

# The Calm Before the Storm: Implications of Climate Change Policy for Natural Gas Utilities and Natural Gas Producers

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# Natural Gas: A Nearly Perfect Fuel

- **Abundant**

- Do we have more natural gas than coal in the U.S.?

- **Clean**

- Lowest emissions of CO<sub>2</sub>, SO<sub>x</sub>, NO<sub>x</sub>, and particulates from a fossil fuel
- Carbon Capture Taking Place Today: Natural Gas is being commercially converted to hydrogen today with carbon captured as a solid
- Potential to Fuel the Very Low Carbon Future Sought by UN Intergovernmental Panel on Climate Change

- **Infrastructure in Place Today**

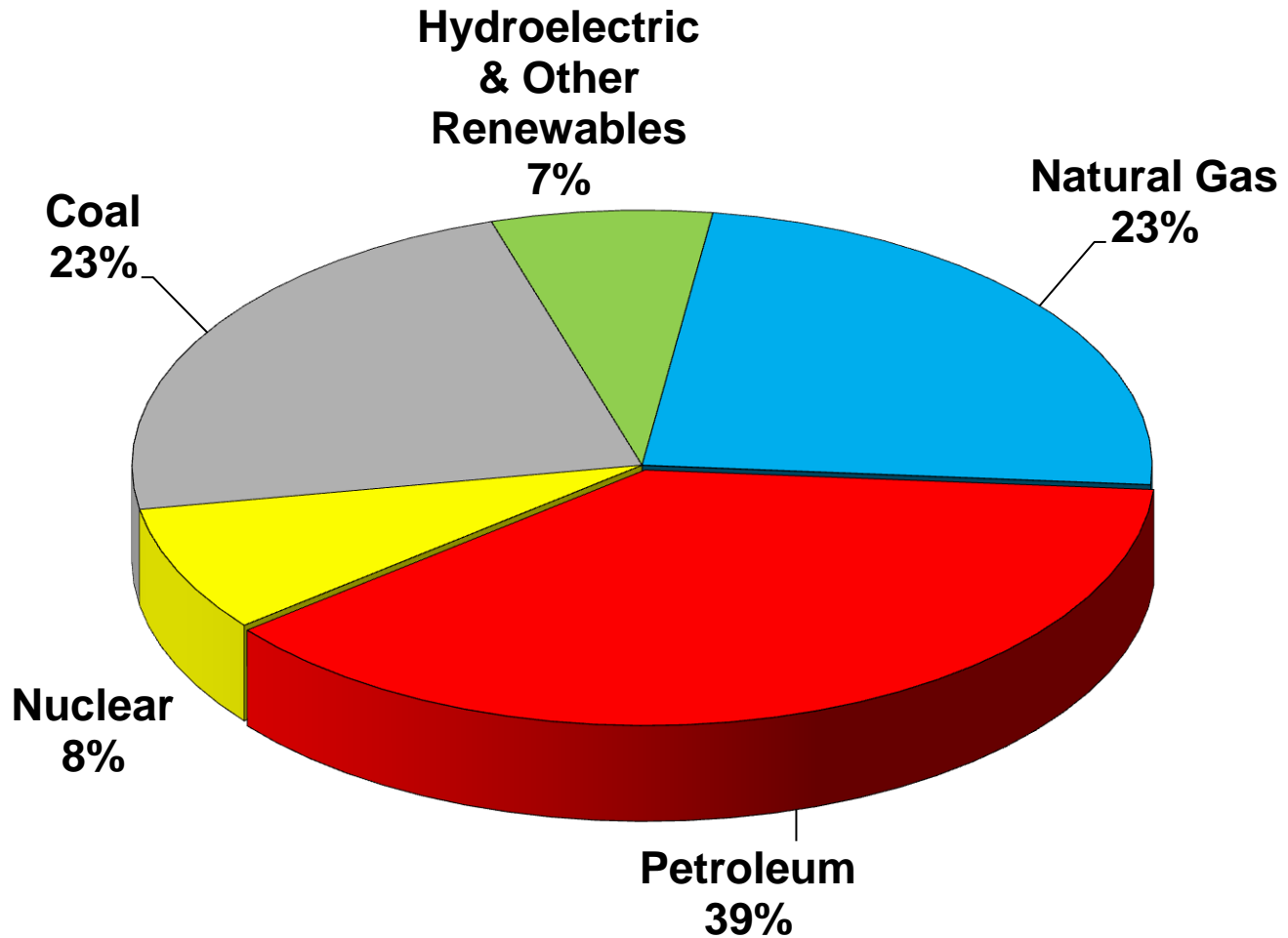
- 2.2 million miles of pipeline transporting natural gas to 69 million U.S. industrial, commercial, residential and electric generation customers
- Safest form of transportation in the U.S.

