The Energy Outlook: Trends and Policies Impacting Southeastern Natural Gas Supply and Demand Growth

Second Annual Local Economic Analysis and Research Network ("LEARN") Conference
Federal Reserve Bank of Atlanta

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Take Away Points – What's Happened?

- **Worst economic recession in history. Record unemployment rates by any measure makes this the single most important benchmark and characteristic.**
- **Demand impacts (domestic, global) were considerable and have significant impacts on prices.**
- **Market has reacted with considerable supply, transportation, refining/processing and storage infrastructure development despite volatile prices and risks.**
    - **Classic industry infrastructure overshoot...**
- **Natural gas production and reserve increases have been impressive. Crude reserves holding steady with some anticipated growth in production in EOR and deepwater. Very impressive resource development over the past three years alone.**
    - **Classic industry innovation response….**

Market Disruption

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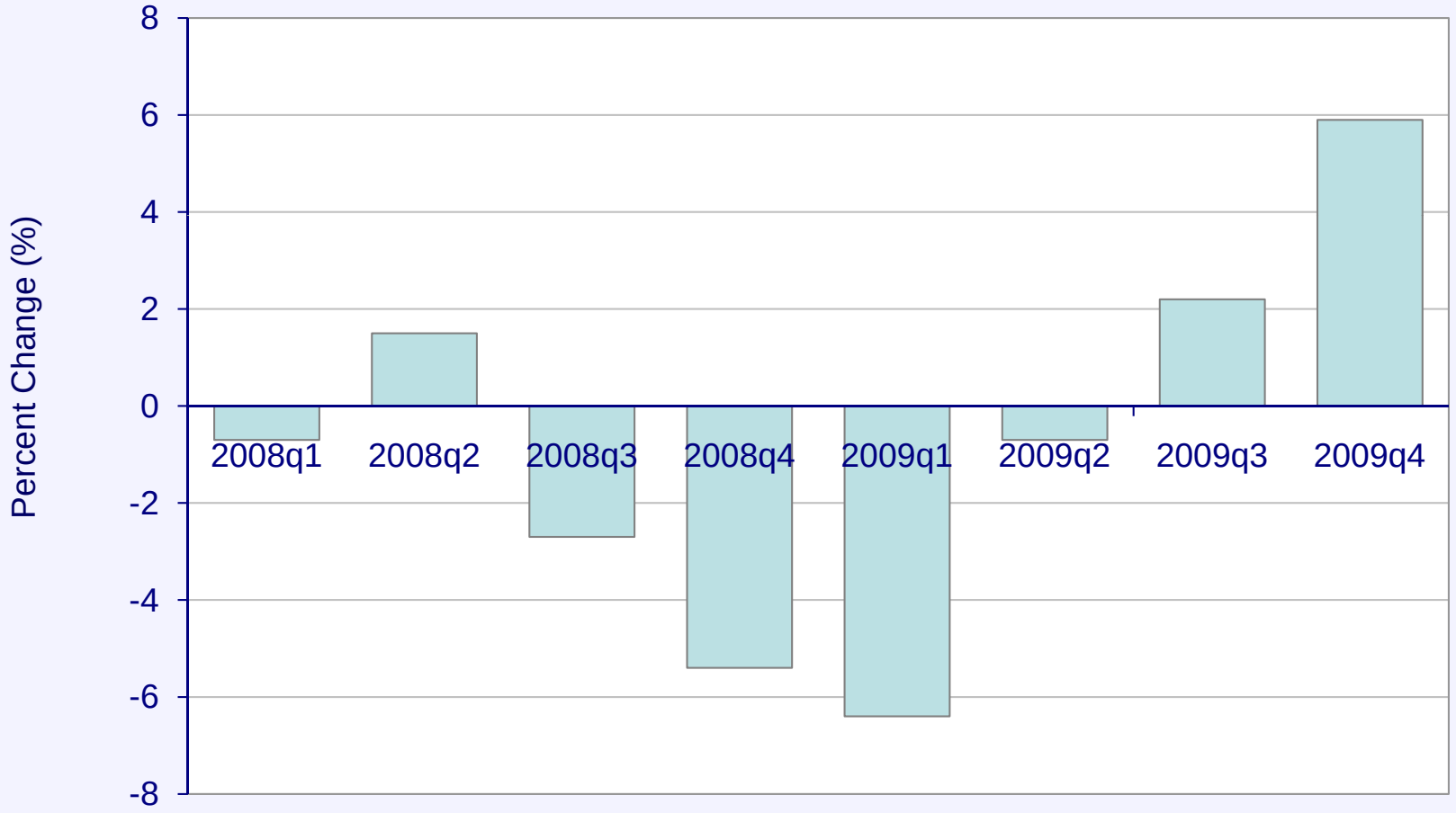
Percent Change in Quarterly GDP

U.S. economy has technically been in recession since the beginning of 2008.



