

Natural Gas Supply from the Gulf of Mexico



ALERT:

GAME

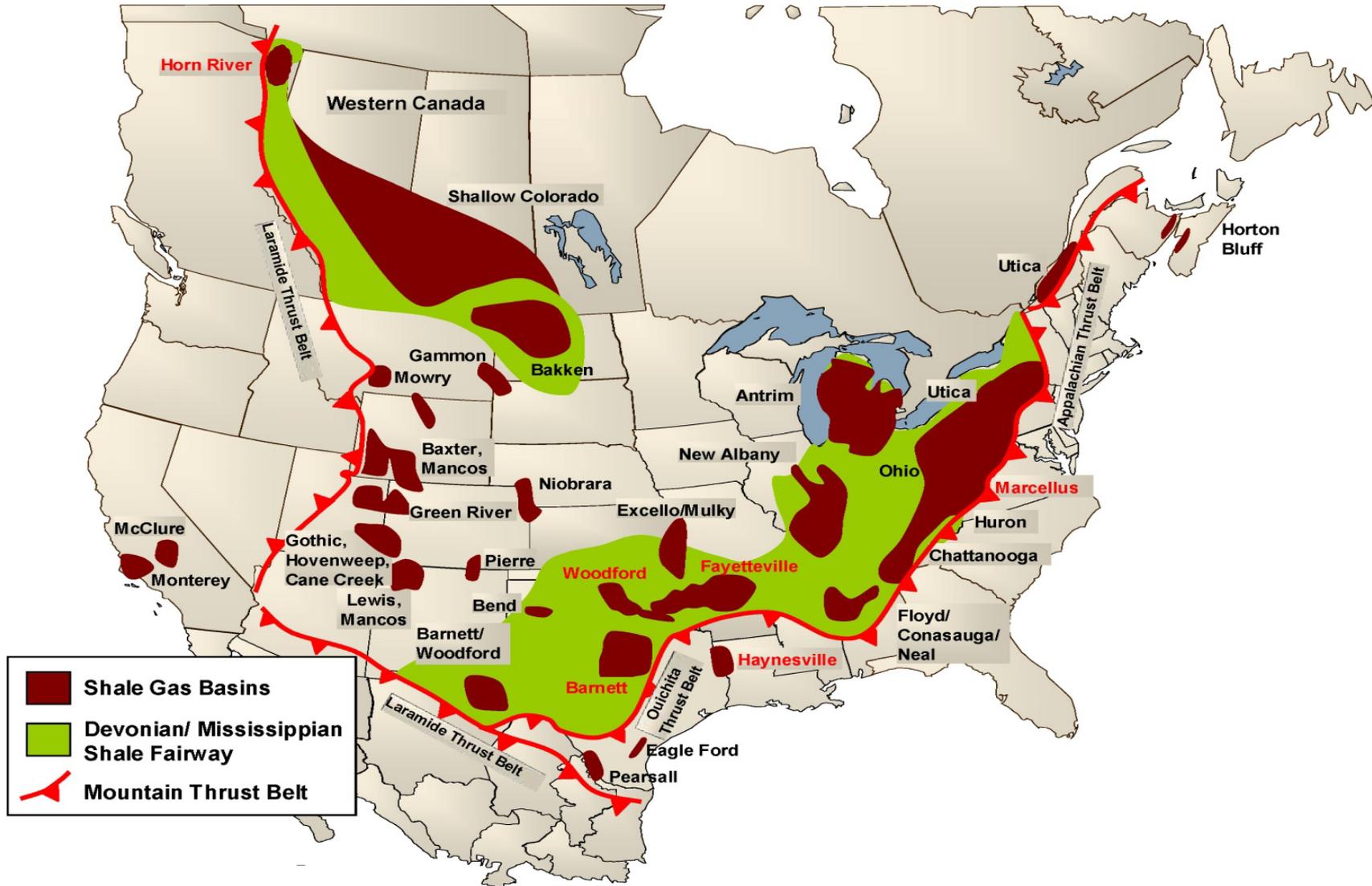
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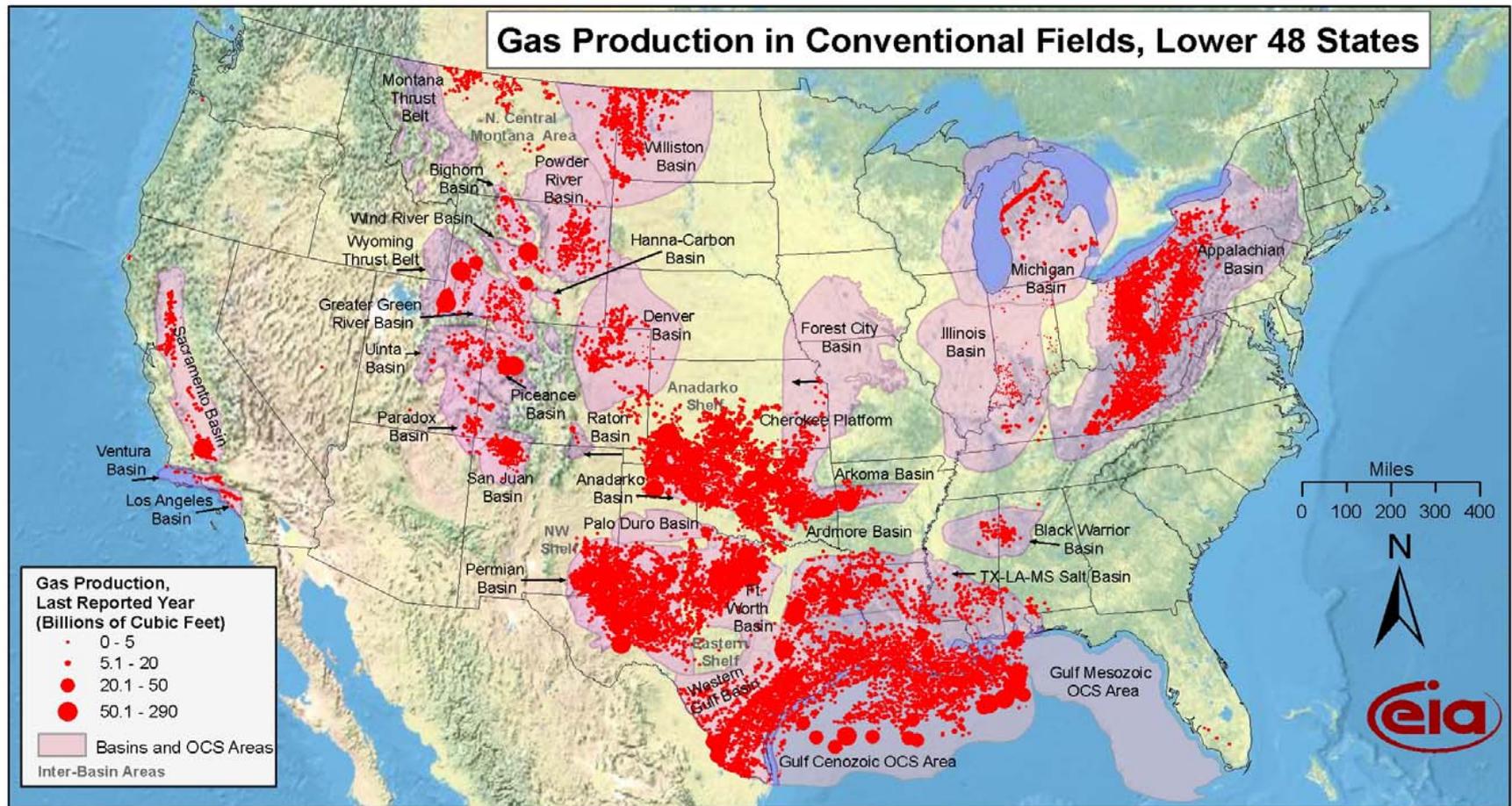


