NATURAL GAS

Climate Change & the Value of Natural Gas Getting the Facts Straight

Pamela

Lacey – IGU Oct. 9, 2013

AGA American Gas Association

Overview

1. **Natural Gas Emissions:**
   - Carbon Footprint Overall
   - Distribution Context
2. **How Natural Gas Direct Use Can Help Reduce Greenhouse Gas Emissions**

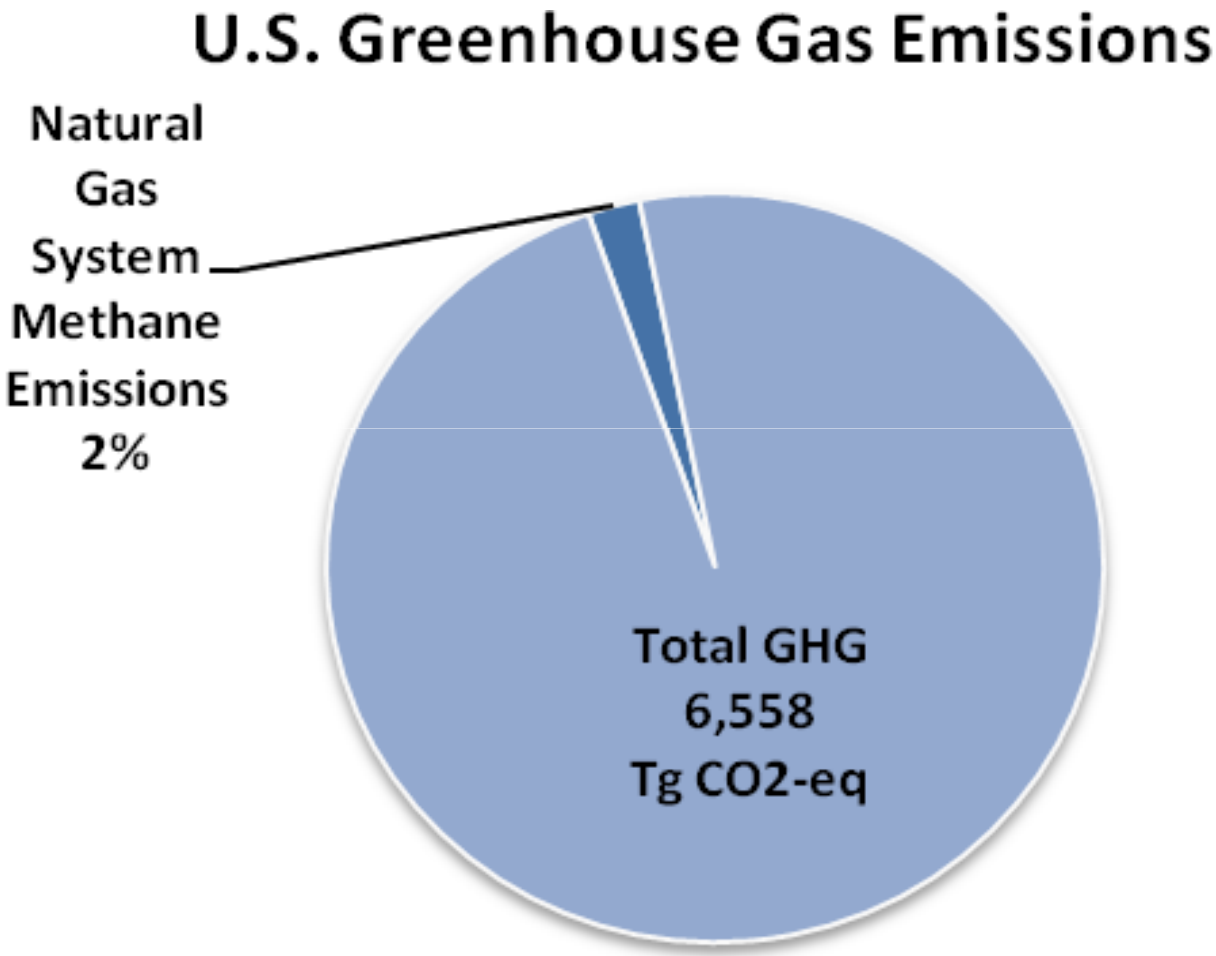
I. Natural Gas – the cleanest fossil fuel

- **When combusted as a fuel, natural gas produces:**
  - **50% less CO_2 than coal**
  - **30% less CO_2 than oil**
  - Significantly less Nitrogen Oxides
  - Virtually no Sulfur Dioxide
  - No mercury
- **Natural gas is clearly the cleanest fossil fuel**

- **However, some argue that these low CO_2 emissions from combustion are offset by allegedly high emissions of natural gas from wells, pipelines and gas mains**

