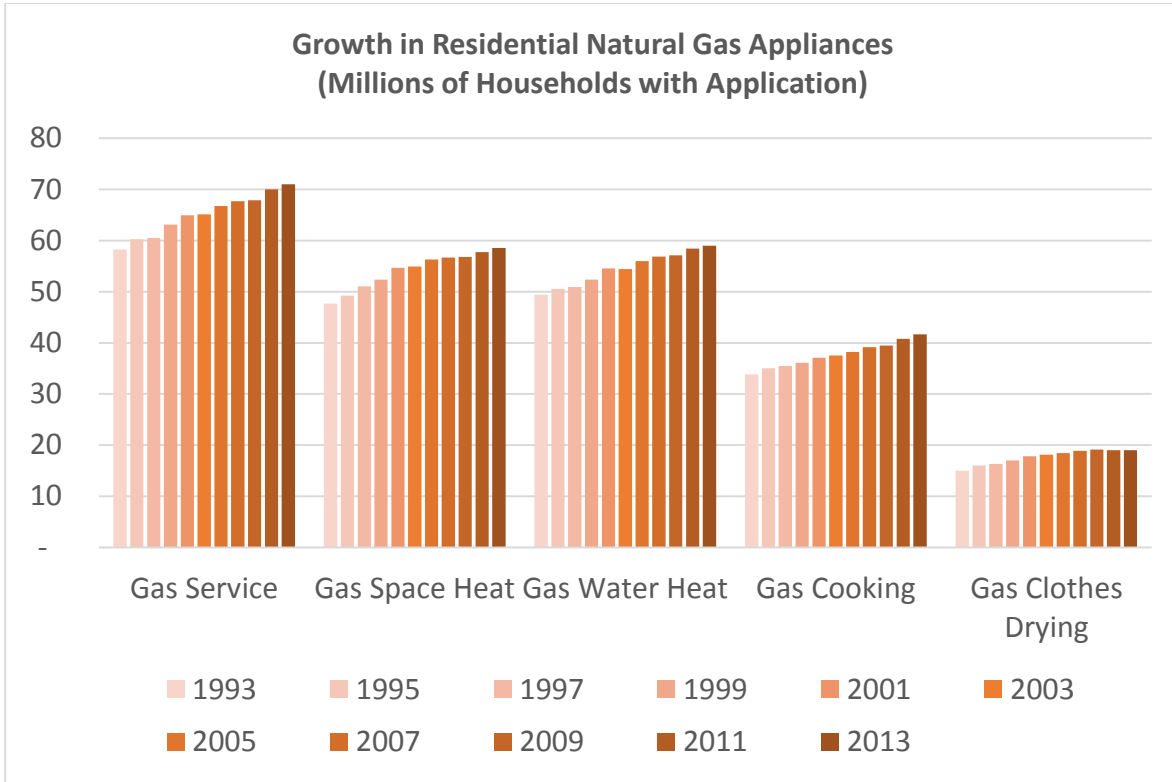
Growth Fact #2

Along with growth in natural gas customers has come growth in burner tips and natural gas appliances in individual homes.

The number of residential gas customers grew by nearly 13 million during the past two decades, representing over 32 million gas fired appliances, based on the U.S. Census Bureau reports.

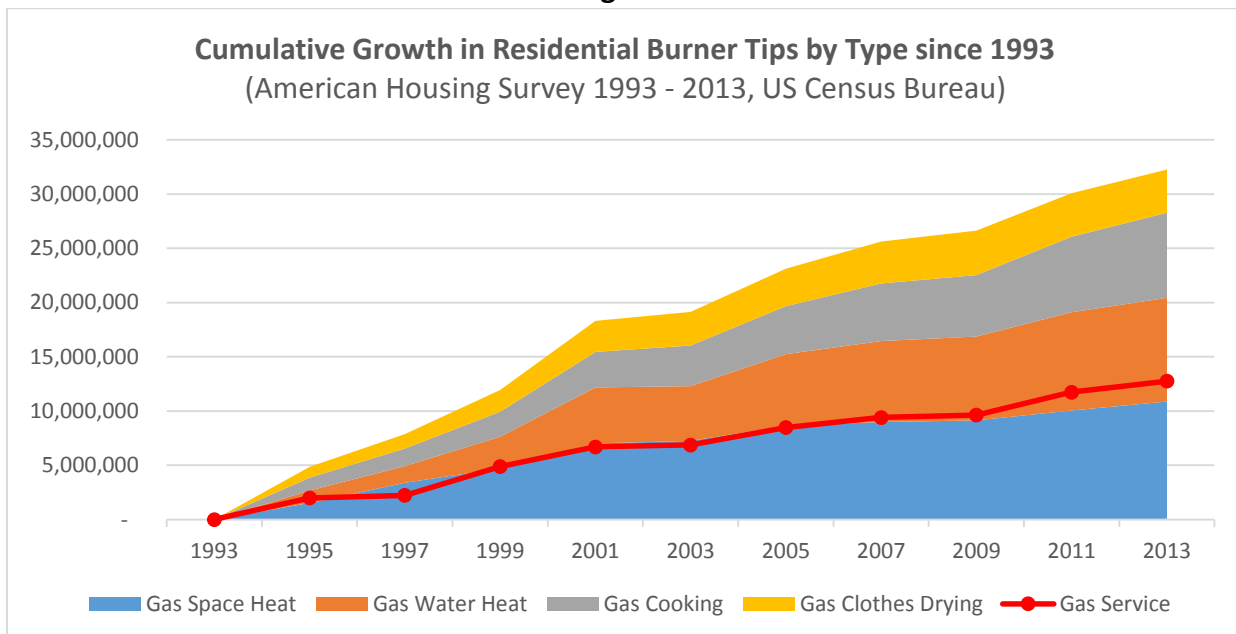
- The number of homes that receive natural gas service—which includes the use of one or more applications for space heating, water heating, cooking, and clothes drying—has grown 22 percent from 1993 to 2013 or about 1 percent per year.
- Homes that begin new gas service are likely to adopt more than one natural gas application. On average, the number of homes with natural gas service increased by more than 600,000 per year. However, when looking at application type, 1.4 million homes added a natural gas application every year. This represents more than two times the rate of new service growth indicating that multiple burner tips within homes is typical.
- In many cases, the past two decades of growth (Figure 2) have featured additional natural gas space heating with an additional 10.9 million homes reporting natural gas space heating applications and 9.6 million more homes with water heaters. One third of new additions were for cooking and clothes drying given 7.86 million homes with natural gas cooking were added and nearly 4 million homes adding natural gas clothes dryers.

Figure 2



- A continued trend in customer growth could translate to over 15 million more customers and 33 million more gas fired appliances in use by 2040, meaning the utilization of gas appliances may exceed 210 million within 25 years.