Gas Shales!!

- 100+ years of cleaner burning natural gas

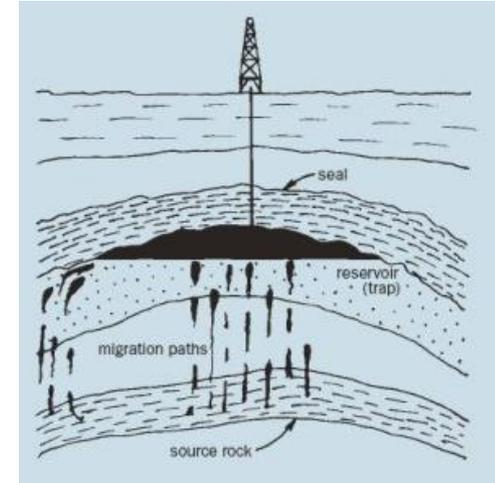
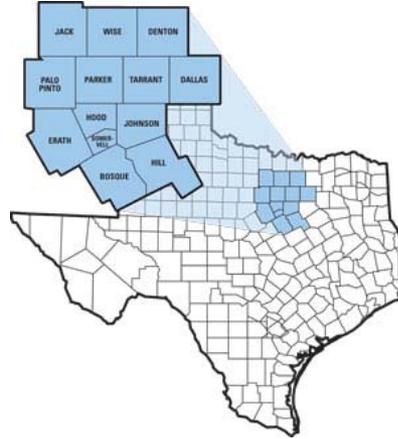