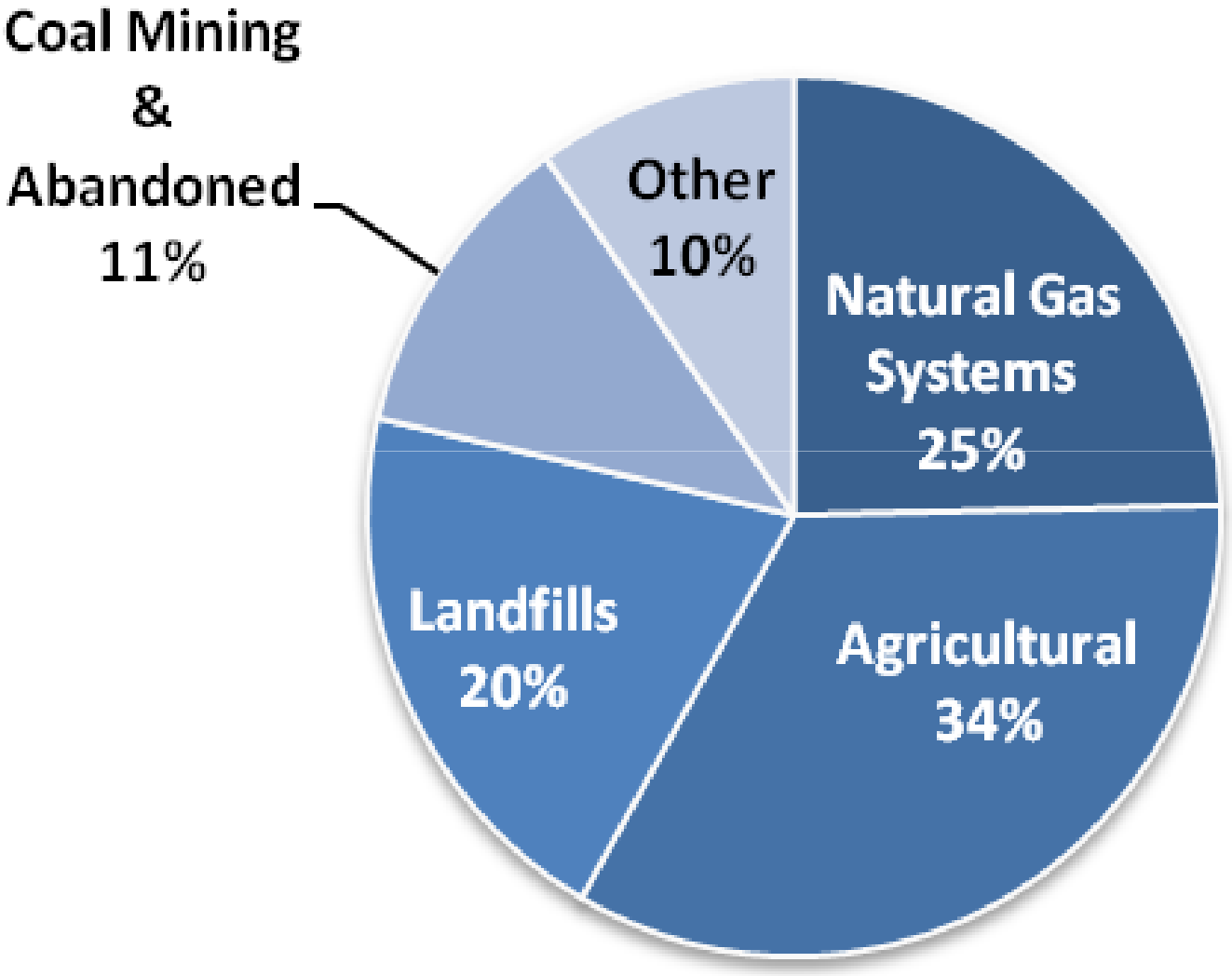
- **Are they correct? No.**

Natural gas systems represent a small share of annual GHGs



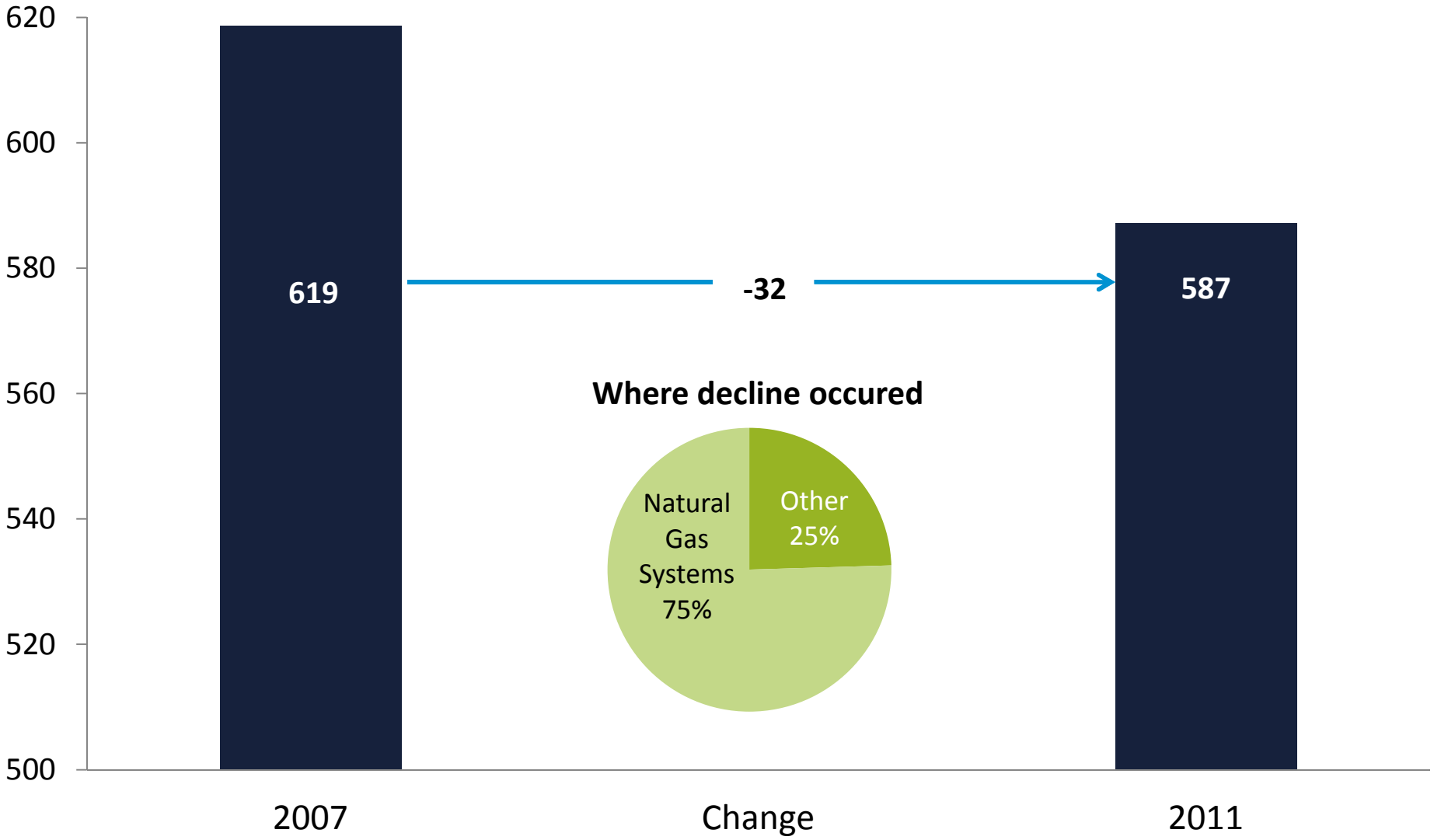
Source: EPA GHG Inventory 2013

Sources of Methane Emissions



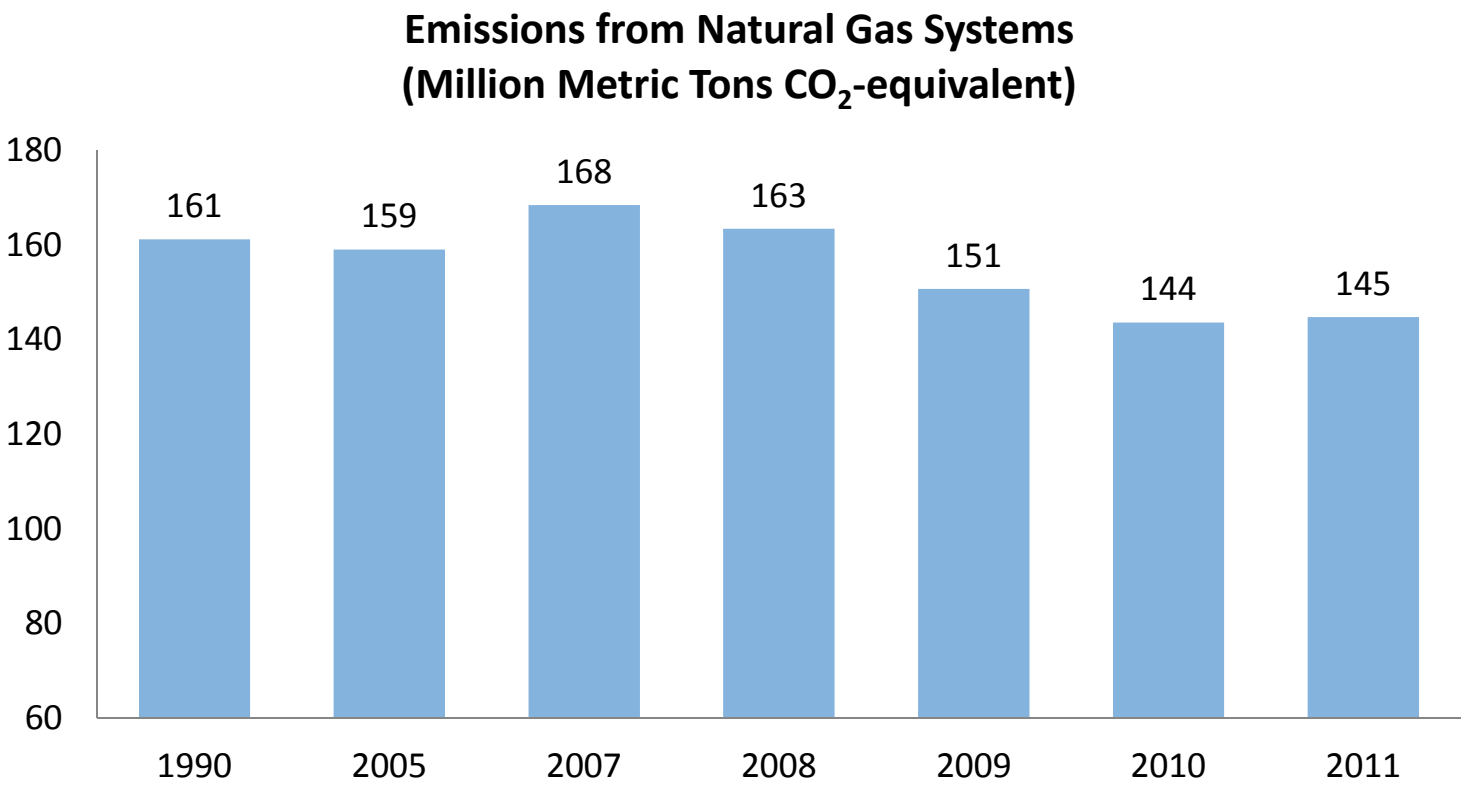
U.S. Methane Emissions Decline

(Million Metic Tons CO2-eq.)