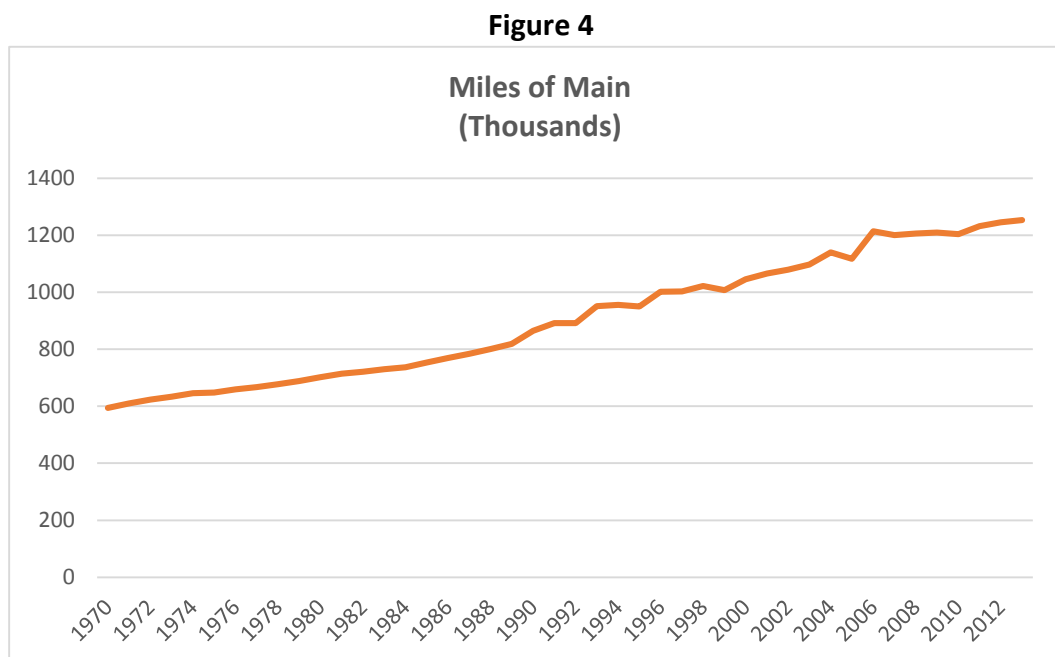
Figure 3



Growth Fact #3

Residential customer growth has required additions to distribution pipeline infrastructure in order to ensure reliable service.

Delivering natural gas to any customer class is an exercise of planning, constructing and maintaining pipeline infrastructure, which is the conduit for serving customers safely and reliably. In short, miles of distribution main have doubled from about 600,000 to over 1.2 million during the past four decades.

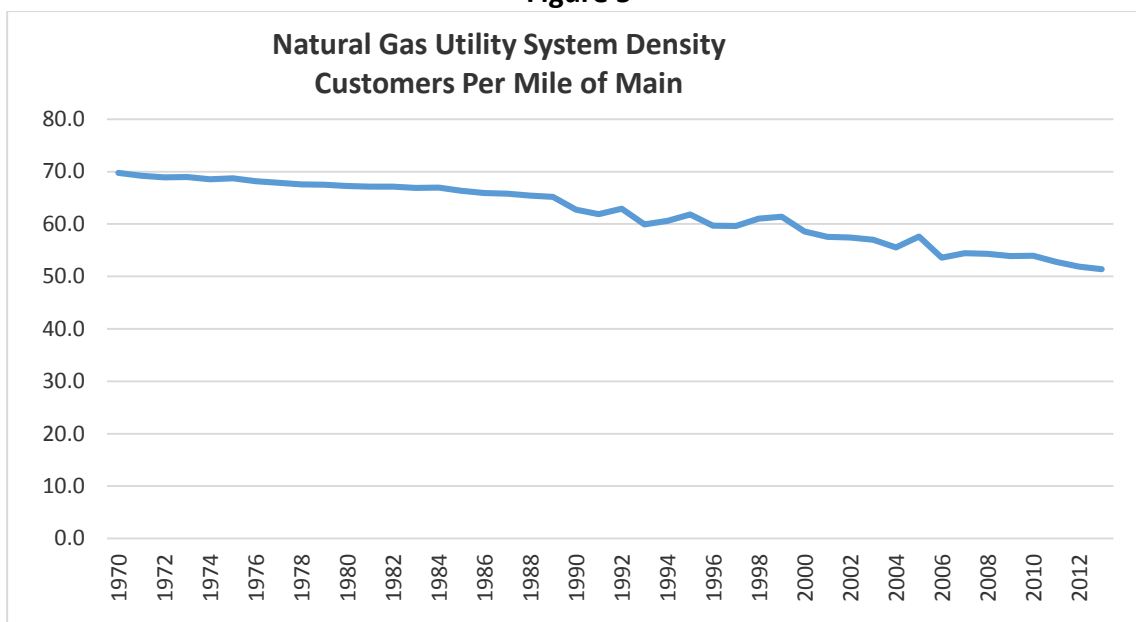


Source: AGA, *Gas Facts*, 2013 Data.

Another way to understand the pipeline infrastructure growth of local gas utility systems is to examine system density, as measured by the number of natural gas customers served per mile of main (Figure 5).

- The ratio of natural gas customers per mile of main has declined about 25% since 1970, from roughly 70 to just over 50 in 2013 (Figure 5).
- This suggests that on average connecting a customer to the natural gas system requires a longer length of main today than in the past, which may put upward pressure on relative construction costs.
- However, on a per-customer basis it also indicates that gas utilities may be expanding their geographic footprint to more rural areas, thus bringing natural gas services to areas not served or underserved previously.
- If so, this metric also points to how important innovative rate mechanisms are to local gas utilities seeking to expand systems and reach new customers.

Figure 5



Source: AGA, *Gas Facts*, various years.

NOTE: Excludes services. System density is calculated: Total Number of Customers / Total Miles of Main.

Growth Fact #4

Utility system expansion and modernization has spurred new investment, which has grown companies' enterprise value and financial strength.

Expansion of the utility system is required to meet the needs of new customers. Replacement of fully depreciated assets to insure system integrity requires additional investments. These assets are part of the utilities' rate base. The rate base is used to determine how much a utility can earn as income from its operations. The growth of rate base is therefore a critical measure of the financial strength of natural gas utilities.

In addition, a natural gas utility's value added to the general economy reflects the enterprises' infrastructure and operations in place to serve customers. Determination of a company's rate base is unique to each local gas utility and its regulators. Revenues can be determined by factors such as weather and the cost of delivering gas to the customer, which normally includes the cost of the commodity itself and the utilization of physical assets with a fair return for the company as determined by regulators. The commodity cost of gas is passed along to customers and therefore adds to revenue, but has no contribution to profits within regulated gas utility businesses.

- According to AGA’s own estimates based on macro-economic modeling¹, the economy-wide value of the natural gas distribution industry has grown by nearly 31 percent since 1993. It was valued at nearly \$50.0 billion in 2014 – about \$11.8 billion more than twenty-one years prior.
- Expanding on the above referenced modeling exercise, gas utility value is expected to grow to \$71.7 billion in the United States by 2040 with total sales growing to over \$147 billion, assuming low volatility in gas prices.
- The two-year average cost of an individual household natural gas bill has dropped about \$250 from 2007 through 2014. This marks a 17 percent reduction in costs to consumers and corresponds to a 20.9 percent drop in the cost of gas. System costs also dropped by 11 percent, but due to lower gas acquisition prices grew as a percentage of total bills.
- Based on a recent AGA survey, individual company rate bases are expected to grow by 7.5 percent a year in the near-term, which compares favorably to the prior five year average of 5.1 percent.