Natural Gas Supply Sources

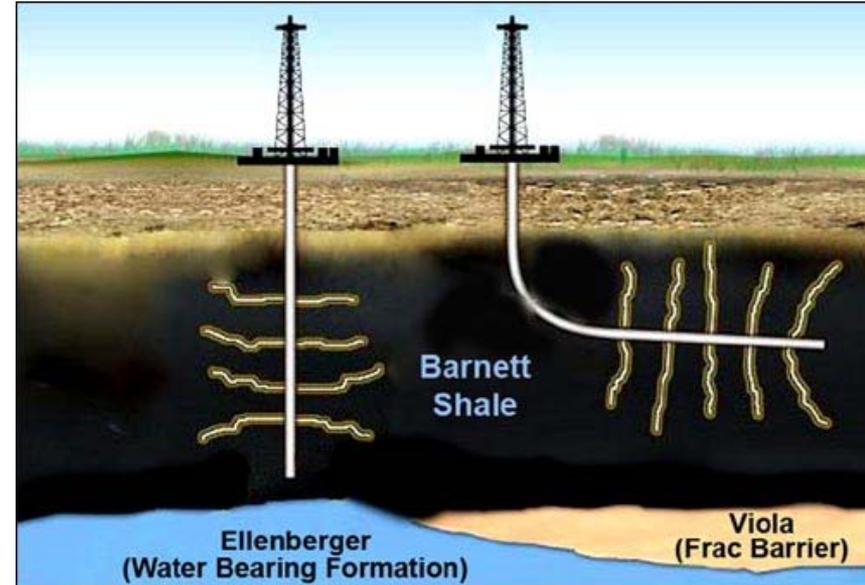
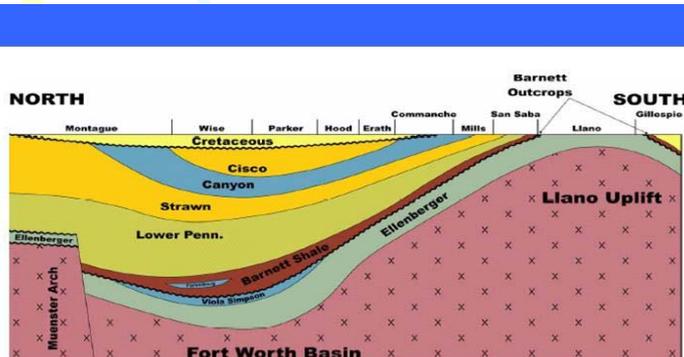


Source: Energy Information Administration based on data from HPDI, IN Geological Survey, USGS
Updated: April 8, 2009

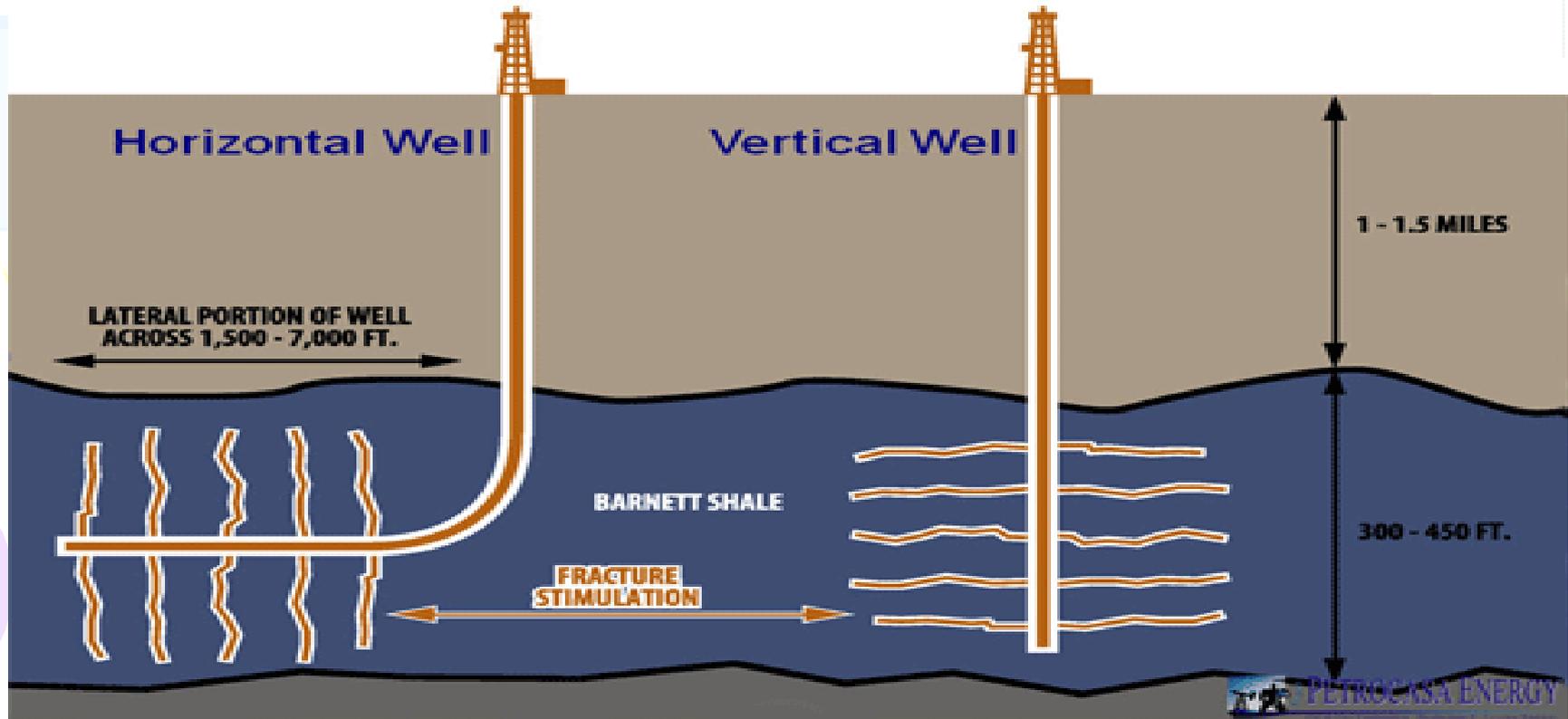
2002- Shale Plays Mitchell Energy Led the Way