Source: Bureau of Economic Analysis, U.S. Department of Commerce.

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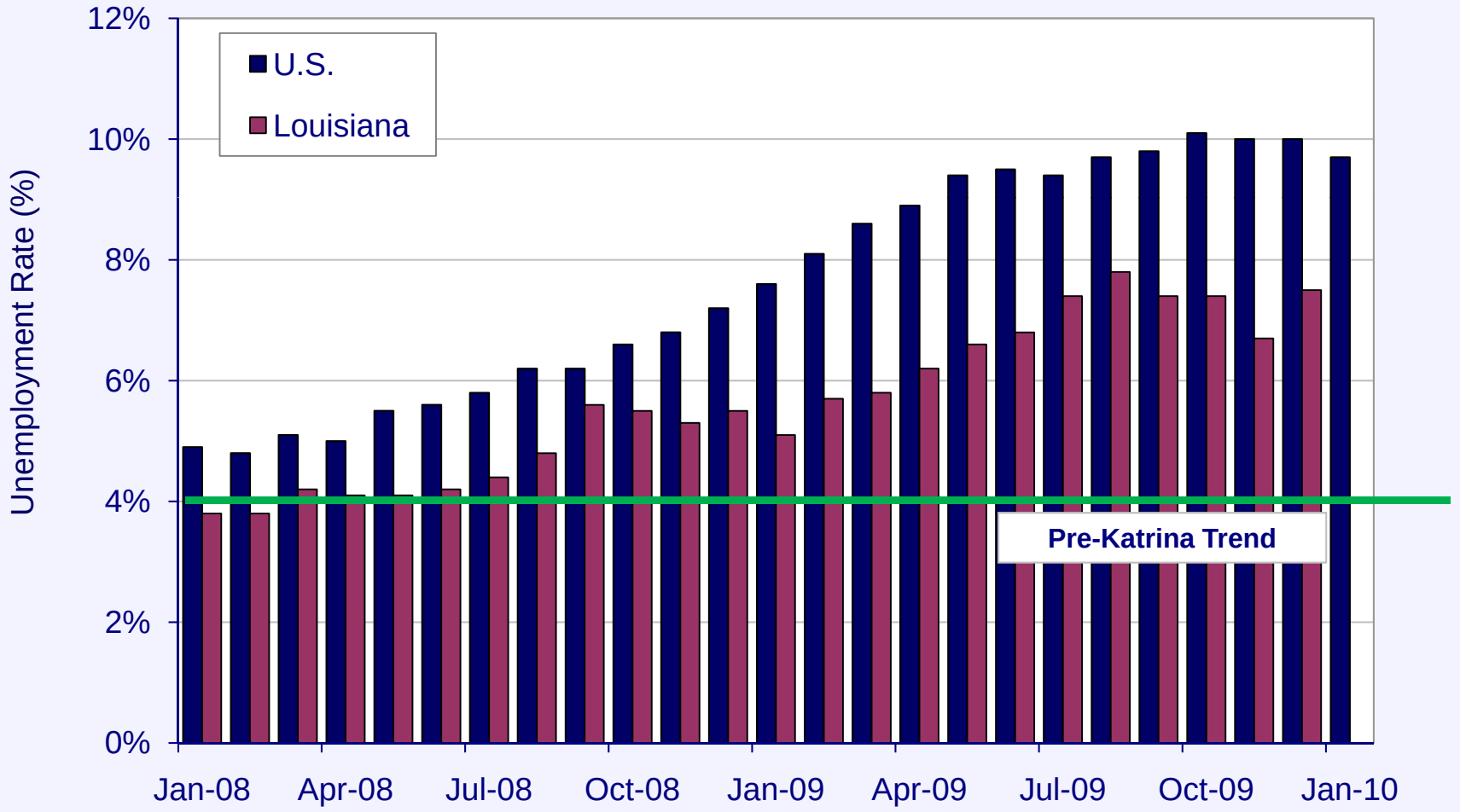
Unemployment Rate
U.S. and Louisiana

Louisiana employment compares well with national average on aggregate basis.