Digging a little more deeply into an explanation of the modeled results above, on a national scale, total gas utility value can be estimated as a share of total sales using data taken from the Bureau of Labor and Statistics’ (BLS) historical inter-industry relationship database. In 1993 the natural gas industry’s total output was nearly \$101 billion (2014\$) in total sales (see Figure 6). The BLS source estimates that the total value added of the regulated rate base was over \$38 billion (2014\$) or 38 percent of total sales. In 2014, total sales were actually lower by about \$4 billion (\$96 billion). This is the result of the lower commodity cost of gas since 2013. However, while gas prices may have been lower, the gas utility value base grew to nearly \$50 billion or \$11.8 billion more than in 1993. This represents a growth of 31% since 1993 or an annual growth rate of 1.28 percent per year.

Modeling internally using a regional macro-economic model and key additional inputs, a forecast of industry output can be generated to estimate future growth. The programming links public information from sources like the BLS, US Census, and Commerce Department to estimate future changes to the national economy and to estimate the impact of specific policies. The model estimates that through 2040 total sales to grow to almost \$148 billion or nearly a 50 percent increase from 2014. The rate base is expected to continue to represent a near 52 percent share of sales or \$71.7 billion in 2014 (Figure 7). One of the principal factors for steady growth is the expectation of relatively stable cost of gas over the coming decades.

¹ AGA uses a nationally recognized macro-economic regional model that uses publicly available data released by the U.S. Federal Government and other sources to build estimates of the economic impacts of investment in the local gas utility sector and broader elements of the national economy.

Figure 6

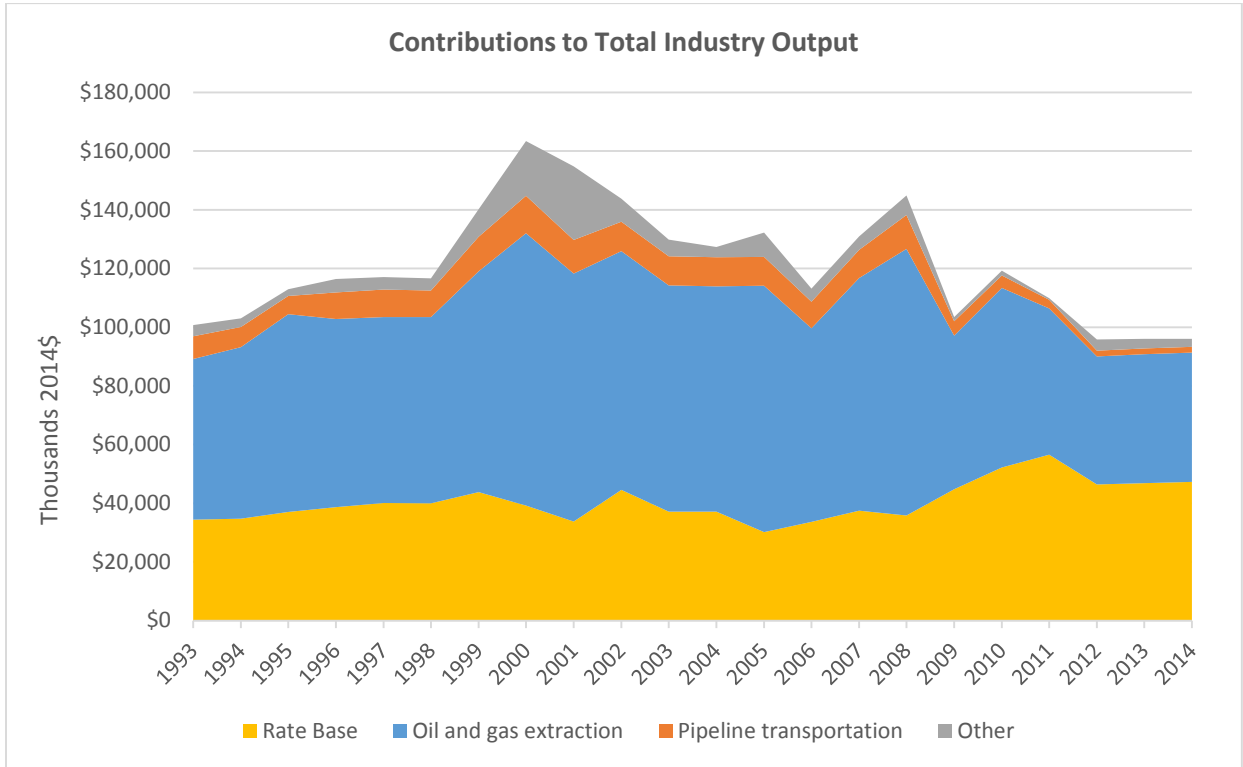
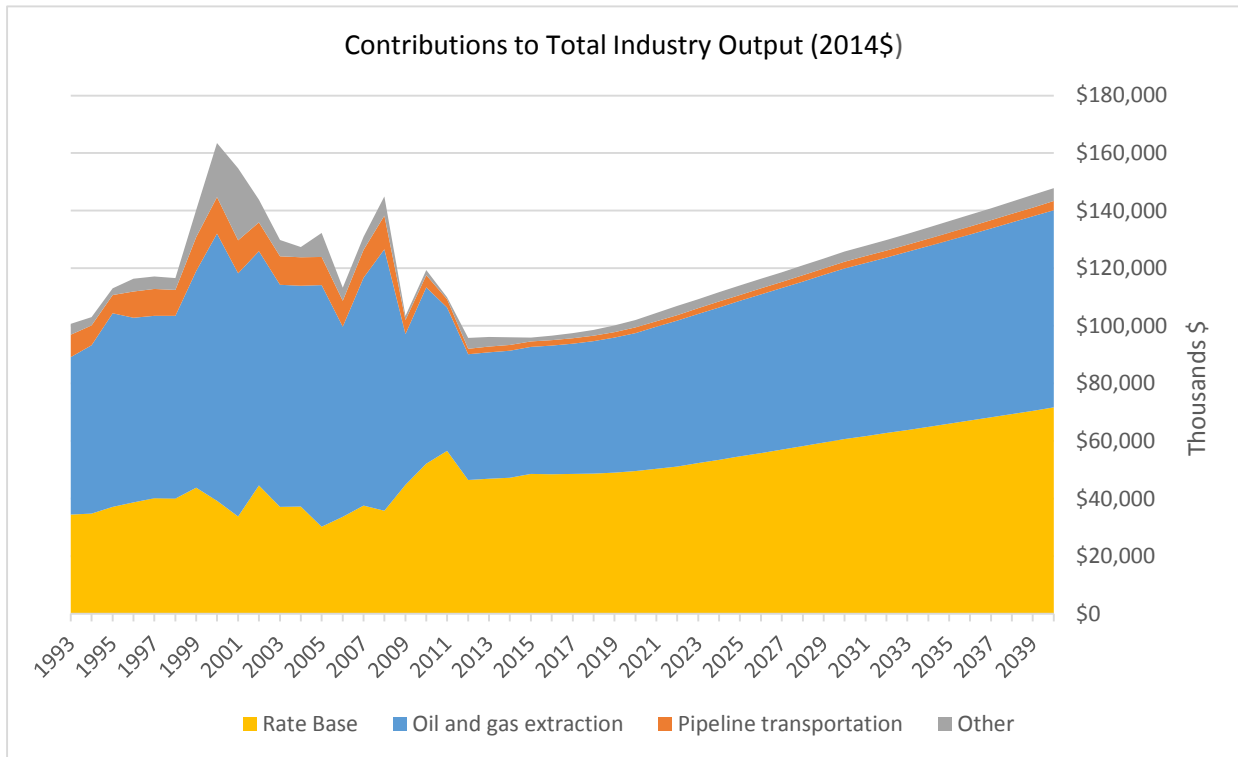