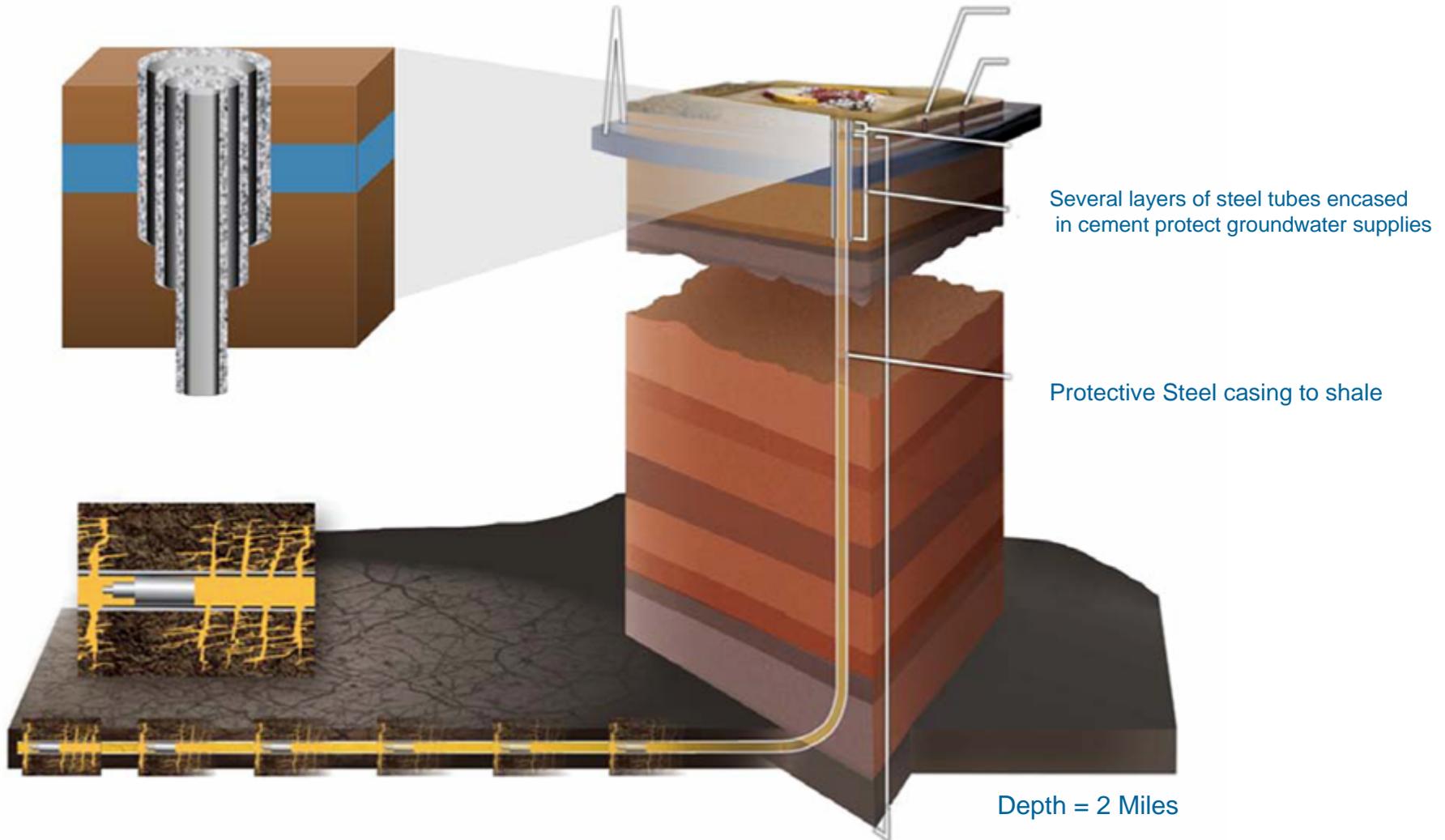
- 1950's-1990's.. George Mitchell produces gas from Ft. Worth Basin
- "small" oil & gas wells for many years
- The "source" --Barnett Shale-"Mother Lode"
- It was under "everything" for 5,000 sq mi!!