Technological advances, industry best practices and infrastructure investment…

add up to a declining emissions trend

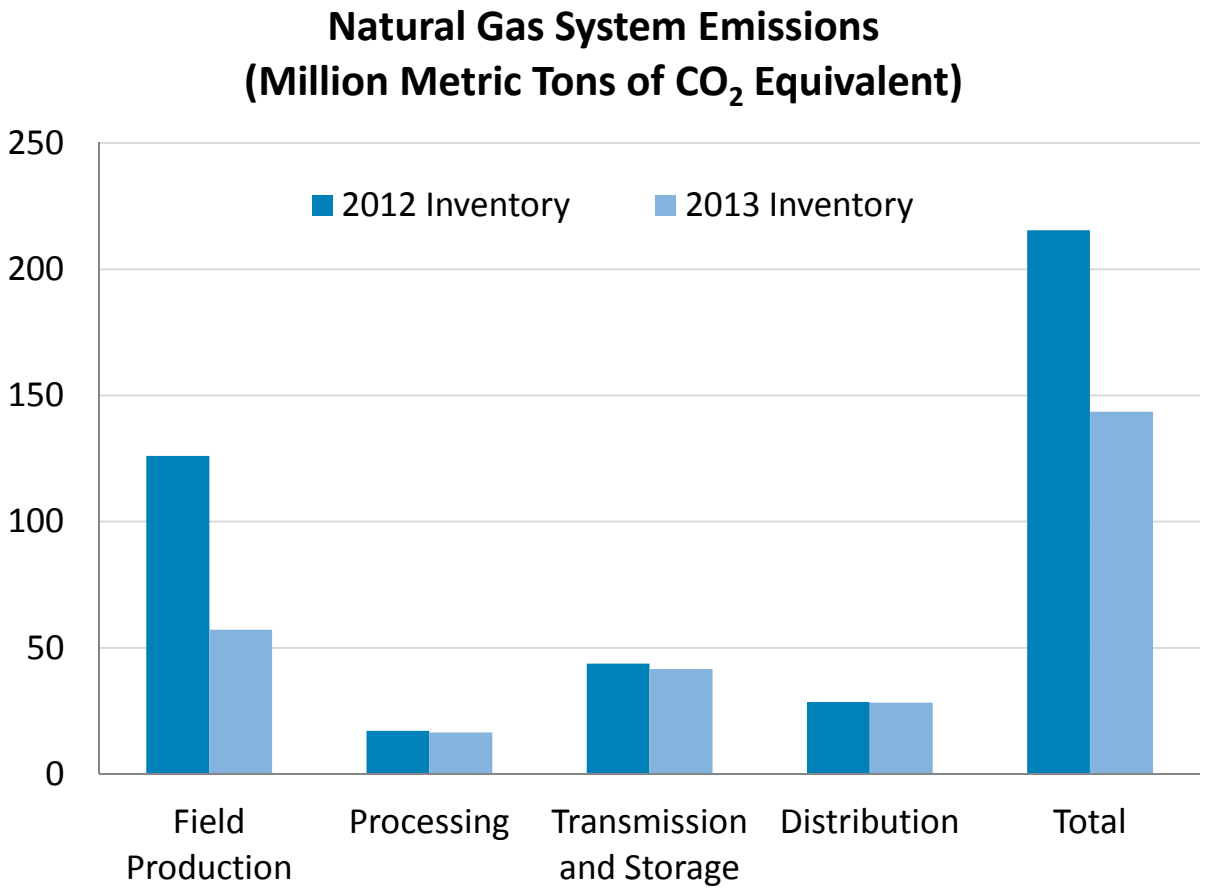


Source: EPA GHG Inventory 2013

Natural Gas Distribution: Emissions Shrinking

- Emissions from distribution **shrank 16 percent** since 1990 …
- even though we added almost **300,000 (30 percent more)** miles of distribution mains …
- to serve **17 million (30 percent)** more customers
- Why? Because we replaced **thousands of miles** of existing cast iron and bare steel pipe with **modern PE plastic pipe**
- Result: EPA estimates distribution systems emitted **0.3%** of produced natural gas in 2011

EPA Inventory: New data has significantly revised emissions estimates downwards



Source: EPA GHG Inventory 2012/2013

Emissions Estimations Declining as they become more accurate

- **EPA 2012 Annual Inventory of U.S. Greenhouse Gas Emissions**
  - originally estimated 2.5% – 3.2% of produced gas emitted in 2010 from well to customer.
- **New 2013 EPA Inventory**
  - only estimates 1.5% of produced gas emitted in 2011 from well to customer, and of this,
  - only estimates 0.3% of produced gas was emitted from gas distribution in 2011.
- EPA also found emissions from distribution have declined over time due to replacing cast iron and bare steel pipe.

EDF Field Studies - Natural Gas Emissions

1. **Production** –published Sept. 2013 – results similar to and confirm EPA Inventory
2. **Processing** – organizational phase; plan to publish later in 2014
3. **Transmission & Underground Storage** – beginning data collection
4. **Distribution** – finishing data collection; submit study for peer review fall 2013; publish 2014
5. **Pump to Wheels** – finishing data collection for natural gas vehicle fueling and exhaust; peer review fall 2013; publish 2014

II. Direct Use of Natural Gas

- **Using natural gas directly to heat space and water is better for the environment than using grid electricity**
- Why?
  - more energy efficient -
  - Use less natural gas for same number of hot showers and warm homes
  - Combusting less fuel = lower emissions

Consumers can save on their monthly utility bills through converting their households to natural gas.

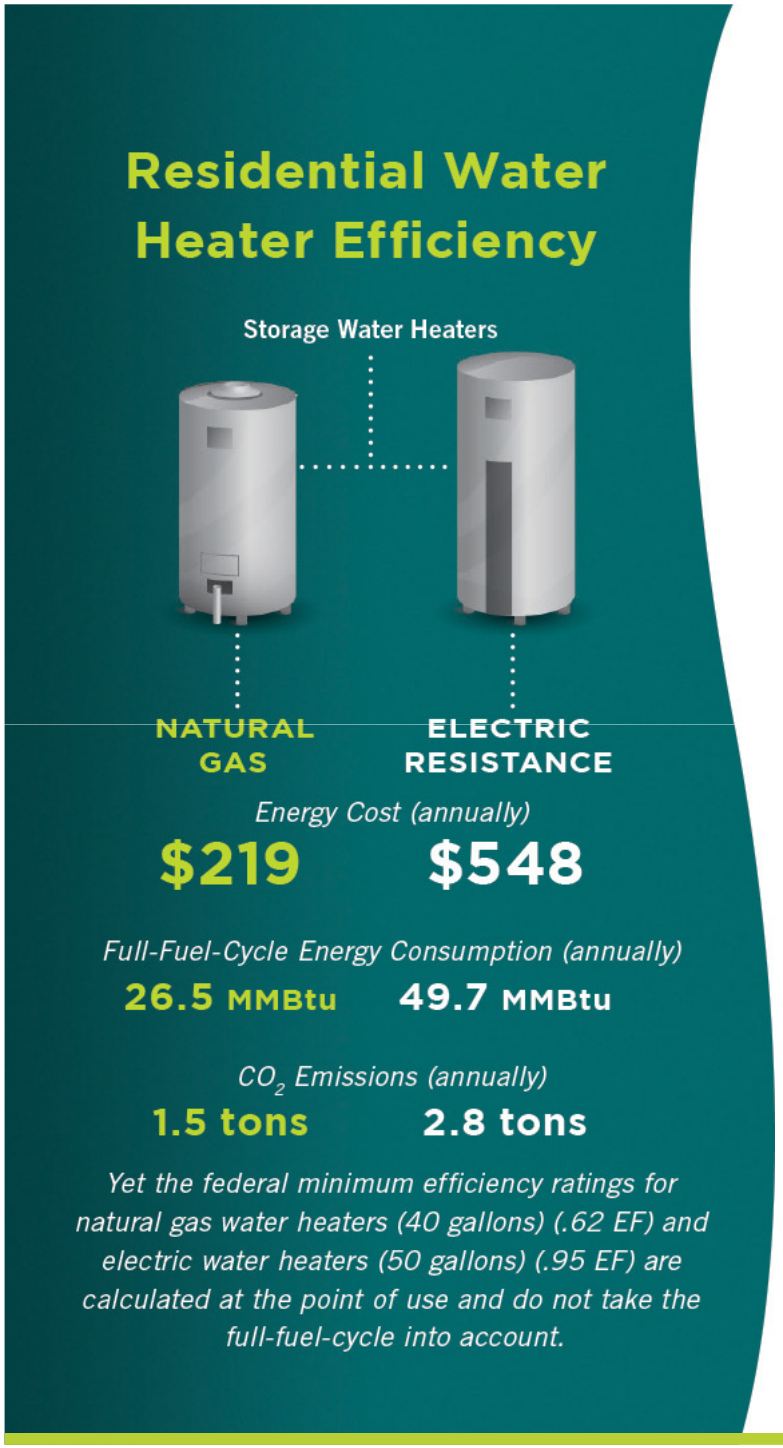
Direct Use of Natural Gas

Is the Clean, Efficient Choice

The direct use of natural gas in America's homes and businesses maintains about 92% of its usable energy, and a household with natural gas versus all-electric appliances produces 37% lower greenhouse gas emissions.

Converting natural gas or any other fossil

fuel into electricity to power comparable electric end-use products and appliances only maintains 32% of usable energy.



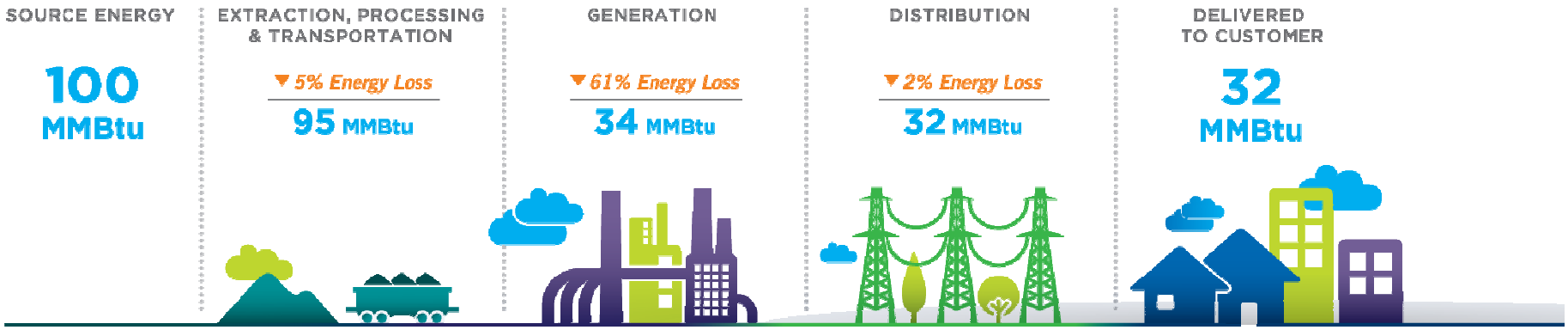
Extraordinarily Efficient

- America's natural gas delivery system is extraordinarily efficient with 92% of the natural gas produced at the wellhead being delivered to customers as usable energy.
- In typical home appliances, the direct use of natural gas results in energy consumption that is 28% less than a similar home with all-electric appliances.
- Natural gas water heaters are nearly 50% more efficient on a full-fuel-cycle energy comparison. Natural gas furnaces and boilers are up to 96% efficient.