- **Today's Leader in Reducing U.S. Greenhouse Gas Emissions**

# What Makes America Run?

#1 – Oil

#2 – Natural Gas      #3 – Coal



# Outline

## Implications for Natural Gas Utilities and Producers in a Carbon-Constrained World

- Rethinking Natural Gas Supply – A New Vision of Abundance
- Trends in Natural Gas Consumption and Greenhouse Gas Emissions – Implications for Natural Gas Distribution
- Cap and Trade Legislation –
  - A Natural Gas Perspective
  - What is likely to be enacted ..... And When
  - Implications for gas distribution and production
- Natural gas in the next 15 years
- Natural gas post-2025
- What needs to be done now

# Rethinking Natural Gas Supply – A New Vision of Abundance

- Conventional View – Natural gas as a bridge fuel – constrained by U.S. supply
- Unconventional gas changes conventional view – *Quickly*
- EIA Understatement of Resource Base and Development Appears Chronic

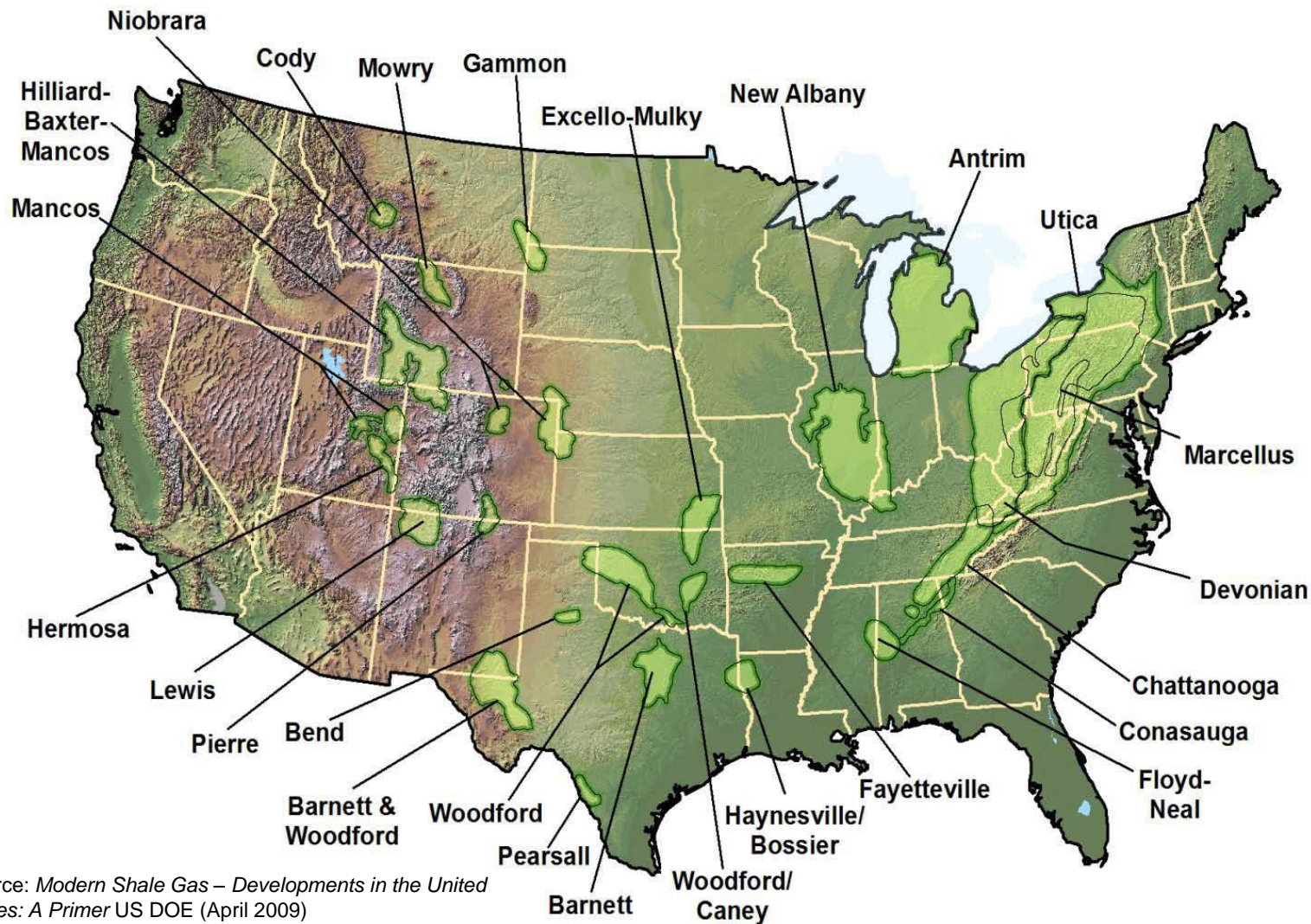
EIA forecasts of unconventional gas production in each Annual Energy Outlook (AEO) from 1998 forward have been significantly outstripped by actual behavior. (Source: North American Natural Gas Assessment – Study by Navigant Consulting for American Clean Skies Foundation, July 4, 2008)

- Unconventional Natural Gas Production:
  - 28% of US production in 1998
  - 46% of US production in 2007
- Natural Gas Shales
- Methane Hydrates
- Does the U.S. have more natural gas than coal?

# Shale Gas Resource Estimates

- Potential Gas Committee adds about 200 Trillion cubic feet (Tcf) to U.S. resource assessment between 2004 and 2006 – almost all attributed to new shale-related data
- Navigant Consulting, Inc. (2008) estimates 275-842 Tcf from 17 U.S. shale plays

# United States Shale Gas Basins



Source: *Modern Shale Gas – Developments in the United States: A Primer* US DOE (April 2009)

# New Albany Gas Shale – Indiana, Illinois, Kentucky

Estimated 160 Tcf with less than 20 Tcf technically recoverable



Source: *Modern Shale Gas – Developments in the United States: A Primer* US DOE (April 2009)