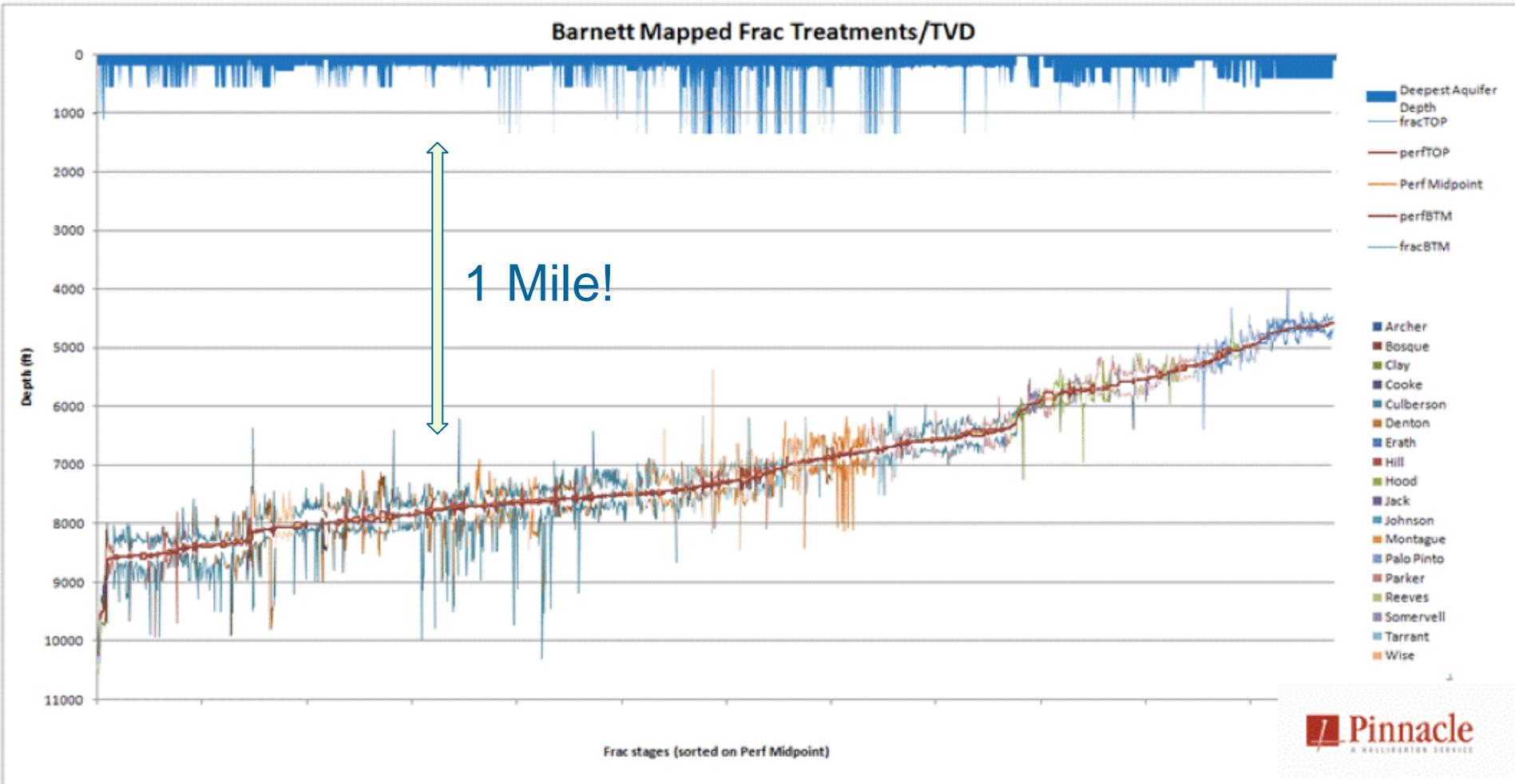
Shale Gas Supply



Shale Plays: Aquifer Protection



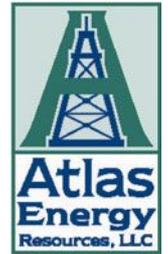
Depth of Affected Region Affected by Hydraulic Fracturing



Fisher (2010)

<http://nwis.waterdata.usgs.gov/nwis/inventory>

Domestic Independent Producers



Shale Discoveries = Barnett, Haynesville, Fayetteville, Marcellus, Bakken, Eagle Ford, Niobrara, Antrim, etc

"The Big Boys"

- Jan '10.. **TOTAL** & Chesapeake—Now #3, \$2.5 Billion!
- March 10'... **Exxon-Mobile** & XTO Energy—\$41 Billion!!
- May '10.. Quicksilver Resources partners with **ENI** (Italy)
- May '10... **Shell**... \$4.7 B! buys East Resources (Marcellus)
- Nov '10... **Chevron** acquires Atlas Energy \$4B! (Marcellus)
- Dec '10... **CNOOC**.... 1B! in Chesapeake Energy-Barnett
- Jan '11.. Quicksilver lease agreement- **Reliance Energy** (India)
- Feb 1 '11... **CNOOC**-1/3 of Niobrara (Colo) with CHK
- May 5 '11... **Chevron** Buys Chief O&G in Marcellus
- Jan 2012... **Marubeni** (Japan) in Eagle Ford (52,000 acres)



ExxonMobil



Reliance Energy

Can Natural Gas Recover?