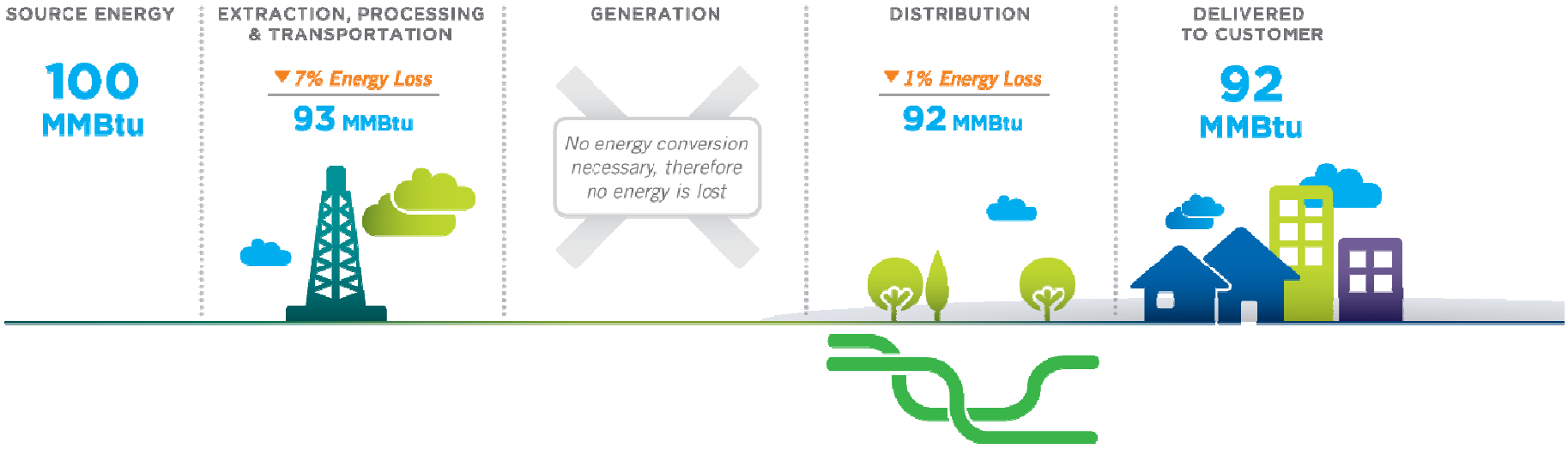
"For appliances for which there is a choice of fuel, such as storage water heaters and heating equipment, efficiency ratings should be calculated using the extended site measure of energy consumption…"

Recommendation of the National Academies

Electricity



Natural Gas

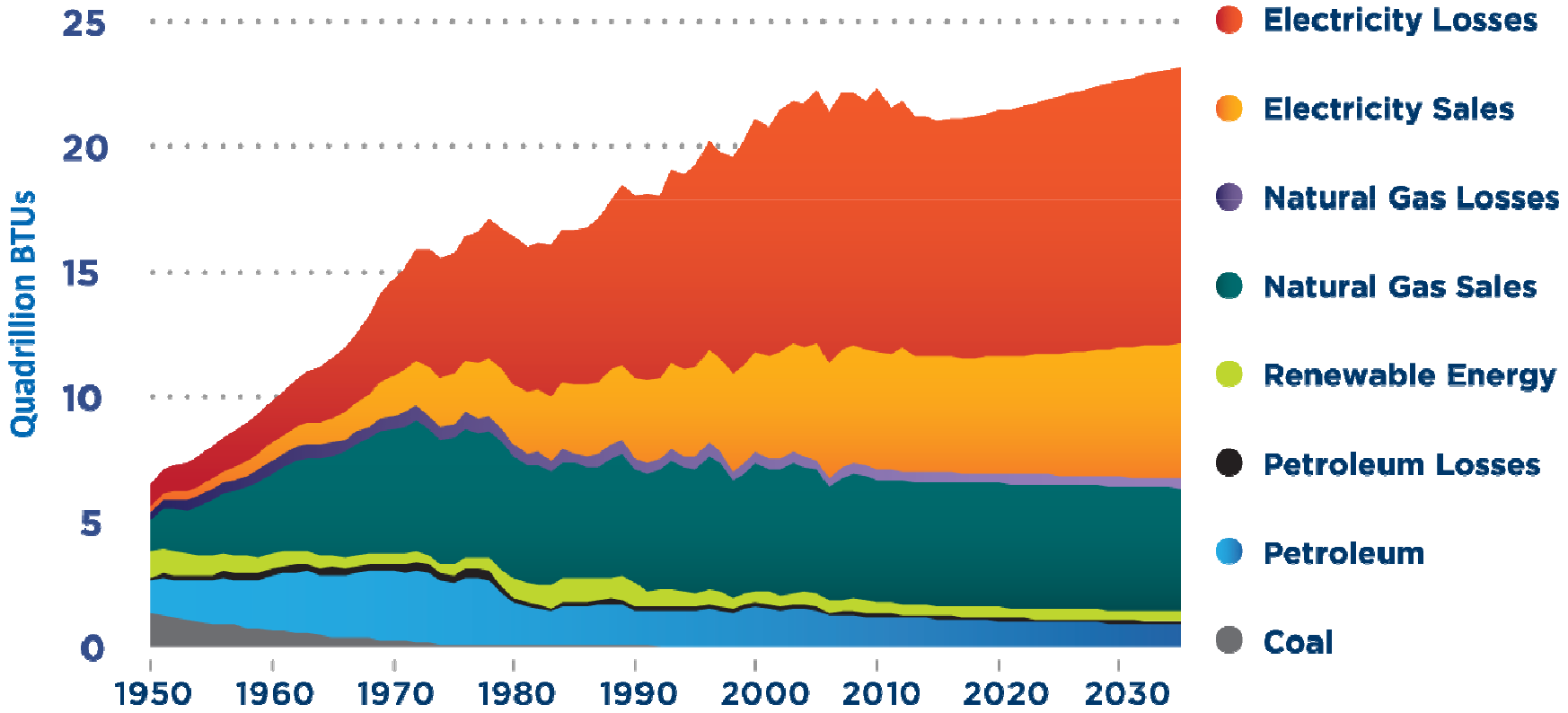


Source: Gas Technology Institute

Efficient Energy Use

Residential Energy Consumption

Expanding the direct use of natural gas in homes and businesses can reduce the energy lost in the generation and distribution of electricity.

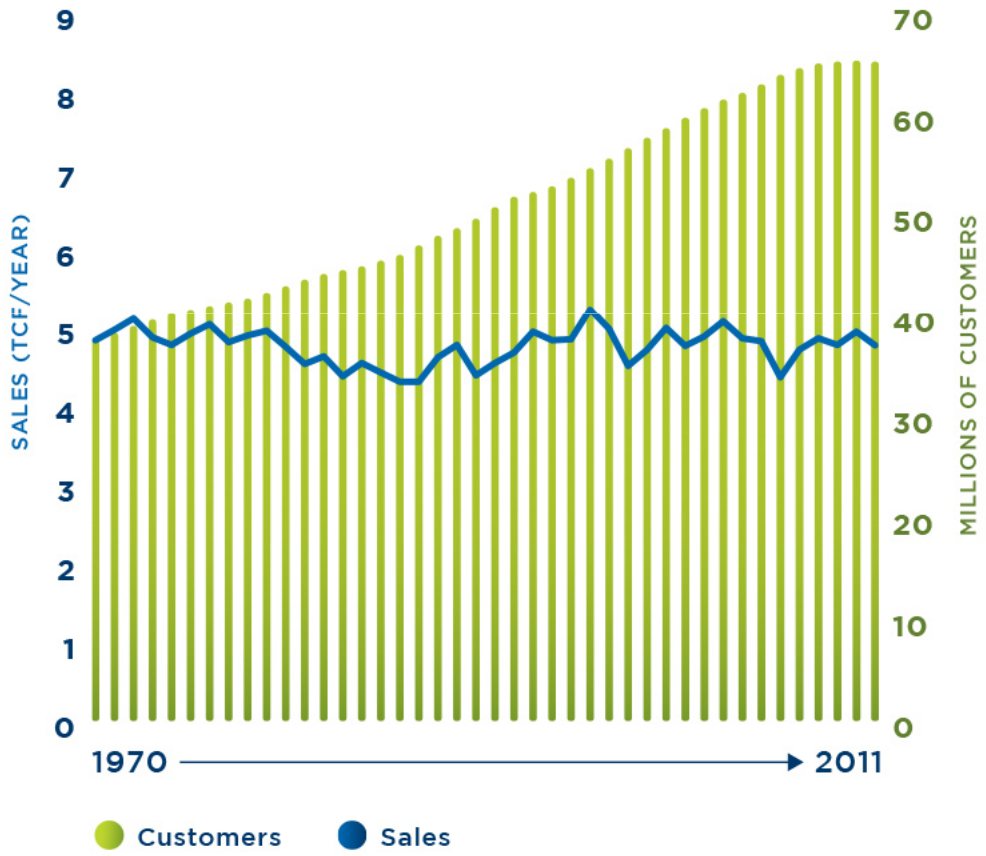


Source: U.S. Department of Energy, Energy Information Administration

Residential Natural Gas Use:

An Efficiency Success Story

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.*



CONCLUSION

- **Natural gas emissions** from production wells, pipelines and distribution mains **are already low** – based on current estimates
- **Better data will provide a more accurate picture of the value chain's "footprint" and demonstrate the true value of natural gas to fight global warming and improve the environment**
- **Natural gas can significantly reduce emissions from power plants** compared to coal fired plants
- But the **best use is "direct use**" of natural gas in homes, businesses and vehicles