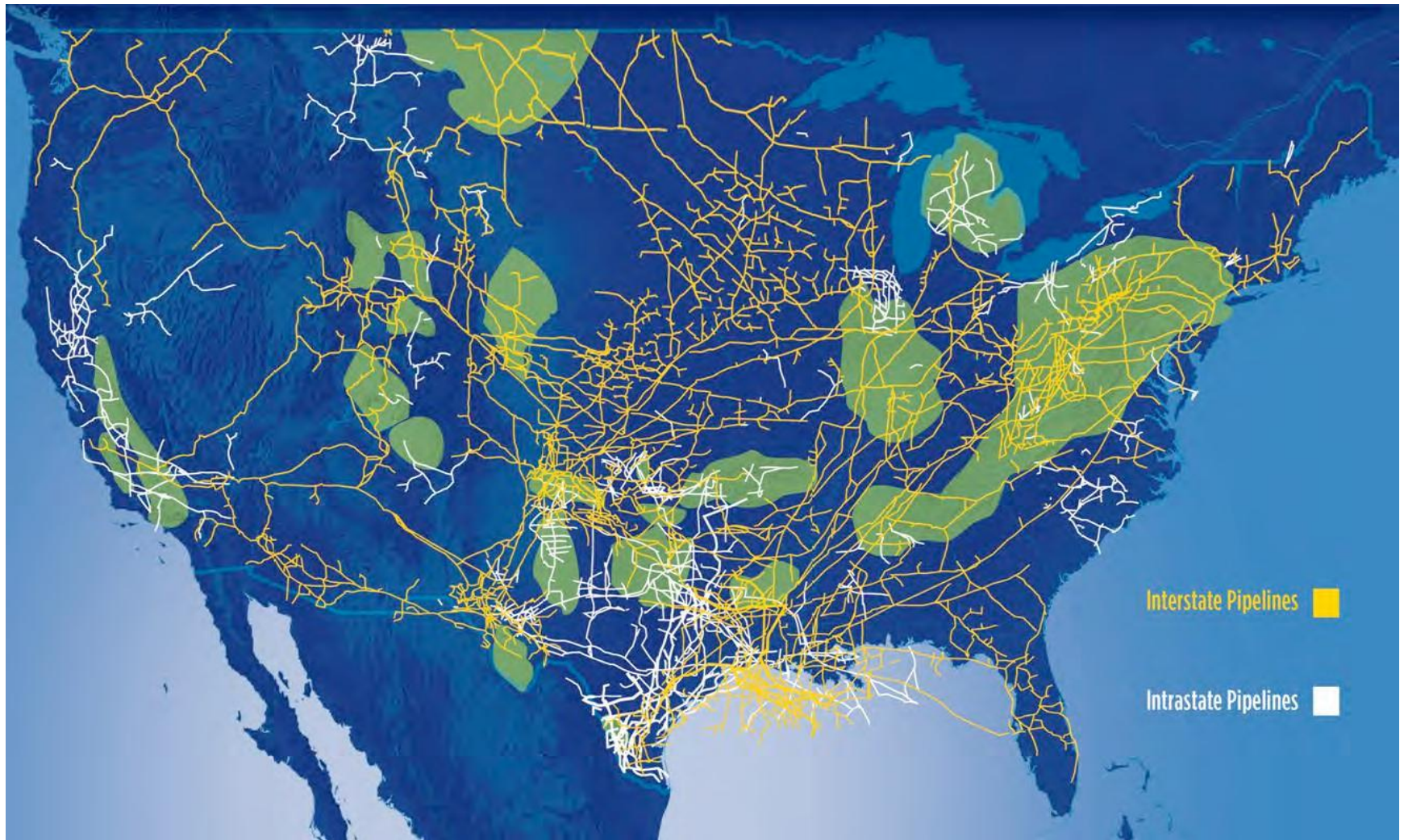
# Antrim Shale – Michigan

Estimated 76 Tcf with 20 Tcf technically recoverable

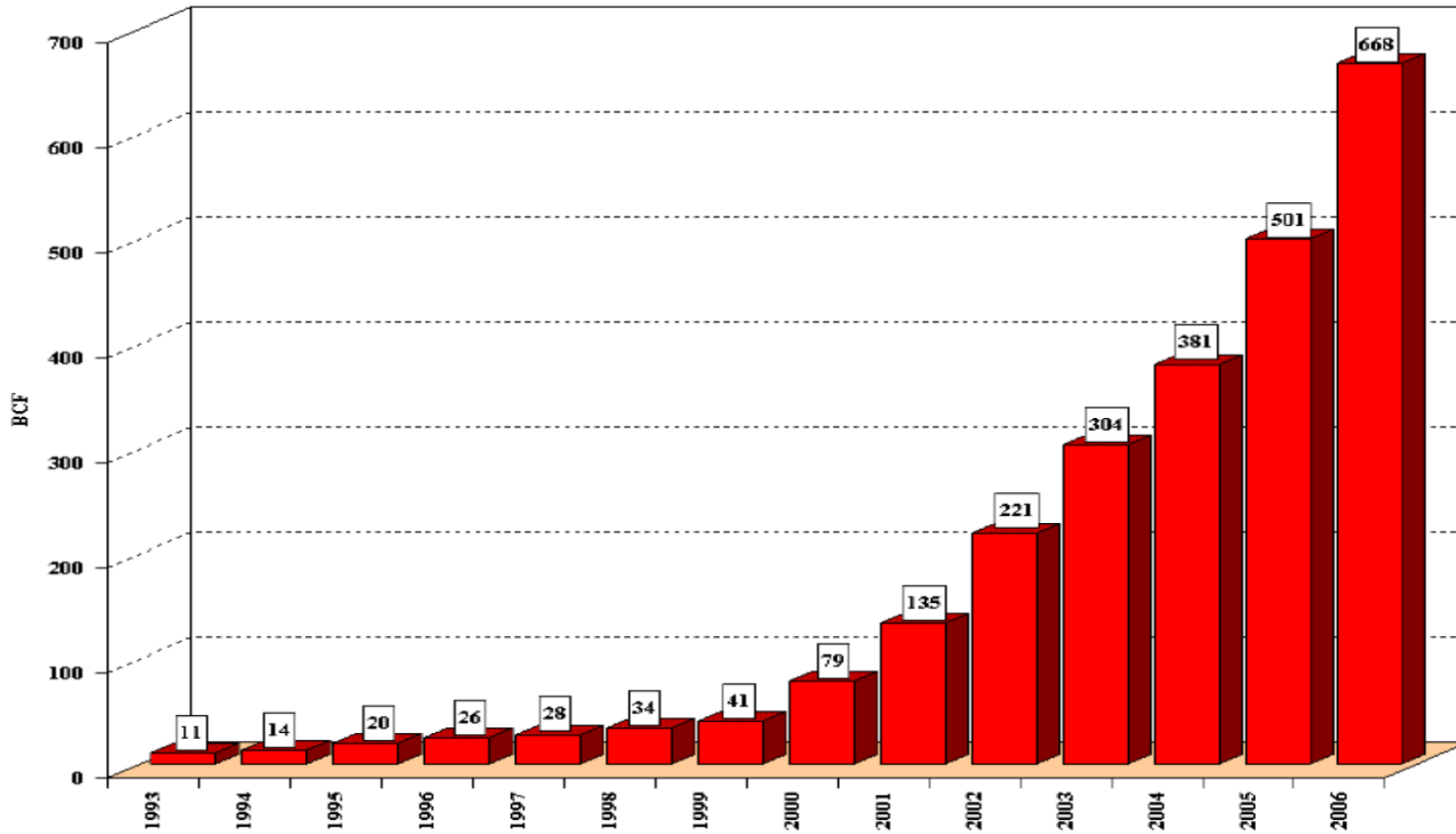


Source: *Modern Shale Gas – Developments in the United States: A Primer* US DOE (April 2009)