WHAT WE HAVE

- Abundant Supplies
- Low Emissions
- Existing Technology
- Domestic Fuel
- Sustainable for Decades
- **CHEAP!!!**

Cost for a BOE = ??

Nat Gas = \$18

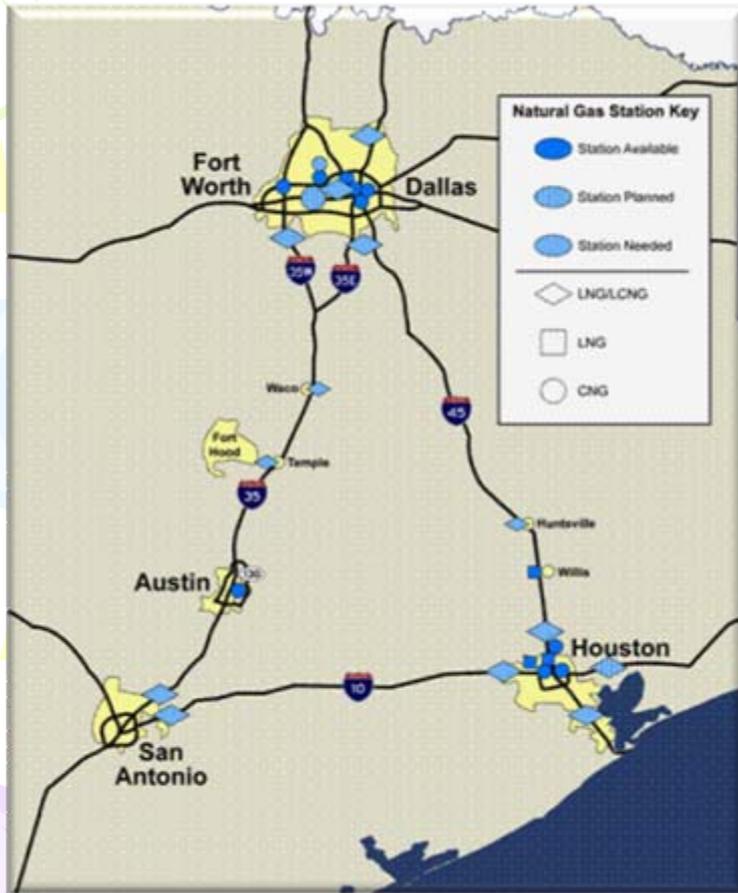
Oil = \$95!!!!!!!!

WHAT WE NEED

- Infrastructure
- Incentives
- Better Price
- Demand
- Competition
- **MARKETS!!**



The Texas NGV Triangle (Clean Transportation)



Texas SB-20

- Cooperative effort between natural gas producers, fleet customers and state government.
- 20% of TERP Money (Texas Emissions Reduction Plan)--\$20-\$30 million
- DFW to Austin-San Antonio to Houston
- 20% for new stations offering public LNG and CNG—grants for 20 new stations
- 80% for government rebates for fleet owners for HDVs-500 Trucks

Detroit—GM, Ford, Chrysler



Change for 2012-13!!