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America's Natural Gas Revolution

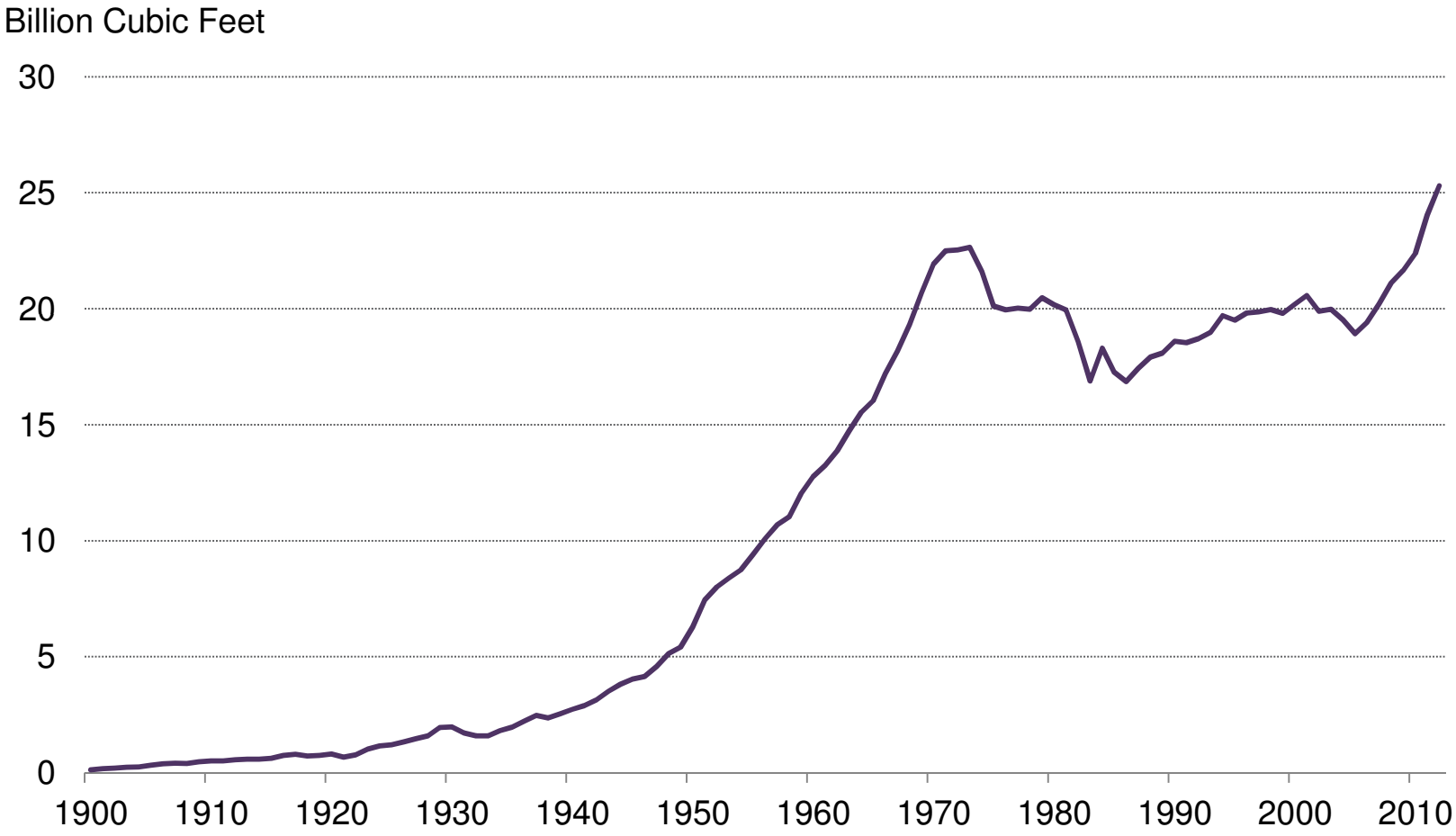
PGCE Meeting // AGA Offices, Washington DC

ROB BARNETT
Senior Energy Analyst

OCT. 9, 2013

TOTAL U.S. NATURAL GAS PRODUCTION

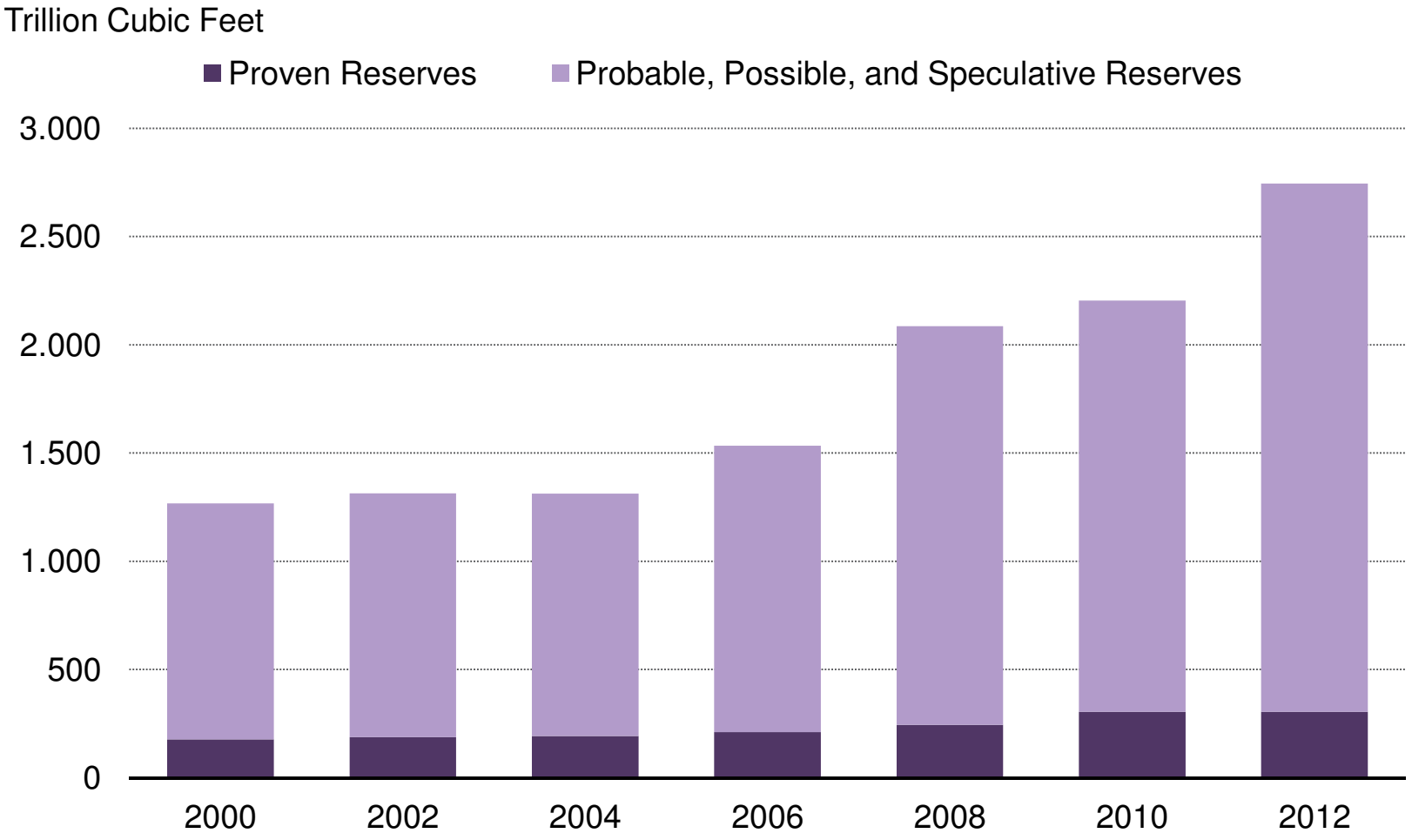
U.S. natural gas production reached its highest level ever in 2012.