# Shale Basins and the U.S. Pipeline Grid



# Natural Gas Production Barnett Shale 1993-2006

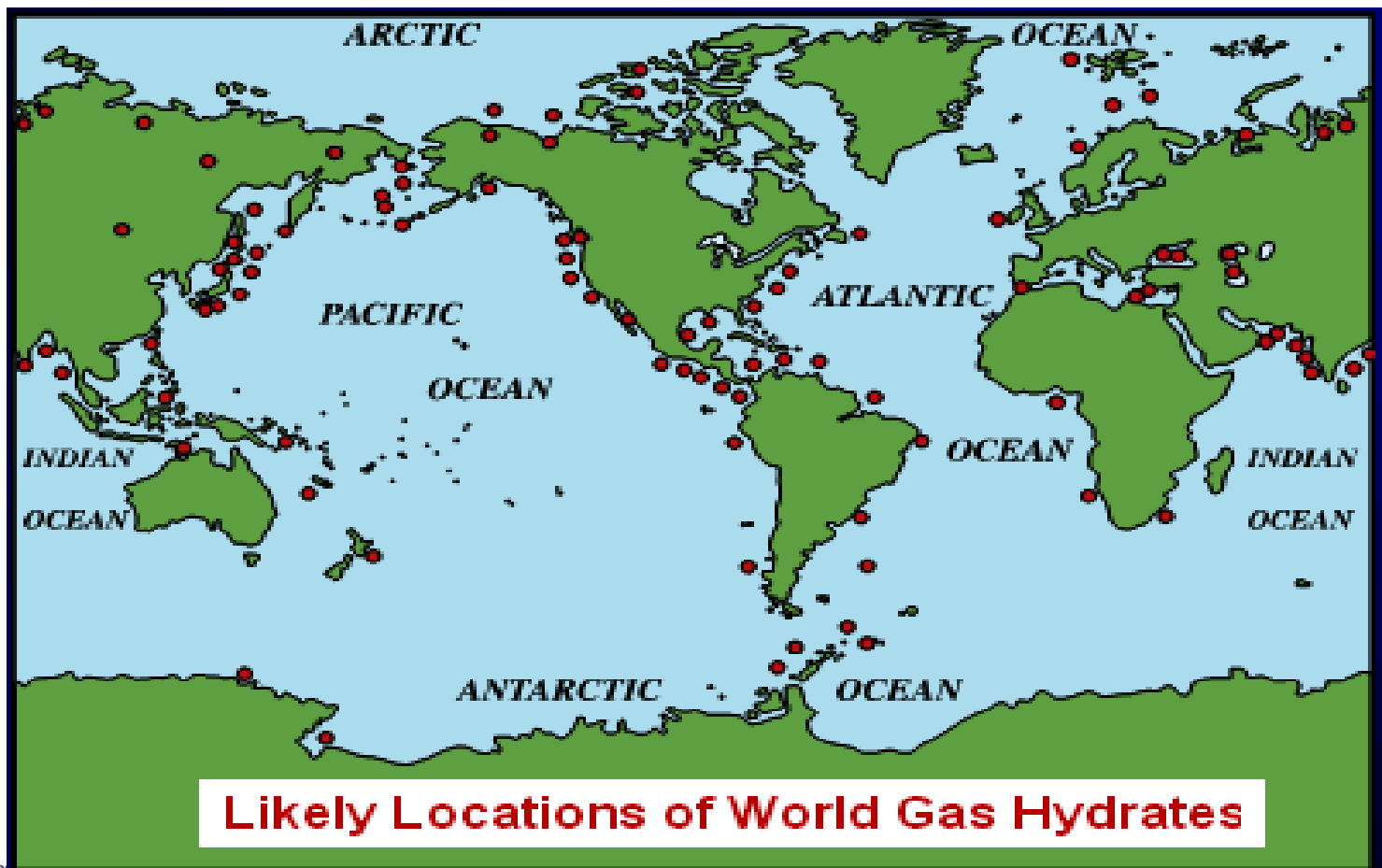


Source: Texas Railroad Commission

# Methane Hydrates (Frozen natural gas)

*The worldwide amounts of carbon bound in gas hydrates is conservatively estimated to total twice the amount of carbon to be found in all known fossil fuels on Earth.*

U.S. Geological Survey