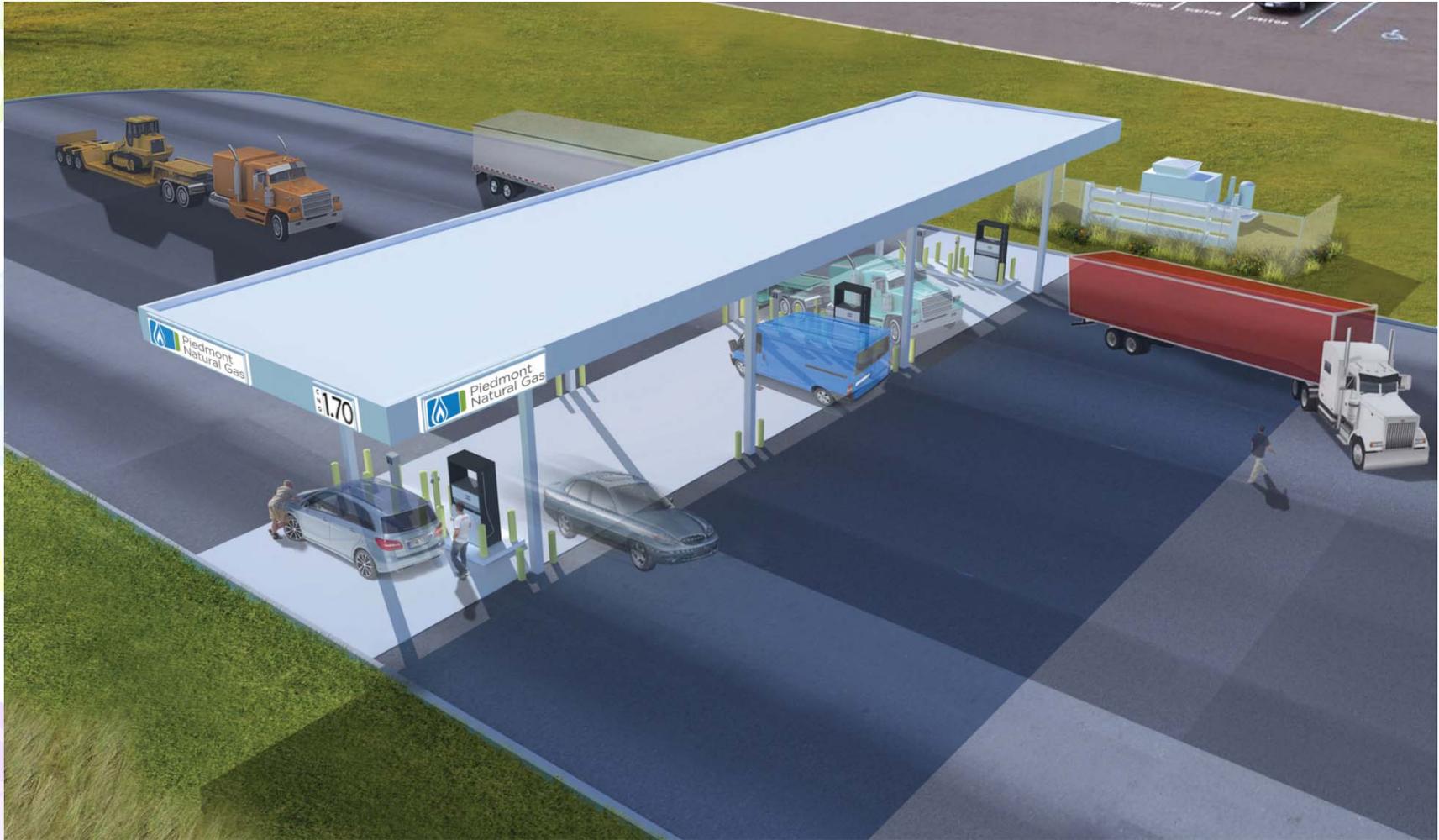


Shell & TA Centers!

Shell Oil and truck stop chain TravelCenters of America agreed to build and operate at least 100 natural gas fueling stations for heavy-duty trucks along U.S. Interstates.



New Public CNG Stations





3M to Make Fuel Tanks for Natural Gas Vehicles

The manufacturing giant, intends to develop less-expensive, higher-performance, lighter, and higher-capacity fuel tanks—which it hopes will jump-start the market for natural gas-fueled vehicles.

Carbon Fiber and new Nanoparticles for extra strength

Up to 20% lighter and 20% greater capacity

Expanding NG Markets!!



Back-UP Fuel



Base Fuel



- 1. CNG
 - 2. LNG
- Transportation Fuels



Air Products makes the Hydrogen for the Space Shuttle
They also made the Hydrogen Fuel Station at Worldsnest
Hydrogen for the Space Shuttle is from Natural Gas