Source: Energy Information Administration and Bloomberg Government

U.S. NATURAL GAS RESOURCE ASSESSMENT

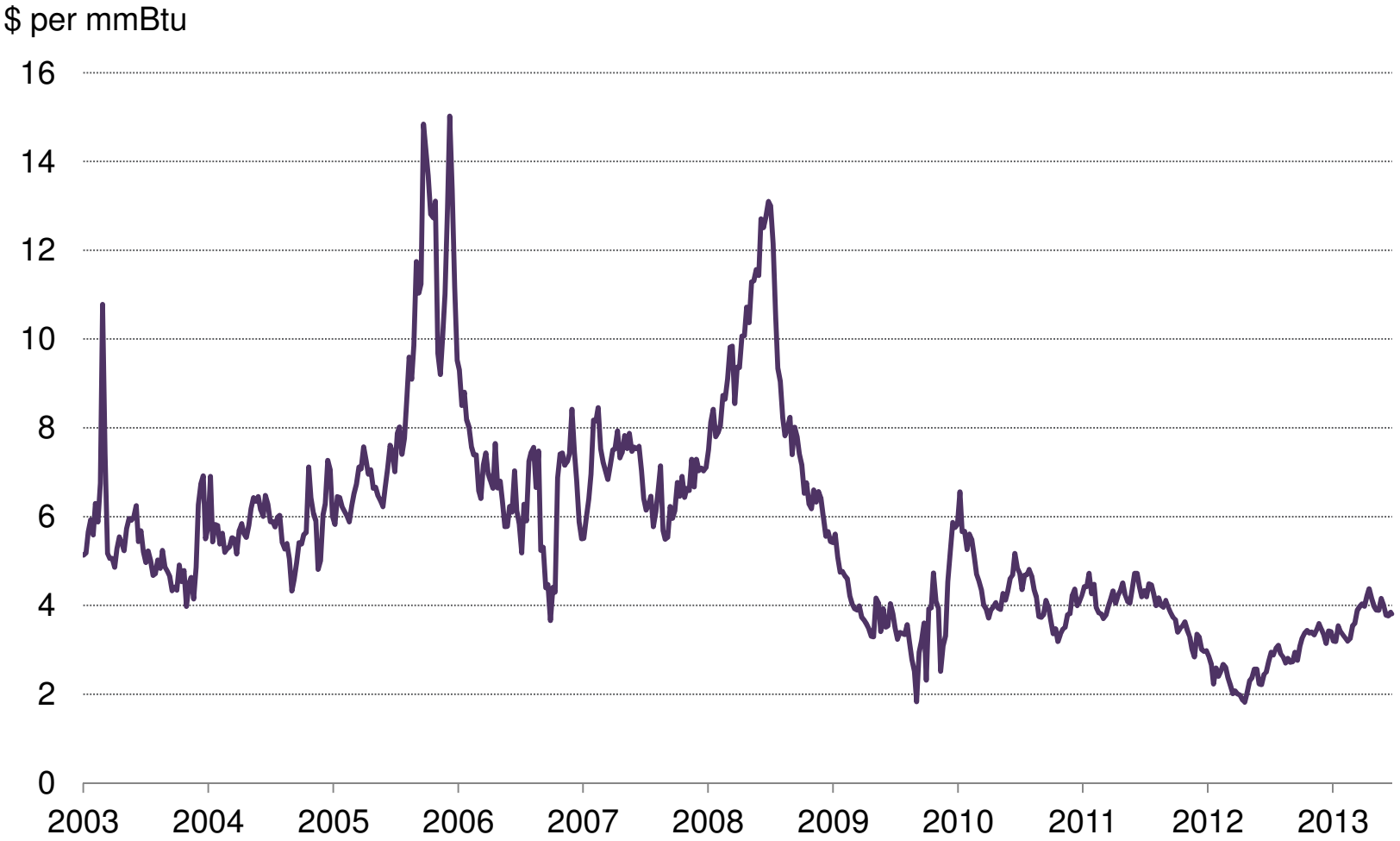
There are about 2.7 quadrillion cubic feet of natural gas reserves in the U.S., enough to last about 110 years at the current consumption rate.



Source: Energy Information Administration, Potential Gas Committee, and Bloomberg Government

U.S. NATURAL GAS PRICES (HENRY HUB)

At just below $4 per mmBtu, U.S. natural gas prices are still a bargain compared with prices observed between 2004 and 2008.

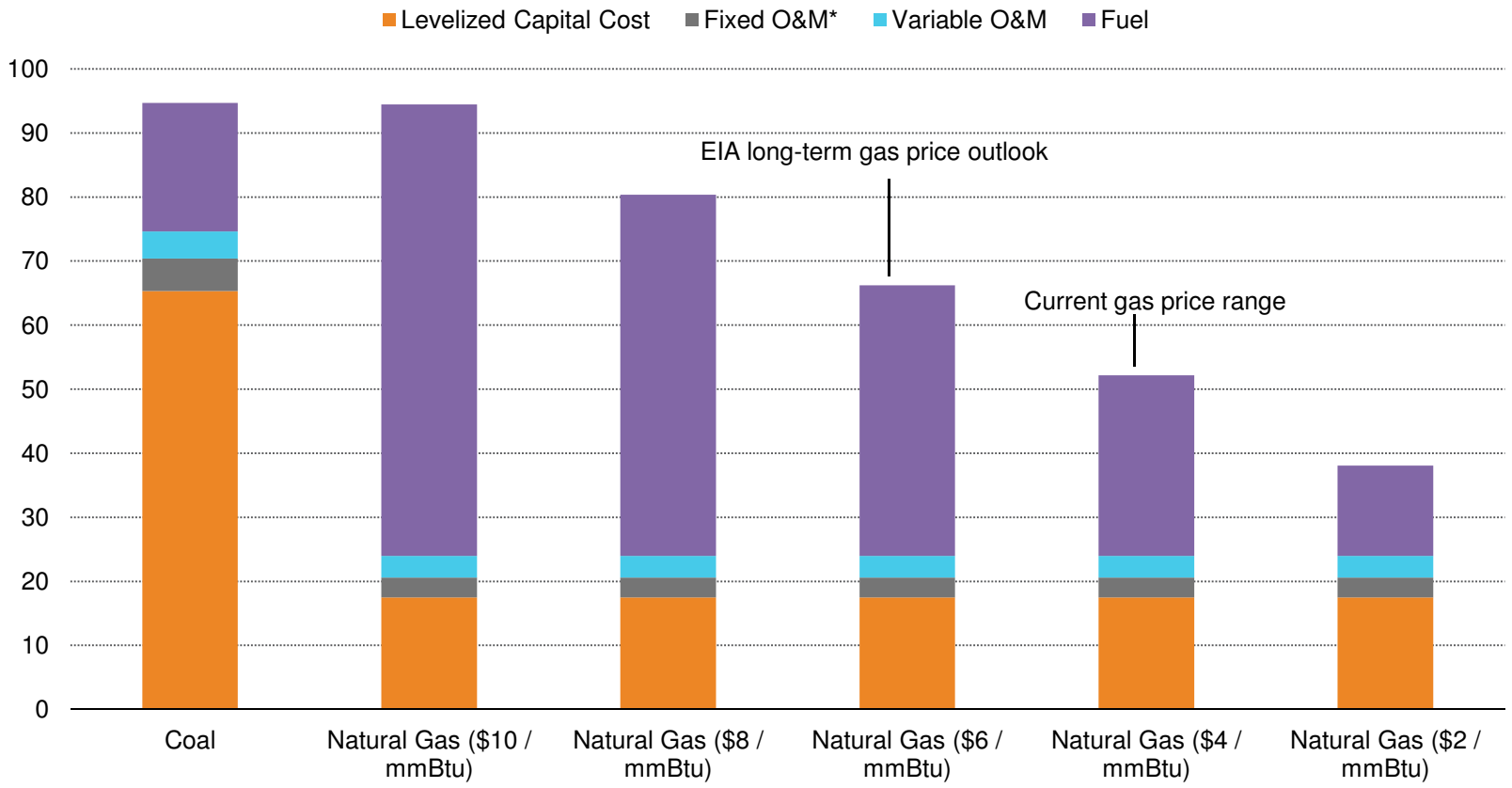


Source: Bloomberg Terminal

NEW COAL POWER PLANTS ARE MORE EXPENSIVE

Even without EPA regulations, new coal-fired power plants are significantly more expensive over the life of the plant when compared with natural gas

Levelized cost of electricity in dollars per megawatt-hour

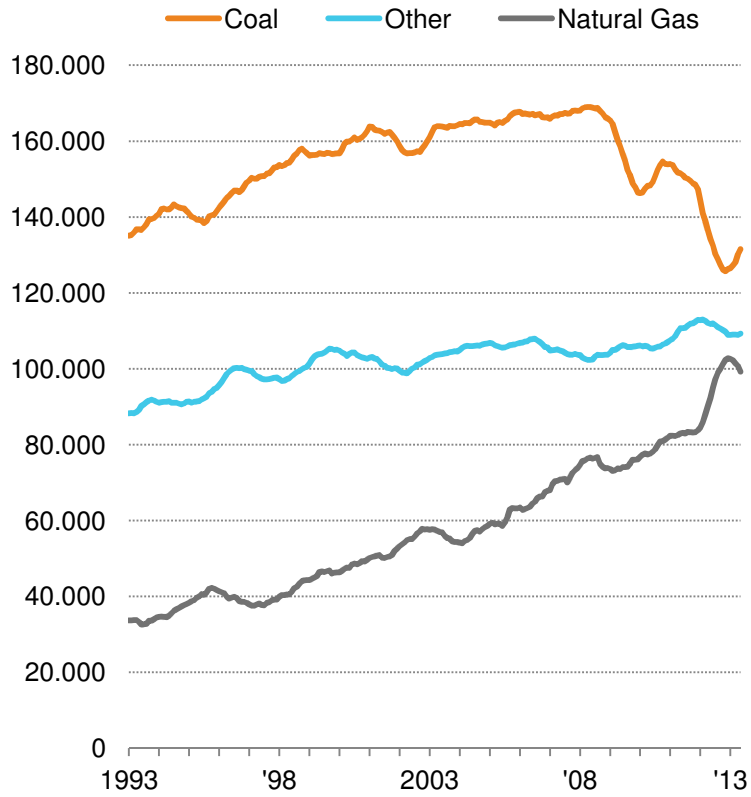


*O&M stands for operation and maintenance costs. Fixed O&M includes transmission investment costs in this example
Source: Bloomberg Government, Environmental Protection Agency