Figure 7



In a recent AGA survey, information was collected from member companies on individual growth rates for local gas utilities. Companies provided information on growth in value both the last five years as well as expectations for the next five years of operation. On average LDC's expect to grow about 7.47% annually with some utilizes reporting growth rates as low as 1.00% or as high as 17.50%. This is a significant change compared to the previous five year growth rate estimate of 5.12% annually.

Growth Fact #5

States are increasingly adopting innovative regulatory mechanisms to align utility incentives with policy goals of improving energy usage, providing access to natural gas, and reducing emissions.

In recent years, many state public utility commissions have authorized a range of alternative rate mechanisms in order achieve various policy objectives. These mechanisms help to reduce the frequency of rate cases, aid in facilitating new investments, and decrease regulatory lag, all of which avoid large increases in customer bills and protect consumers from “rate shock.”

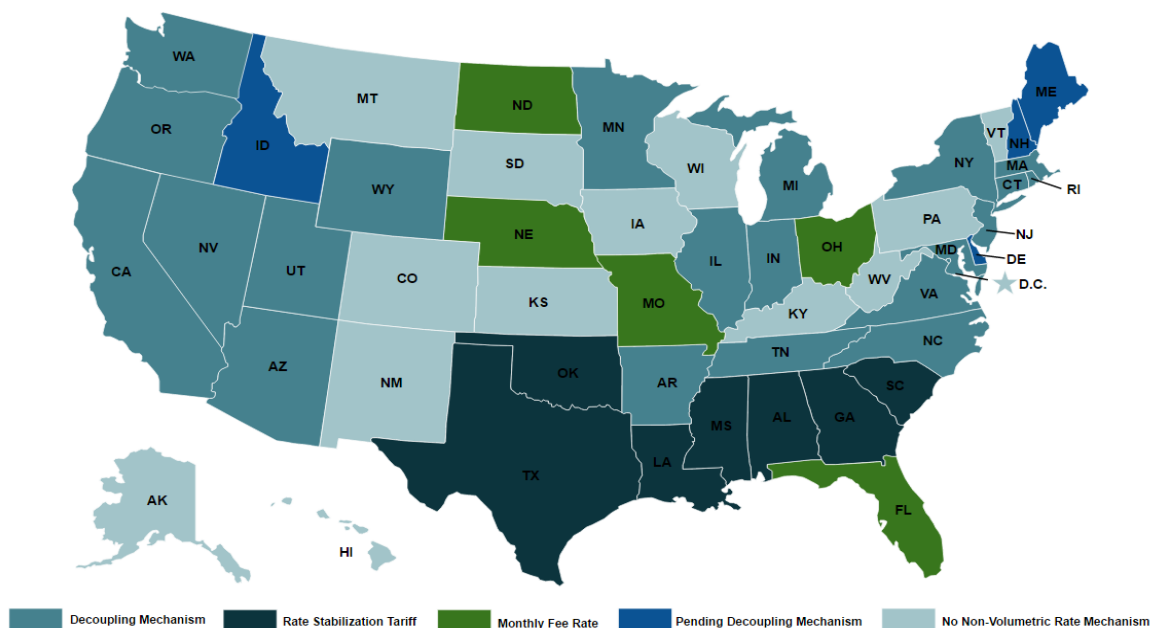
Three major reasons help explain the growing deployment of alternative ratemaking techniques.

- (1) Rate of return ratemaking—frequently referred to as *traditional ratemaking*—often inadequately aligns with new policy and regulatory objectives. A range of policy goals have emerged in recent years that would have a direct effect on natural gas utility operations. Accelerating infrastructure replacement, enhancing energy efficiency programs, and expanding access to natural gas service have, in many states, been driven by policy objectives. However, such objectives can cause utilities to incur vast expenditures between regulator rate cases if they are not aligned with the regulations that govern utility operations and financial accounting. Therefore, many policy goals may be best achieved through an alternative ratemaking paradigm.
- (2) Declining sales growth has also contributed to the rise in alternative ratemaking. As gas utilities continue to increase the efficient delivery of natural gas and offer programs that aid customer efficiency and conservation efforts, traditional ratemaking can make it difficult for utilities to advance these objectives and recover their fixed costs. This policy dilemma arises because the traditional ratemaking model links utility revenues with natural gas sales, which can lead to a number of undesirable regulatory and financial issues should natural gas sales decline.
- (3) An increase in capital expenditures – some of which are non-revenue producing, such as pipeline replacements – present a third explanation for the growth in alternative rate mechanisms. Under traditional ratemaking, forcing utilities to defer the recovery of these costs until the completion of a future rate case can lead to cash-flow problems, regulatory lag, and ultimately, “rate shock.”

Non-volumetric rate design facts

- Revenue decoupling: A rate adjustment mechanism that separates (decouples) a gas utility's fixed cost recovery from the amount of gas it delivers, which is employed by utilities in 20 states;
- Flat monthly fee or straight fixed variable rates: This recovery mechanism shifts much, if not all, the costs to the per customer charge and is not influenced by variances in throughput – used in about ten states; and
- Rate stabilization tariffs: Seven states allow use of this mechanism, the public utility commission periodically reviews the utility's expected return on equity (ROE), compares it to the regulator-authorized rate of return, and adjusts rates, as needed, to maintain the ROE within the authorized range.

Map 1
States with Non-Volumetric Rate Designs



Accelerated cost recovery facts

- Pipeline replacement – Utilities in 40 states are allowed to track and rate-base these investments without a full rate case.
- Bad debt – In 21 states, utilities can track and recover consumer's bad debt.
- Pension costs – 14 states allow utilities to expense pension costs as they occur.