# Natural Gas Utility Customers: U.S. Leaders in *Reducing Greenhouse Gas Emissions*

- U.S. Greenhouse Gas Emissions rose by 17% between 1990 and 2007
- The number of U.S. customers using natural gas increased by almost 29% during this period
- *Despite the 29% increase in customers using natural gas:*

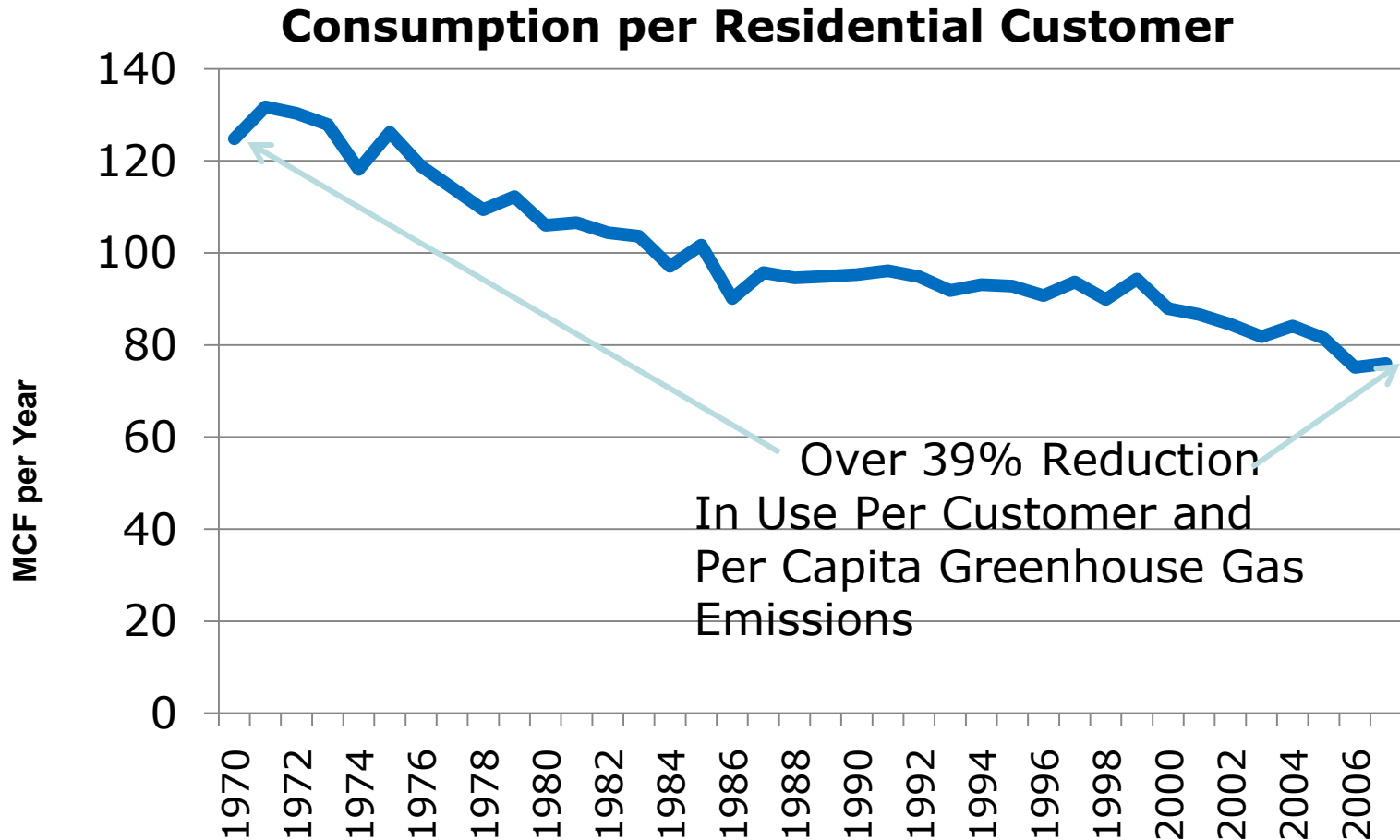
**Today U.S. Natural Gas Residential, Commercial and Industrial Customers Produce About the Same Greenhouse Gas Emissions As They Did in 1990 – and Fewer Emissions Than in 1970.**