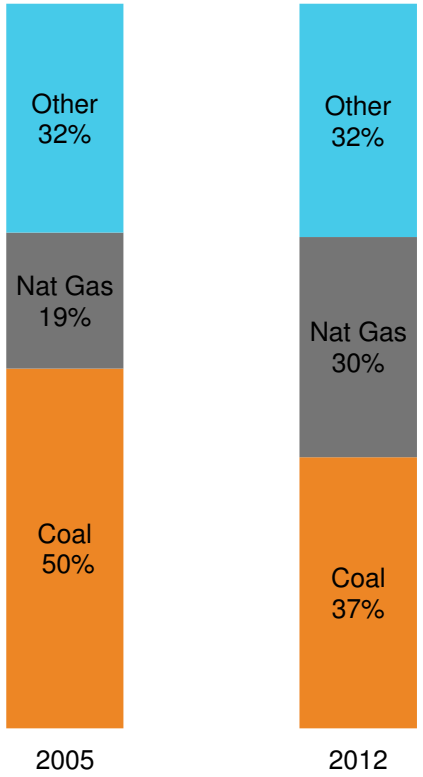
NATURAL GAS HAS BEEN DISPLACING COAL

Since 2005, coal use in the power sector has declined by 25 percent. During the same period, natural gas use has increased by 62 percent

Million kWh, 12-month trailing average



Share of electric power by source

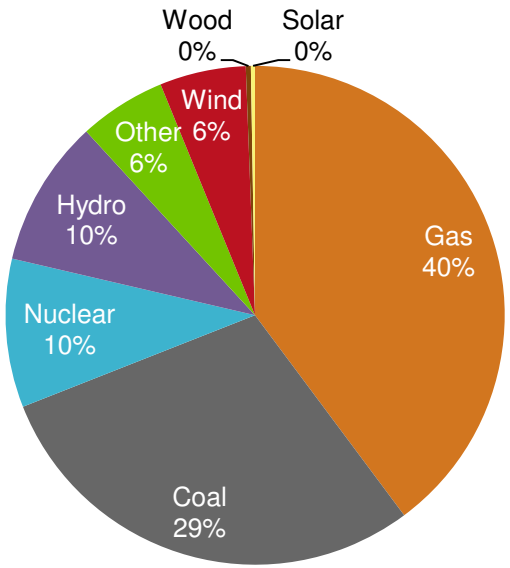


Source: Bloomberg Government, Energy Information Administration

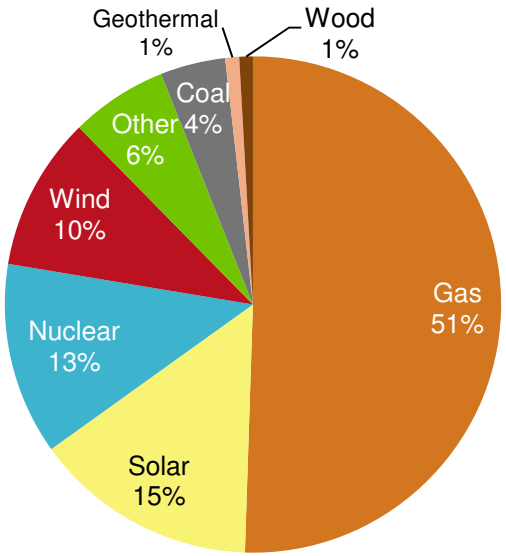
GAS AND OTHER LOW CARBON TECHNOLOGIES DOMINATE PLANNED ELECTRIC CAPACITY ADDITIONS

About half of all proposed electric power plants would be fueled by natural gas. Solar, Nuclear, and Wind are the other dominant technologies.

Operating versus proposed electric capacity, 2012



Operating capacity



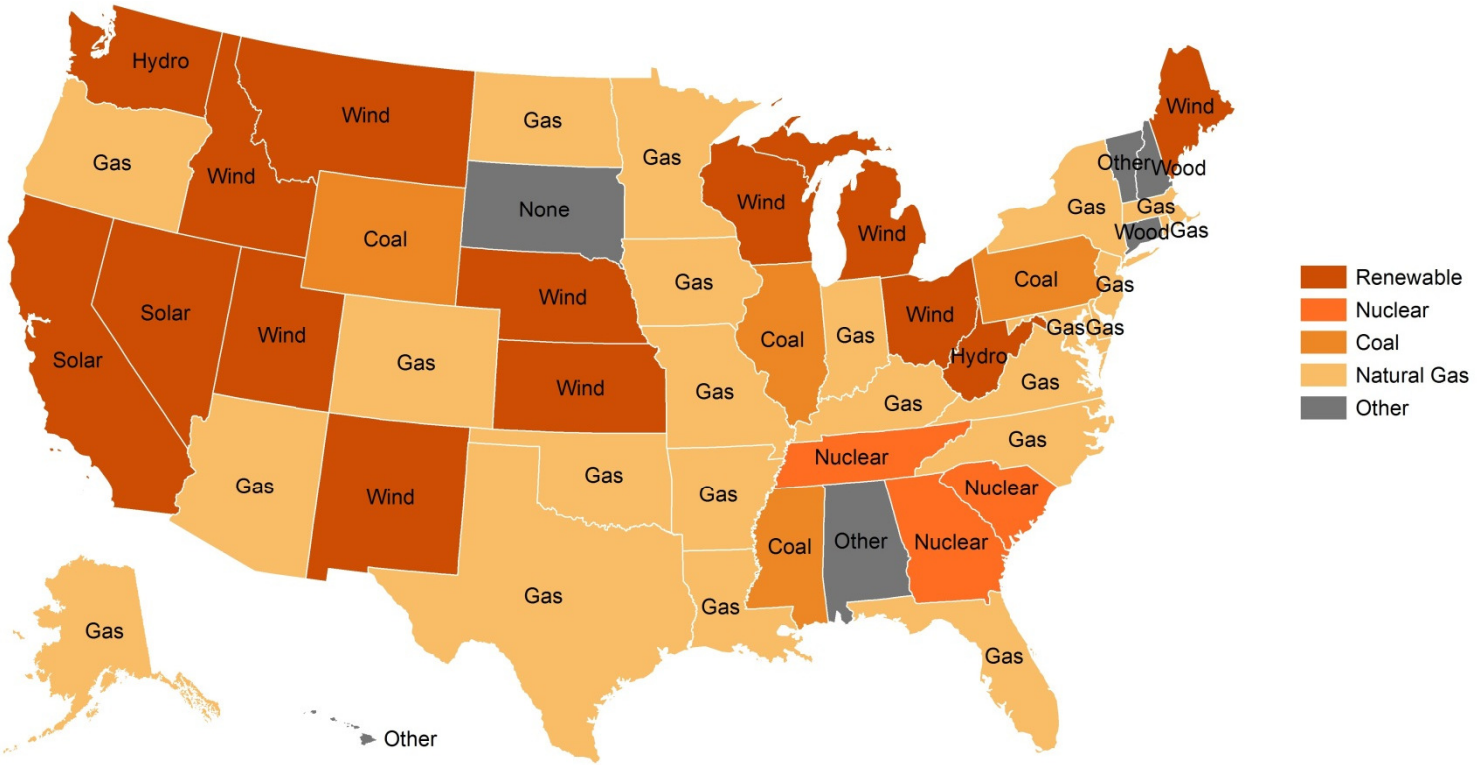
Proposed capacity

Source: Bloomberg Government, EIA

GAS AND OTHER LOW CARBON TECHNOLOGIES DOMINATE PLANNED ELECTRIC CAPACITY ADDITIONS

A number of regions that were historically dominated by coal generation are shifting toward natural gas.

Dominant source of proposed electric capacity, 2012



Source: Bloomberg Government, EIA

ABOUT THE ANALYST

Rob Barnett, an energy analyst at Bloomberg Government, specializes in energy sector economics, environmental policy and strategy, and EPA regulations. Before joining Bloomberg, he was an associate director of Climate Change and Clean Energy at IHS Cambridge Energy Research Associates. At IHS CERA he led the environmental and energy analysis for various studies, including "Growth in the Canadian Oil Sands: Finding the New Balance," and "Crossing the Divide: The Future of Clean Energy." Before that, Barnett worked for Clemson's Power Quality and Industrial Applications Laboratory, where he modeled electric power systems to assess the impact of distributed generation.

Barnett holds a master's degree in economics from Boston University and undergraduate and master's degrees in electrical engineering from Clemson University.