Growth Fact #6

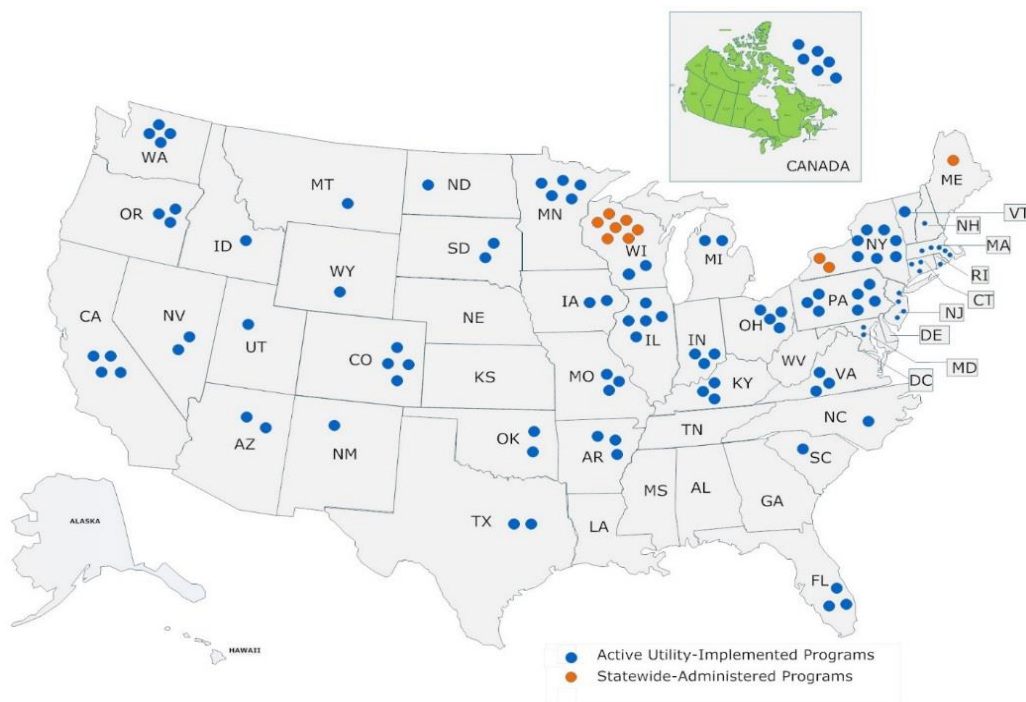
Natural gas utilities have steadily invested more dollars in energy efficiency for homes and businesses, which has contributed to decreased usage per customer, growth in energy savings, and increased cost savings for customers.

Growth in Rate-Payer Funded Natural Gas Efficiency Programs and Compatible Regulatory Policies

Whether looking at dollars spent, the number and variety of programs, customer participation levels, or impacts, such as energy savings and emissions reduction, it is evident that natural gas efficiency programs have grown significantly during the past decade. In fact, the natural gas industry has been a national leader in energy efficiency. Today, the average American home uses 40 percent less natural gas than it did 40 years ago. The reduction in per-capita natural gas use has resulted from tighter building envelopes, increased appliance efficiency and changes in consumer behavior driven by utility sponsored efficiency programs.

For natural gas utilities, investing in energy efficiency programs present an opportunity to moderate consumer costs, reduce energy usage and greenhouse gas emissions, and enhance energy security. Many have long-performing rate-payer funded energy efficiency programs, which are innovative and successful, and they continue to work with their state regulators to accelerate progress toward realizing a clean energy future while building sustainable value for utilities and their customers.

Map 2
Ratepayer-Funded Natural Gas Efficiency Programs in 2013
112 Active in 39 States & 6 in Canada



Source: AGA Natural Gas Efficiency programs Survey.

The number of states with innovative rate mechanisms that align utility incentives with helping customers reduce energy usage has steadily increased. Revenue decoupling, as discussed earlier, has strongly contributed to the growth of efficiency programs. In fact, natural gas efficiency programs are found in all states that allow the utility to segregate margin recovery from its natural gas throughput or delivered volumes.

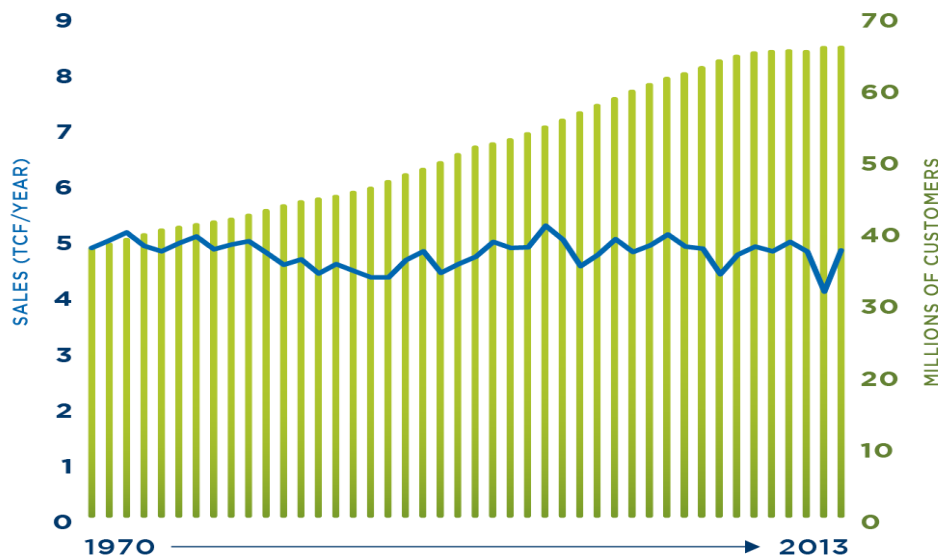
Regulators increasingly allow natural gas utilities to recover all costs associated with efficiency program implementation (direct program cost and lost margins). Also a growing number of regulators allow utilities to earn a profit or provide the opportunity for a financial incentive for meeting program targets. As of 2013, 37 states permit utilities to recover natural gas efficiency program costs, 29 allow them to recoup lost margins related to program implementation, and 18 approve financial incentives to reward efficiency program implementation and performance.

Such rate strategies, which recover the costs of regulatory-approved programs, have stabilized utility financial performance and enabled local gas utilities to be advocates for energy efficiency. Furthermore, these financial incentives put energy efficiency and conservation program on a more equal footing with alternative utility investments.

Declining Use per Customer or Growth in Efficiency

One critical feature of natural gas use in buildings has been the steady and inexorable improvement in efficiency as measured by use per customer. It is impossible to understand the evolution of natural gas usage in buildings without recognizing the efficiency gains achieved during the past 40 years. Since the 1970s, natural gas usage per household has decreased even as overall demand for energy has risen. This trend is due in part to installation of tighter-fitting windows and doors, better insulation, utility sponsored energy efficiency programs, and the development of increasingly more efficient natural gas appliances.