*How did this happen?*

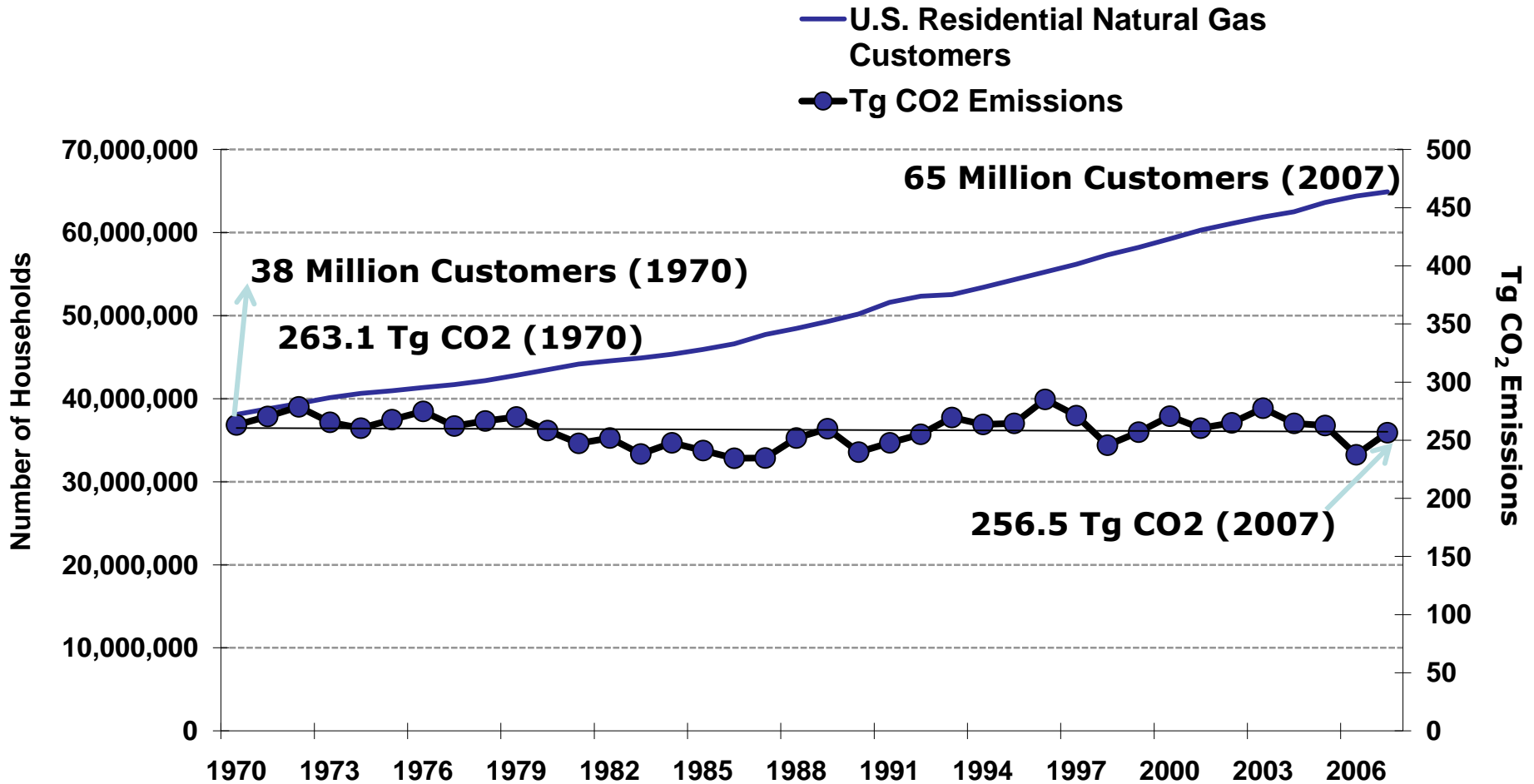
Source: US Greenhouse Gas Inventory Reports: Inventory of US Greenhouse Gas Emissions and Sinks: 1990 – 2007, USEPA # 430-R-09-004 (April 15, 2009), ES-3, and Chapter 3 – Energy at 3-3, 3-4.

<http://www.epa.gov/climatechange/emissions/usinventoryreport.html>

# Declining Use per Natural Gas Residential Customer Since 1970



# U.S. Natural Gas Customers Lead in Reducing Greenhouse Gas Emissions



# Climate Change Legislation – Goals

- Reduce total U.S. Greenhouse Gas Emissions by at least 80% below 2005 levels with staged reductions:
  - 2012 – 3%
  - 2020 – 17% or 20%
  - 2030 – 42%
  - 2050 – 83%
- Protect U.S. Economy and U.S. Consumers
- Be Fair
- **Get Enough Votes for Passage**