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NATURAL GAS

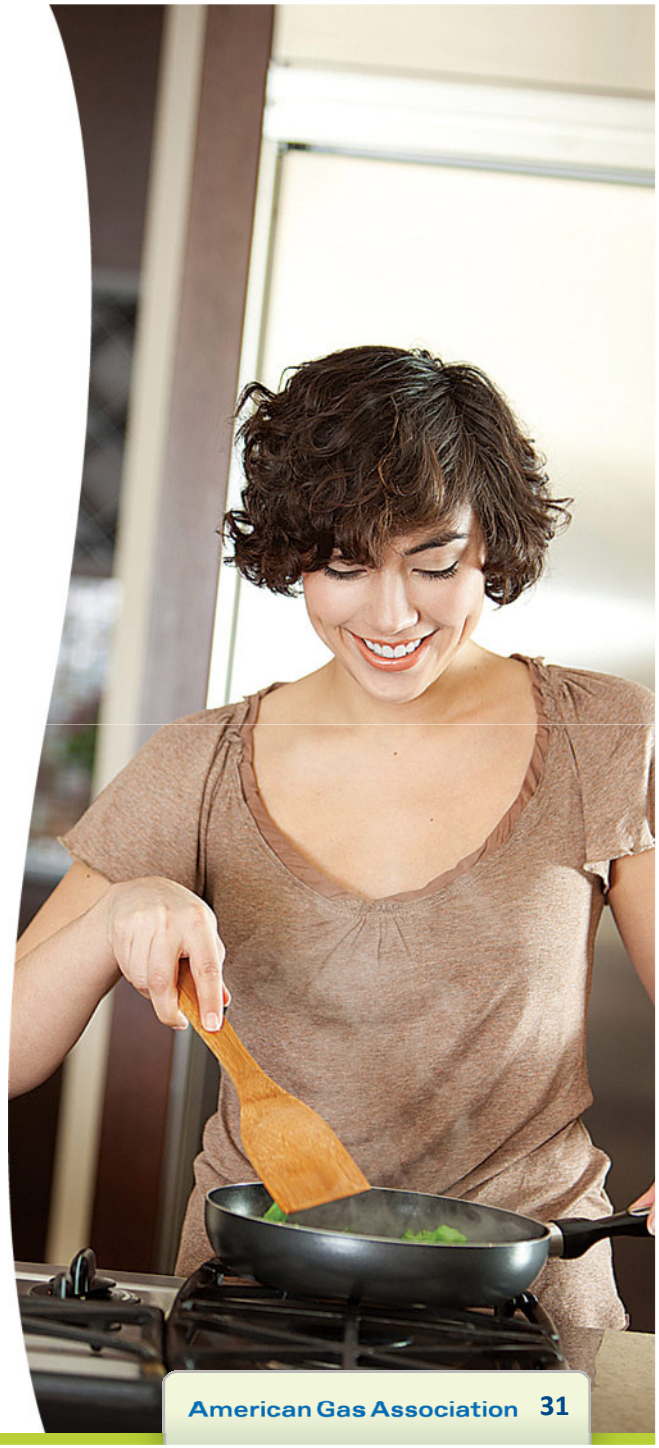
October 9, 2013

Communicating Advocacy Priorities

AGA American Gas Association

Delivering natural gas that **fuels America's way of life**

- The American Gas Association , founded in 1918, represents local natural gas companies that cleanly fuel the way of life of 177 million Americans nationwide
- 2.4 million miles of pipeline
- 90 million therms of natural gas delivered annually accounts for 40% of the total U.S. natural gas consumption



Sources: AGA *Gas Facts*; U.S. Census Bureau *American Housing Survey;* U.S. Department of Transportation

OUR ROLE IN POLICY

Delivering on America's National Priorities

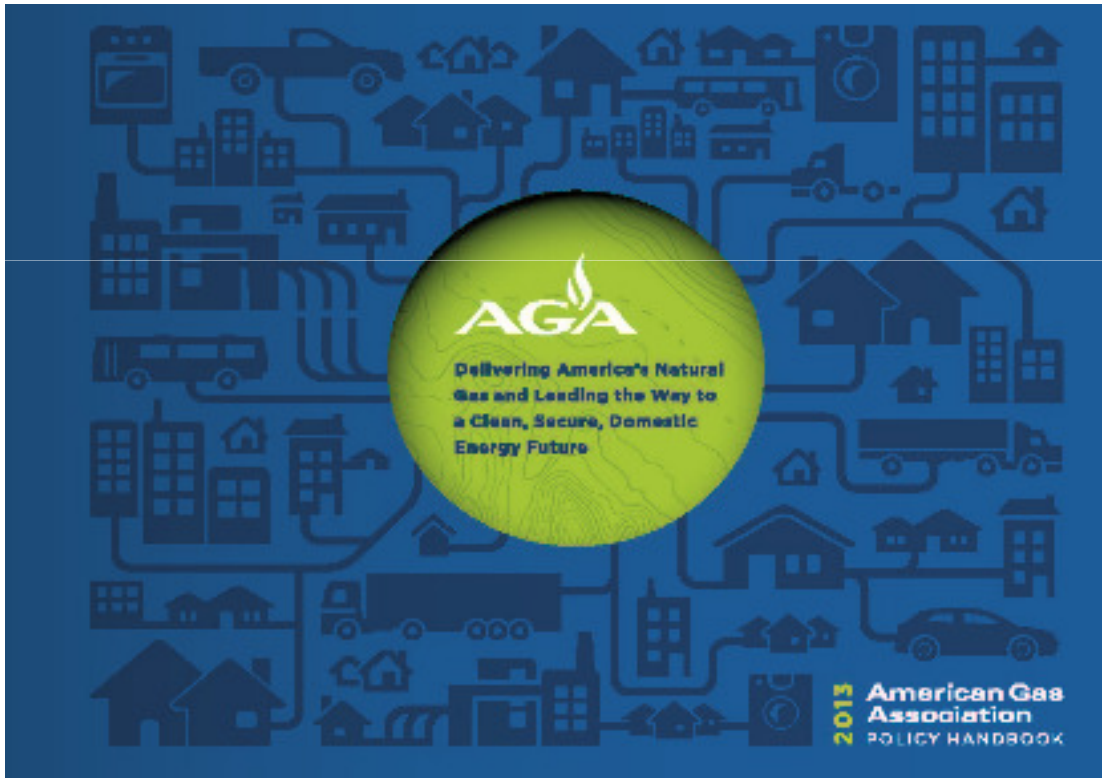
- National energy policies should help:
  - improve energy efficiency
  - ensure energy affordability
  - reduce greenhouse gas emissions
  - increase America's energy security and support American jobs
  - create a level playing field

INDUSTRY ISSUES

Advocacy Priorities

- Pipeline Safety
- Fiscal and Tax
- Recognition of the benefits of natural gas in energy policy
- Natural Gas Supply
- Infrastructure: Cybersecurity
- LIHEAP
- Efficient Natural Gas Solutions
- Natural Gas as a Foundation Fuel

The Playbook



Earned Media

National Journal

platts

Energy Experts Blog
Evaluating energy and environment policy

THE WALL STREET JOURNAL.

The Boston Globe

OIL & GAS MONITOR

E&E PUBLISHING, LLC

npr

SNL

Pipeline & Gas Journal

Digital Communications

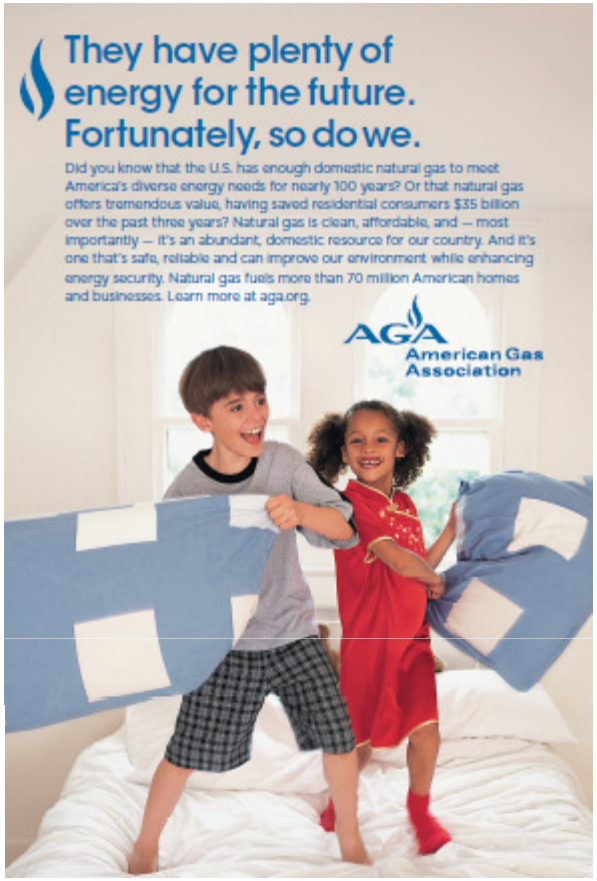
- Total “followers”: 9,845
- Most popular content: AGA President & CEO Dave McCurdy’s Pipeline & Gas article on advancing natural gas technology
- Milestones:
  - Reached our 4,000th tweet
  - Launched campaign surrounding our 10,000th follower

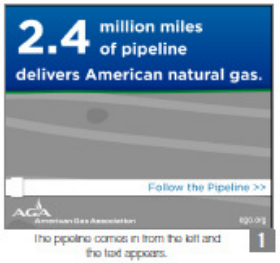
- Total “likes”: 675
- Most popular post: Today is Call 811 Day (8/11/13)

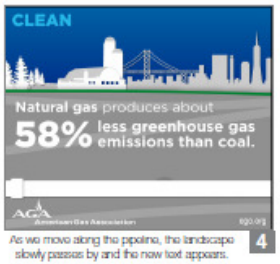
- Average monthly visitors: 38,826 (18% uptick in percentage of monthly visitors in 2012)
- Most popular page (besides homepage): 2013 Events landing page
- Mobile users (including tablets): 12% of all visitors (50% uptick in percentage of mobile visitors in 2012)

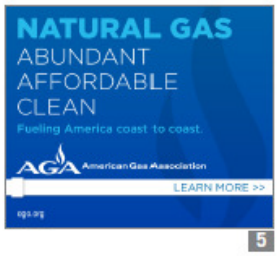
Advertising

- Online presence
  - Washington Post
  - National Journal
  - The Hill
  - Real Clear Politics









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