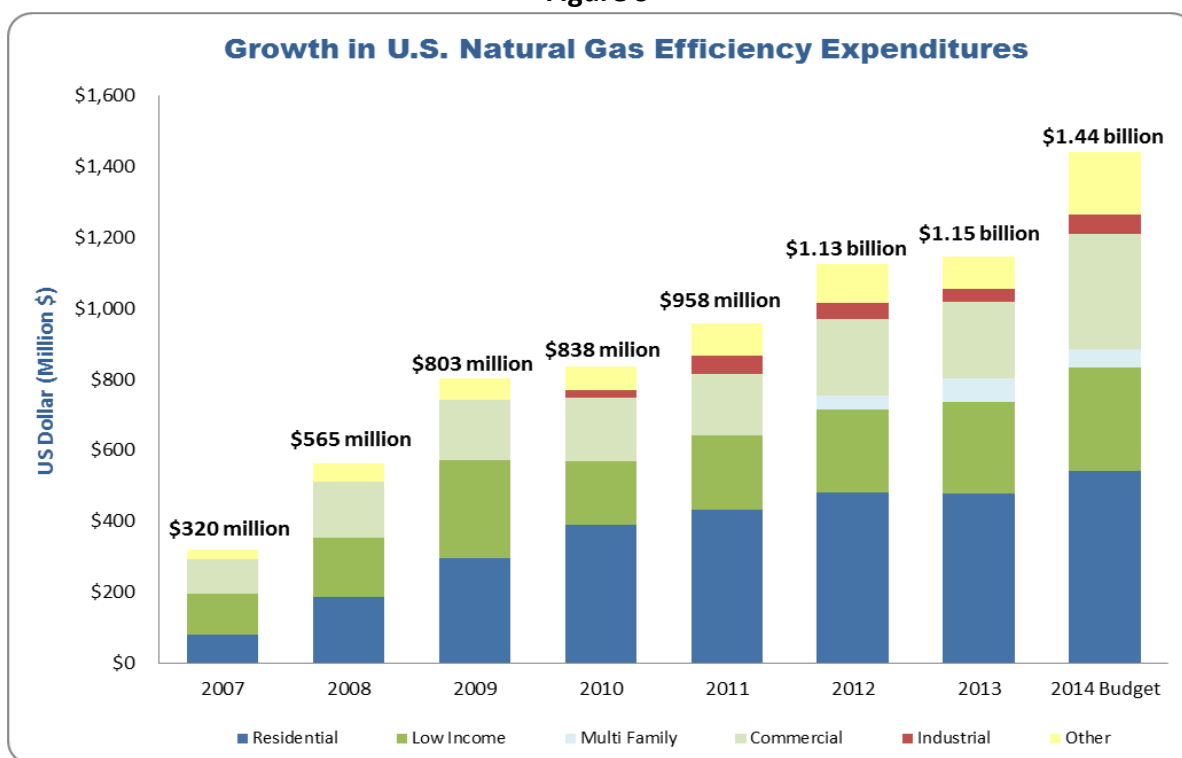
Figure 8
Declining Use per Customer



Efficiency-Directed Gas Utility Investments

Natural gas utilities have invested significant dollars in cost-effective and innovative efficiency programs, and these programs yield meaningful reductions in energy consumption. These investments include financial incentives to customers and vendors, administrative and implementation costs (such as marketing, and installation), and evaluation measurement and verification. In 2013 natural gas utilities invested \$1.15 billion in 112 natural gas efficiency programs spanning 39 states, and they budgeted more than \$1.4 billion for 2014 (projecting a 25 percent increase in spending).

Figure 9



Source: AGA Natural Gas Efficiency programs Survey – 2008 through 2014.

Efficiency Programming Impacts – Benefits to Customers and the Environment

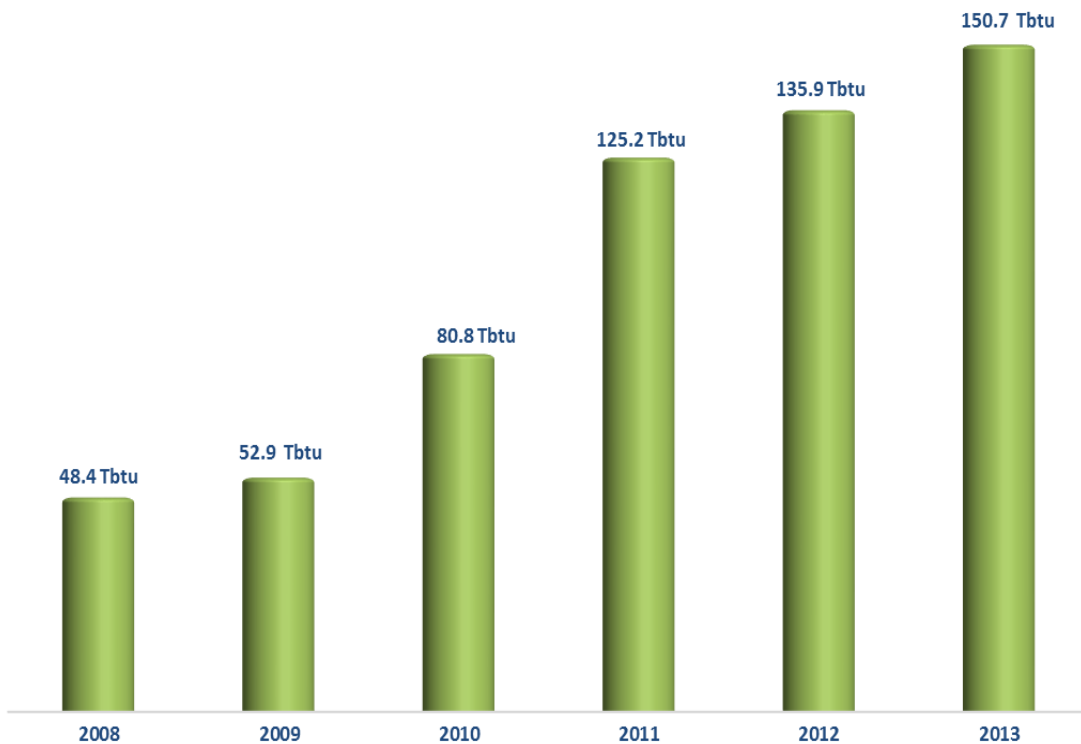
Energy efficiency investments mean more savings for customers. In fact, they helped participating residential customers save on average 18 percent of household gas usage, which translates to about \$140 in savings on annual gas bills. Low income customers particularly benefit, as nearly half of low-income families use natural gas to heat their homes, and the typical low income family spends 13 percent of its income on home energy—four times as much as other families. About seventy percent of natural gas and combination utilities provide home efficiency and weatherization programs to their low income customers at little to no cost.

Also as a result of efficiency investments, natural gas utilities helped customers save 151 billion cubic feet of natural gas (or 151 trillion Btu of energy). In other words, with daily U.S. gas production at about 72 Bcf per day (source: Bentek Energy), efficiency programs saved the equivalence of more than two days of natural gas production in 2013. These energy savings resulted in 7.9 million metric tons of avoided carbon dioxide (CO₂) emissions—on average, the equivalence of removing 1.7 million cars off the road.

These energy savings and offset emissions represent a 12 percent increase from the 136 trillion Btu of energy savings and 7.1 million metric tons of avoided CO₂ emission achieved in 2012. From 2008 to 2013, savings from natural gas efficiency programs more than doubled—from 48 trillion Btu to 151 trillion Btu of saved energy.

Figure 10

Growth in U.S. Energy Savings Resulting from Natural Gas Efficiency Programs



Source: AGA Natural Gas Efficiency programs Survey – 2008 through 2014.

Growth Fact #7

Utility financial performance has remained strong.

A number of factors have combined to make utility stocks attractive to its shareholders:

- Market induced volatility of other equity holdings, particularly in 2008 when the S&P index fell more than 35%, made utility stocks more attractive to the risk adverse investor. In support of that observation, GASFX, a stock fund comprised of members of the American Gas Association, has outperformed the S&P index in most years that the fund existed, particularly during the past ten years.