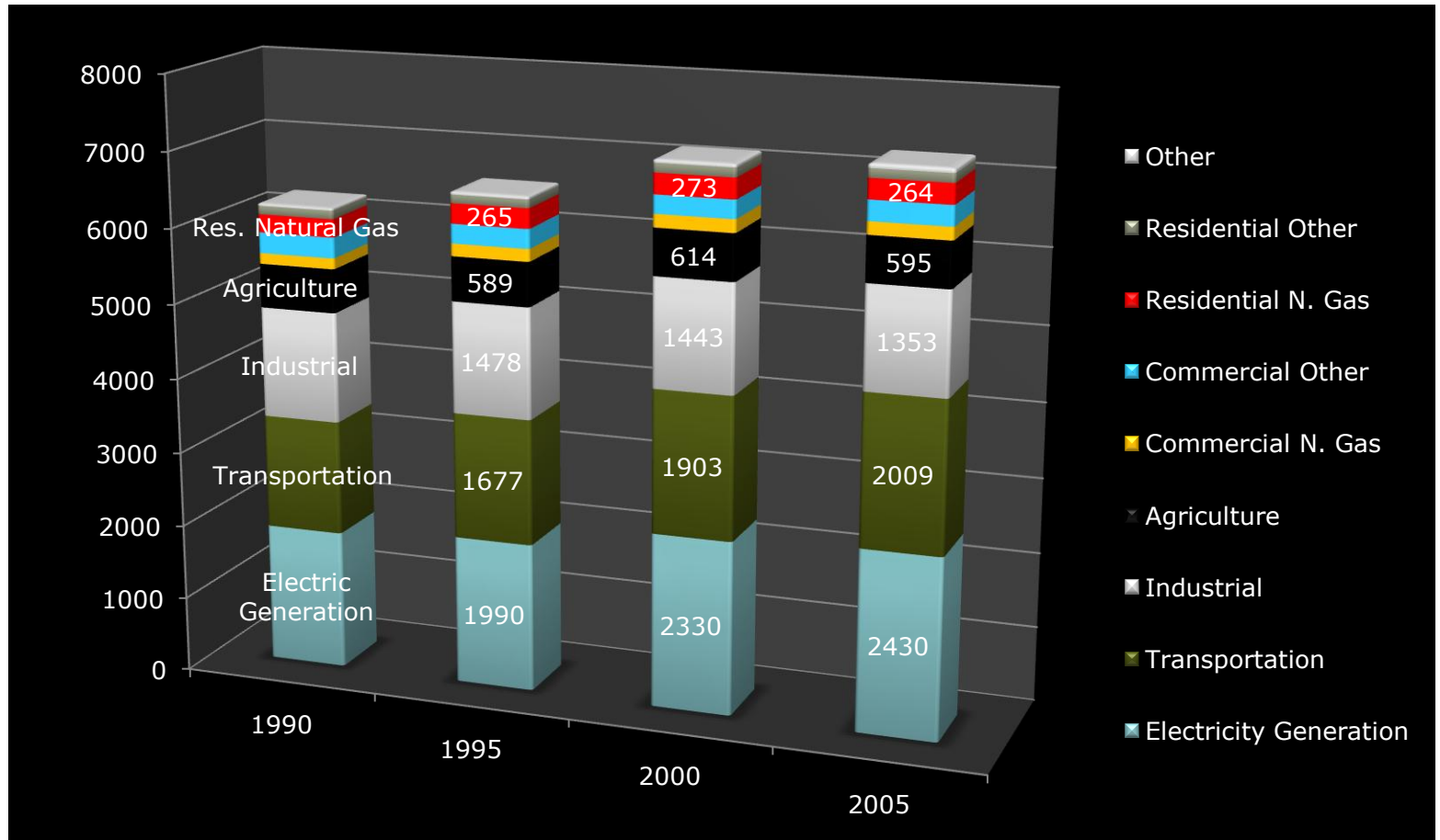
# Climate Change Legislation – A Natural Gas Perspective

- Natural Gas - Part of the Solution
- Natural gas producers “largely absent” during House debate
- New producer group –ANGA - focused on retaining and growing natural gas market
- Similar Treatment for natural gas and electric customers under Waxman-Markey *except*:
  - Residential, commercial and small industrial natural gas customers covered in 2016 (electric customers in 2012)
  - Natural gas utilities receive 9% of emission allocations (less than current requirements = higher customer bills )
  - Natural gas utilities must allocate 1/3 of allowances to energy efficiency programs – net impact of higher natural gas bills in earlier years
  - Carbon footprint labeling for appliances (may favor gas appliances)

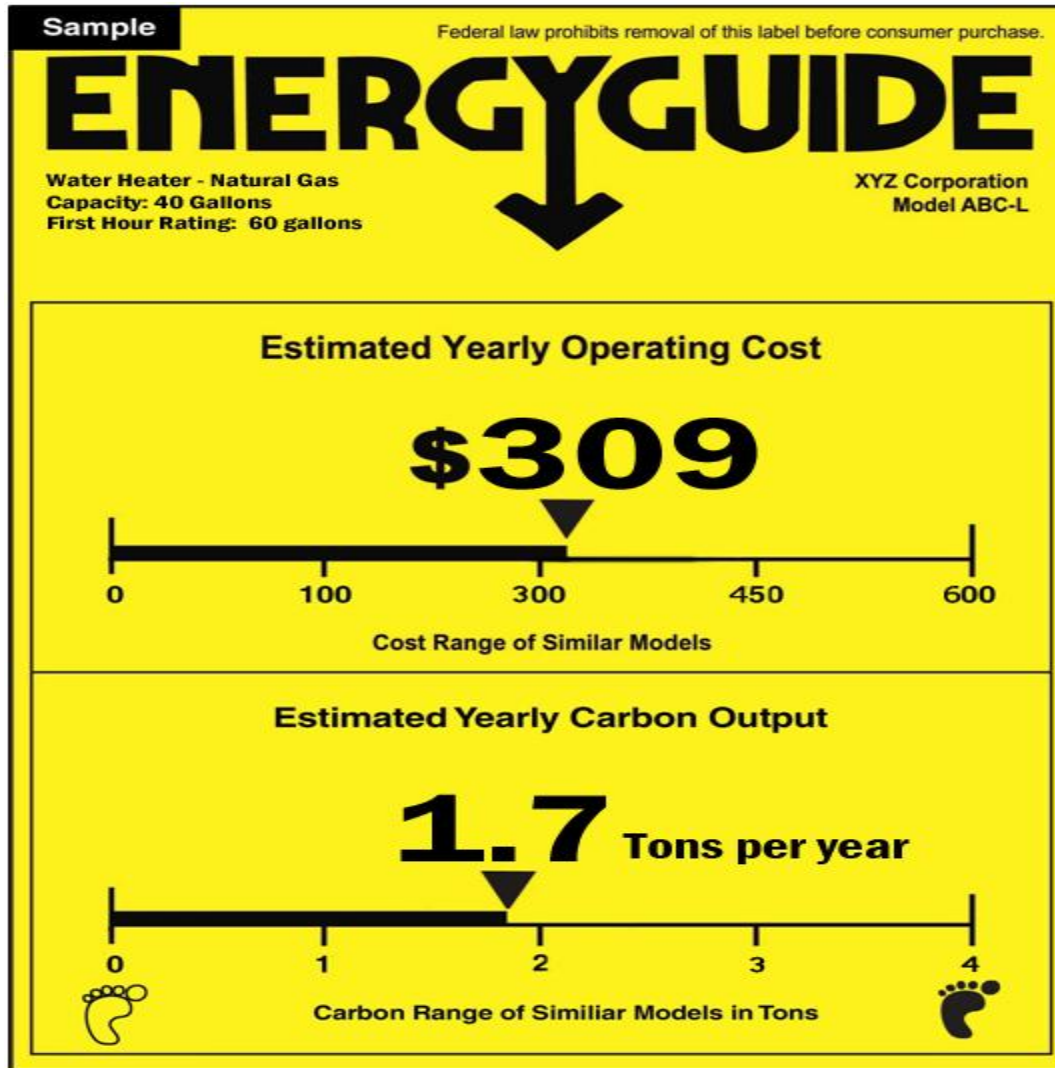
# U.S. GREENHOUSE GAS EMISSIONS BY SECTOR