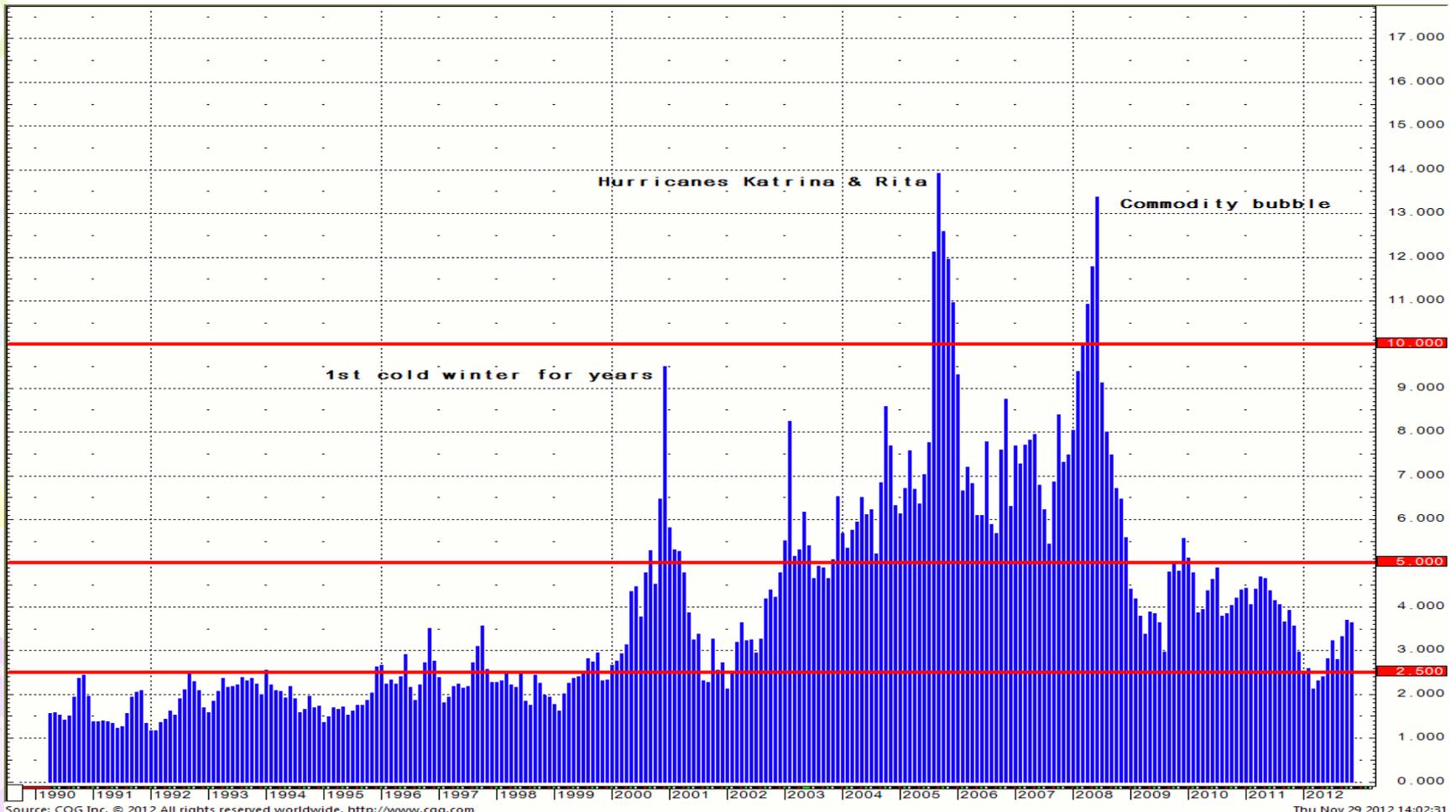


Air Products worlds largest supplier of hydrogen from sustainable sources
Natural Gas
Solar
Wind
Gasification
Anaerobic Digester

Robert Plarr
Victoria Peters
Chris Sanders
supports sustainable integration

Hydrogen Source

NYMEX Natural Gas Futures Prices



Physical Gas Procurement Then and Now

• **MLGW Gas Purchases 1984**

- One supplier
- One pipeline with storage
- One known low fixed cost (tariff rate)

• **MLGW Gas Purchases 2012**

- Up to 50 different physical suppliers
- Manage 3 pipelines and underground storage
- Variable prices ranging from \$2.00 to \$14.75
- Prices change every day, month and season

7 Year Gas Purchase Costs

| Year | MMBtu | \$/MMBtu | ACTUAL |
|-------------|------------|----------|--------------------|
| | Purchased | | \$ AMT Purchased |
| 2005 | 42,530,480 | \$8.668 | \$368,652,444.71 |
| 2006 | 37,641,447 | \$7.331 | \$275,959,857.00 |
| 2007 | 43,597,597 | \$6.546 | \$285,389,721.57 |
| 2008 | 45,209,400 | \$8.343 | \$377,194,500.52 |
| 2009 | 39,505,317 | \$3.817 | \$150,790,352.79 |
| 2010 | 42,840,795 | \$4.419 | \$189,315,344.12 |
| 2011 | 35,452,840 | \$3.867 | \$137,095,103.35 |
| <hr/> | | | |
| 286,777,876 | | | \$1,784,397,324.06 |

7 Year Pipeline Costs

| Year | ANR | Trunkline | PEPL | Texas Gas | Total |
|------|--------------|--------------|-------------|---------------|---------------|
| 2005 | \$1,719,449 | \$6,827,752 | \$0 | \$17,319,263 | \$25,866,464 |
| 2006 | \$1,715,815 | \$6,615,014 | \$0 | \$17,071,135 | \$25,401,964 |
| 2007 | \$1,698,222 | \$7,368,515 | \$1,709,194 | \$17,075,860 | \$27,851,791 |
| 2008 | \$1,704,895 | \$8,013,819 | \$1,471,299 | \$17,124,053 | \$28,314,066 |
| 2009 | \$1,697,623 | \$8,022,737 | \$1,467,268 | \$17,099,594 | \$28,287,221 |
| 2010 | \$1,798,556 | \$8,032,135 | \$1,462,122 | \$17,049,192 | \$28,342,006 |
| 2011 | \$1,347,503 | \$8,077,736 | \$1,434,144 | \$17,183,085 | \$28,042,469 |
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| | \$11,682,064 | \$52,957,708 | \$7,544,026 | \$119,922,183 | \$192,105,981 |