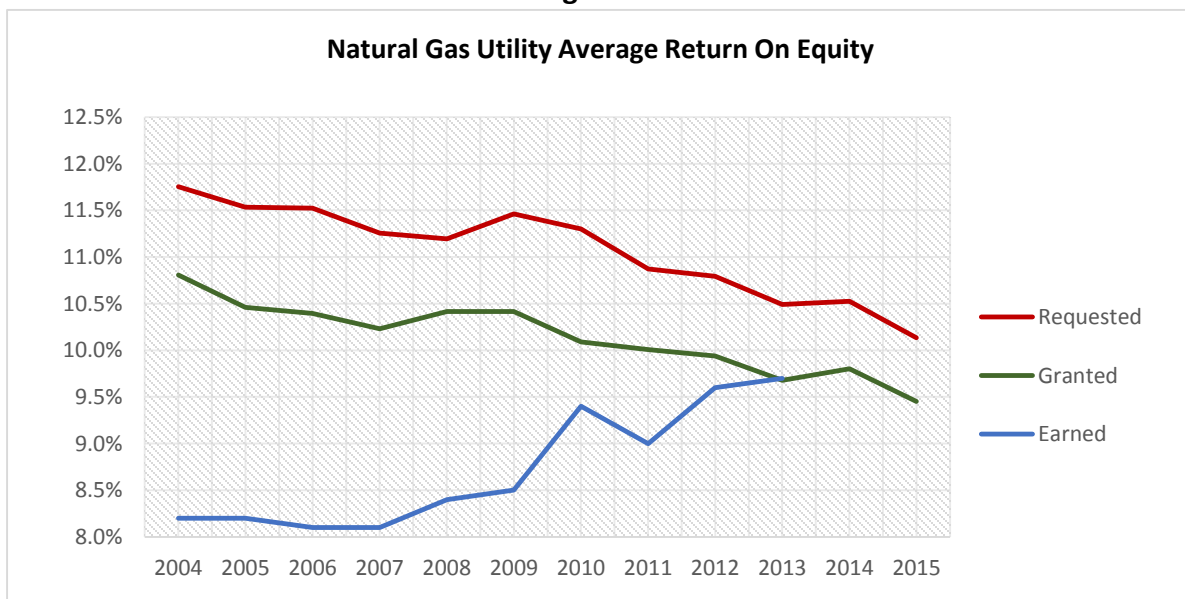
Table 2
Average Annualized Total Return (As of 6/30/2015)

Fund	3 Year	5 year	10 Year	Since 5/89*
GASFX	13.9%	17.9%	10.4%	10.1%
S&P 500	17.3%	17.3%	7.9%	9.9%

Source: Hennessy Funds.

- High dividend payments by this sector have helped to make the overall yield strong, particularly when the income tax rate on qualifying dividends was reduced.
- Improved regulatory environment that adopted innovative rate structures and accelerated cost recovery for specific expenses helped to reduce earnings volatility. In turn, regulators have shown a tendency to reduce allowed rate of returns on equity to compensate for regulatory reduction in earnings risk.
- Overall, natural gas utilities earned returns on equity have grown as regulatory allowed returns have decreased. This has allowed gas utilities' earnings to approach allowed levels.

Figure 11



Source: American Gas Association – various surveys of AGA members regarding rates, return on equity and other topics.

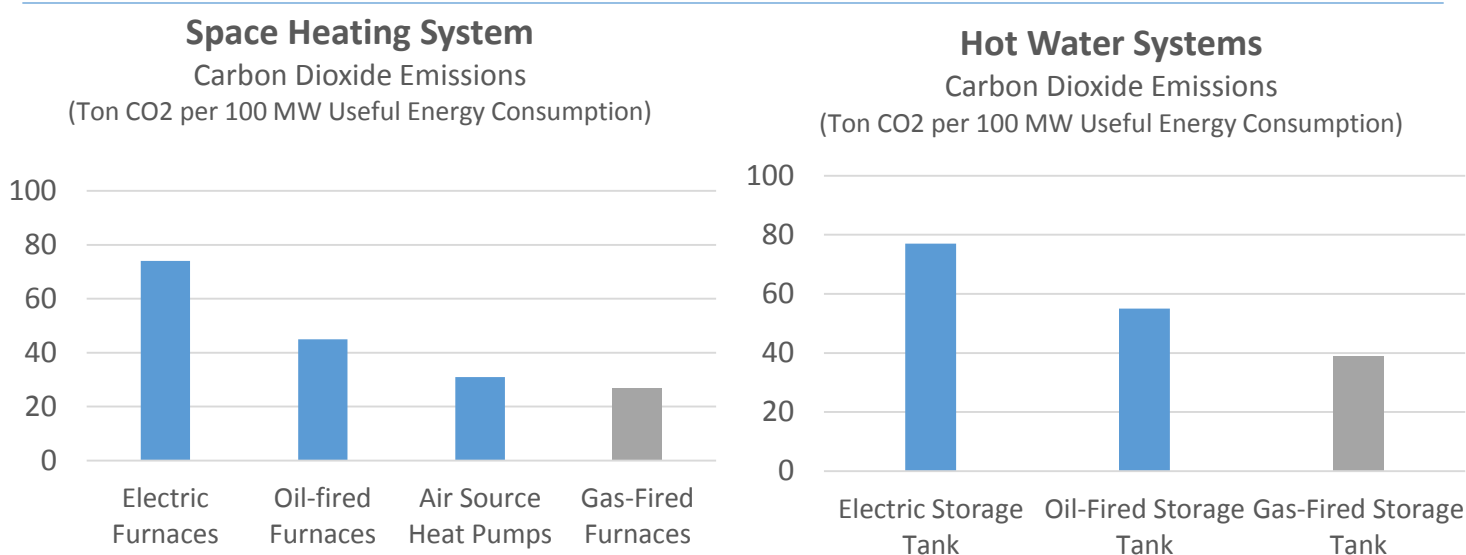
Growth Fact #8

Direct use of natural gas is increasingly seen as a tool to grow opportunities to reduce greenhouse emissions when compared to other alternatives used in space and water heating.

Although somewhat more obtuse than other measures of natural gas consumption growth, one possible indicator of future utility expansion is the growing recognition of opportunities for emissions reductions achieved through increasing the direct use of natural gas in homes and businesses.

Natural gas is a low-carbon fuel relative to coal and oil and can be used as a substitute in certain applications. The combined efficiencies of the natural gas production, gathering, processing, transmission, and distribution systems are the highest of any major fuel source. At over 90 percent, the full fuel cycle efficiency of delivering natural gas to homes and businesses is three times greater than that of electricity, and higher than propane and heating oil. The full fuel cycle offers a comprehensive view of energy and environmental trade-offs between major fuel sources. Figure 12 demonstrates a measure of CO₂ emissions for space heating and water heating applications based on fuel type.