## 1990-2005 (Tg CO<sub>2</sub> EQUIVALENT)

OVER 80% FROM THREE SOURCES: ELECTRICITY GENERATION, TRANSPORTATION AND INDUSTRIAL



# Carbon Footprint Labeling



# The Senate

## Multiple Actions

1. **Senate Energy Bill** - Senate Energy and Natural Resources Committee approved a bill 15-8 on June 17, 2009 – *The American Clean Energy Leadership Act of 2009, S. 1462*
2. **Senate Climate Change Legislation**
  - Kerry-Boxer bill passed by Environment and Public Works Committee (October 23, 2009)
  - Other committees will also consider climate change .... And new proposals are floated
  - Sixty votes are necessary in the Senate to avoid a filibuster

# The Senate *Energy* Bill – The American Clean Energy Leadership Act of 2009 (ACELA), S. 1462 (Bingaman Bill)

- **Electricity**

- Requires 15% renewable electricity standard (RES) by 2021
- Strengthens federal backstop siting authority for high priority electric transmission

- **Natural Gas**

- Requires OCS inventory
- Opens Eastern Gulf of Mexico to exploration and production
- Increases amount of loan guaranty to \$30 billion for Alaska Natural Gas Pipeline

- **Energy Efficiency**

- Strengthens appliance efficiency programs and Energy Star programs
- Increases building efficiency
- Promotes manufacturing energy efficiency

# S. 1733 - The Clean Energy Jobs and American Power Act (Kerry-Boxer *Climate Change* Bill)

- Similar to House Cap and Trade bill but includes floor and ceiling prices for emission allowances
- Much horse-trading needed to get 60 votes
- Reflects new lobbying by natural gas producers
  - Subsidies to dispatchable power sources that reduce greenhouse gas emissions per megawatt below a 2007 baseline
  - Priority to generation projects that are designed to integrate intermittent renewables
  - Support for R&D for low greenhouse gas-emitting end-use technologies – including natural gas

## End Game 2009 – A Likely Scenario?

- Highly unlikely that there will be 60 votes in the Senate for climate change bill this year
- Likely that there are 60 votes in the Senate for an *energy* bill (Bingaman Bill)
- House and Senate energy provisions (but *not* climate change provisions) *could* go to House-Senate conference in late 2009 or early 2010
- Awaiting tax title
- Energy bill may result
- 2010 – work continues on climate change bill -- and energy bill (if not passed in 2009)

# Impact of Climate Change Legislation on Outlook for Natural Gas

	SHORTER TERM	LONGER TERM
NATURAL GAS PRICE RELATIVE TO COMPETITION	+	?
ABILITY TO FUNCTION UNDER CAP	+	?
AVAILABILITY OF HIGH EFFICIENCY, LOW CARBON TECHNOLOGY	+	?
NATURAL GAS SUPPLY AVAILABILITY	+	?
NATURAL GAS DEMAND FOR ELECTRICITY GENERATION	+	?



# The Challenge Ahead for Natural Gas

*"If I'd asked my customers what they wanted, they'd have said a faster horse" – Henry Ford*

- An 80% reduction in greenhouse gas emissions by 2050
  - Thinking about very abundant U.S. natural gas
- (“The Stone Age didn’t end because we ran out of stones” – Sheikh Ahmed Zaki Yamani)
- The opportunity is very bright in the short-term
    - Declining use of natural gas per customer driven by much more efficient appliances and buildings
    - Declining greenhouse gas emissions per natural gas customer
  - What happens in 2025 – 2030?
    - Lower carbon electric generation mix
    - More efficient electric appliances and more energy efficient homes
    - A different “horse”
  - Must begin developing low carbon natural gas end use appliances today
    - AGA Board-approved R&D Initiative
  - Natural gas and the hydrogen economy



Thank You

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