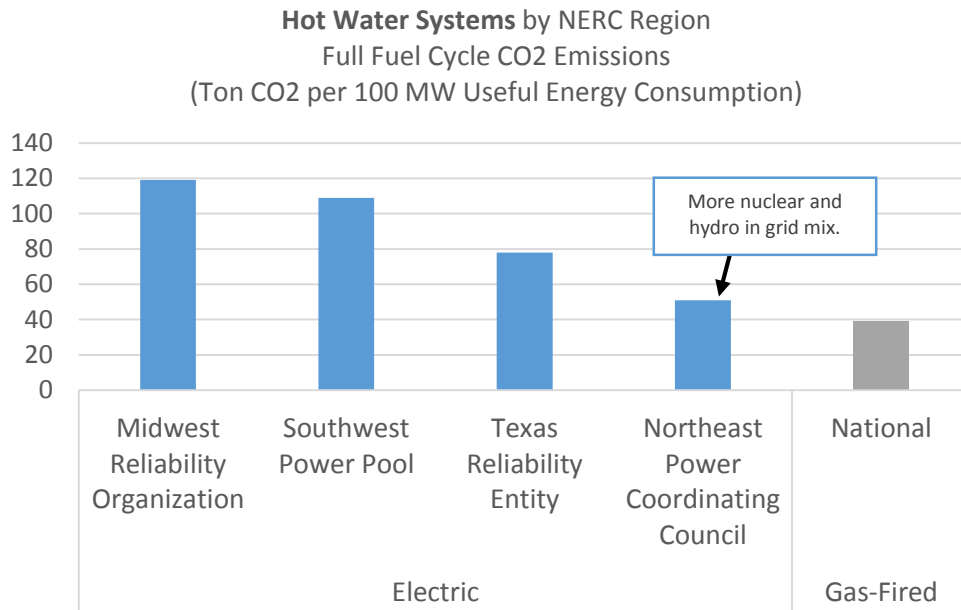
Figure 12
Greenhouse Gas Impacts of Natural Gas Direct Use



Source: MIT Energy Initiative, *Future of Natural Gas*, June 6, 2011. Appliance efficiencies are Energy Star compliant.

The magnitude of greenhouse gas reduction benefits of natural gas in relation to electric appliances is dependent on the type of grid mix demonstrated in Figure 14.

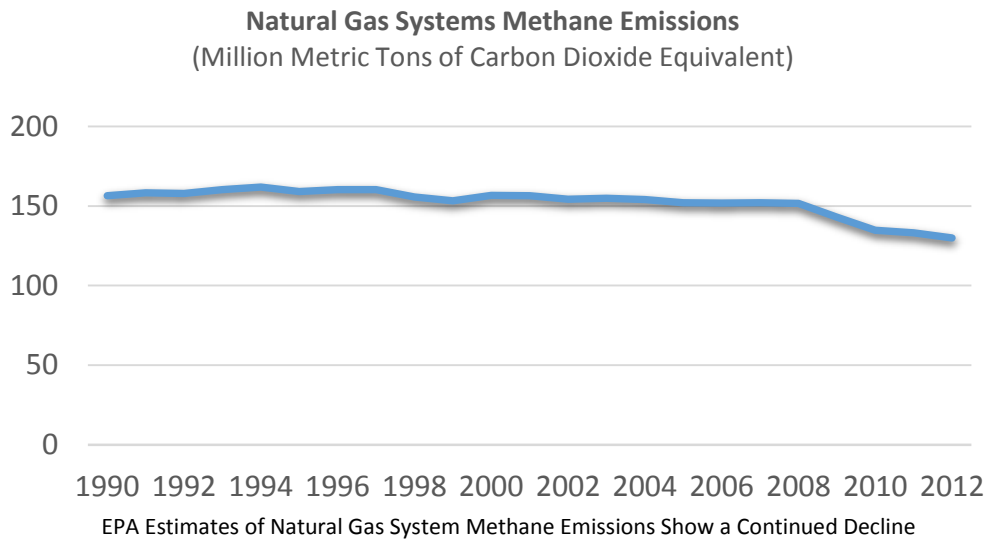
Figure 13



Source: MIT Energy Initiative, *Future of Natural Gas*, June 6, 2011. Appliance efficiencies are Energy Star compliant.

In addition, methane emissions have declined from natural gas systems during the past two decades. As methane emissions decrease, the overall greenhouse gas benefits of using natural gas in homes and businesses increases.

Figure 14



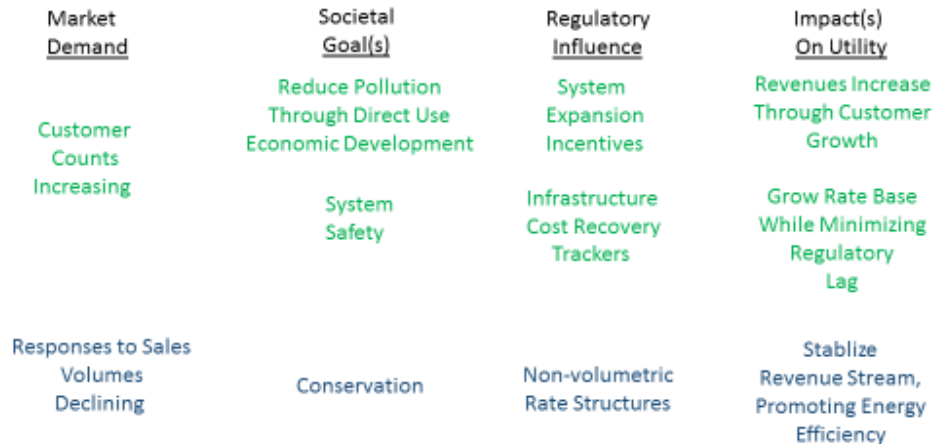
Source: *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2012*, Environmental Protection Agency.

Conclusions

Measuring the volume of gas delivered to consumers is no longer a sufficient metric to evaluate growth of gas distributors. During the past four decades, natural gas utility companies have increased service territory, added customers and hundreds of thousands of miles of pipe, modernized infrastructure, and improved their financial foundations, all while serving as proponents of the efficient use of gas to small volume core and other customers. Changes in throughput to US residential customers in the near- to medium-term are likely to be modest in total even with continued growth in the small volume customer base. However, that does not mean that companies are not growing.

Beyond the immediate business of distributing natural gas, gas utilities serve as an agent for local community and broader regional economic growth by delivering energy solutions to homes and businesses. For example, some local gas companies are examining the application of Combined Heat and Power technologies to local businesses with the thought of capitalizing on very competitive natural gas fuel costs, the opportunity to generate electricity on site and the possibility of reducing the carbon emissions profile of manufacturing and other industrial processes.

How Does Your Gas Utility Grow?



In addition, local gas utilities through oil to gas home heating conversions offer a choice to residential energy consumers regarding the cost and reliability of home heating service during critical peak demand periods. The availability of natural gas can be an anchor for manufacturing and other businesses in a pipeline corridor that ultimately brings fuel choices to new pipeline customers with far reaching economic impacts.

Natural gas and local gas utility technical and management support can be the momentum starter for transportation alternatives in cities and regions with infrastructure and business plans built for fleet vehicle operations from buses, to trash trucks, to long haul carriers to

personal transportation. And even more broadly, some local gas utilities have reached upstream to purchase reserves in the ground or support further development of the resource endowment so critical to our country's new energy reality.

Each of the factors and ideas touched on above add to the picture of a dynamic contributor to the domestic natural gas and broader energy opportunity in the United States, as envisioned today. And it is growing, just like the natural gas utilities that support their businesses and their communities.

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