Source: Bureau Labor Statistics, U.S. Department of Labor.

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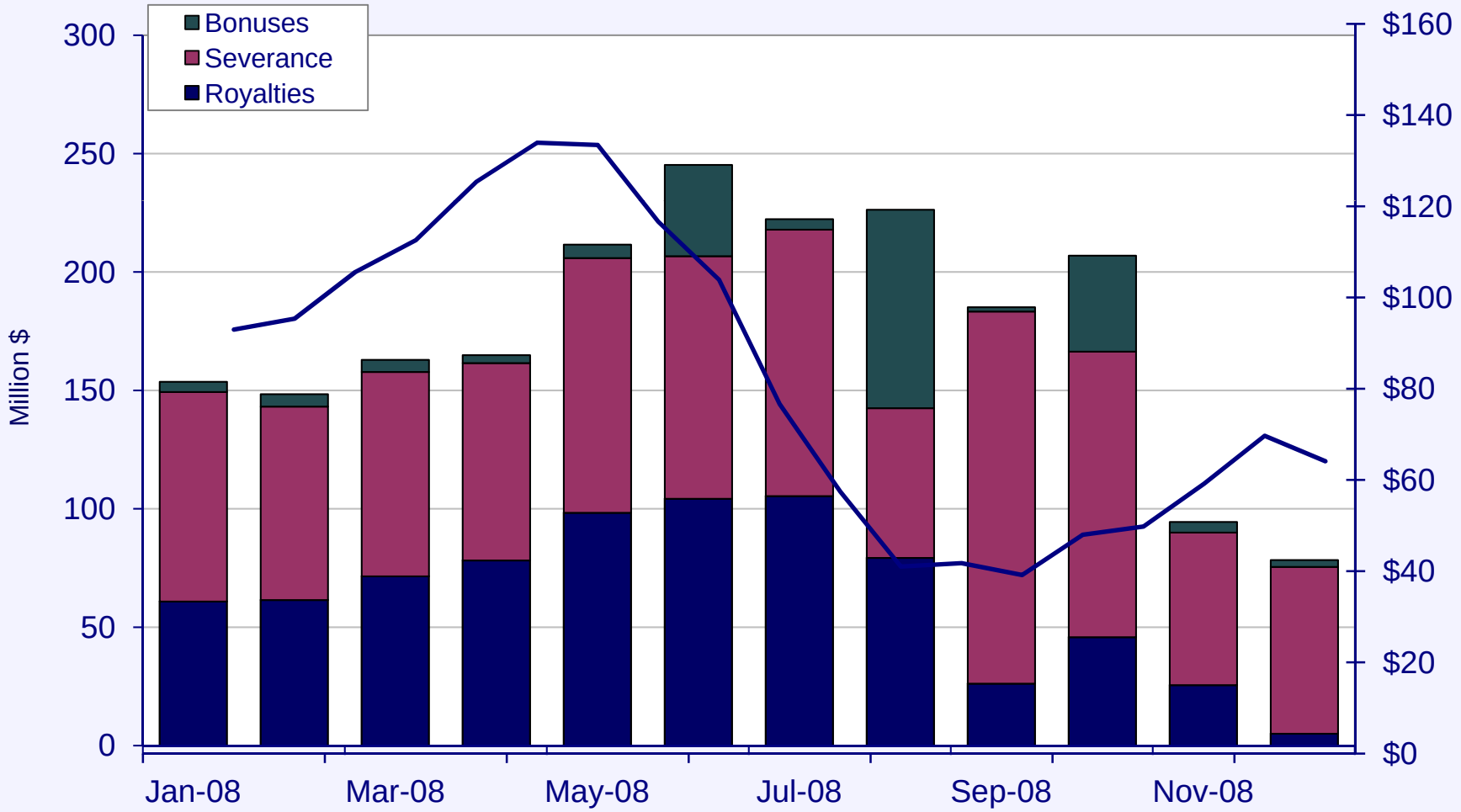
Trends in Mineral Revenues

State mineral revenues, which were growing at rapid rate, have fallen off considerably due to energy price decreases.



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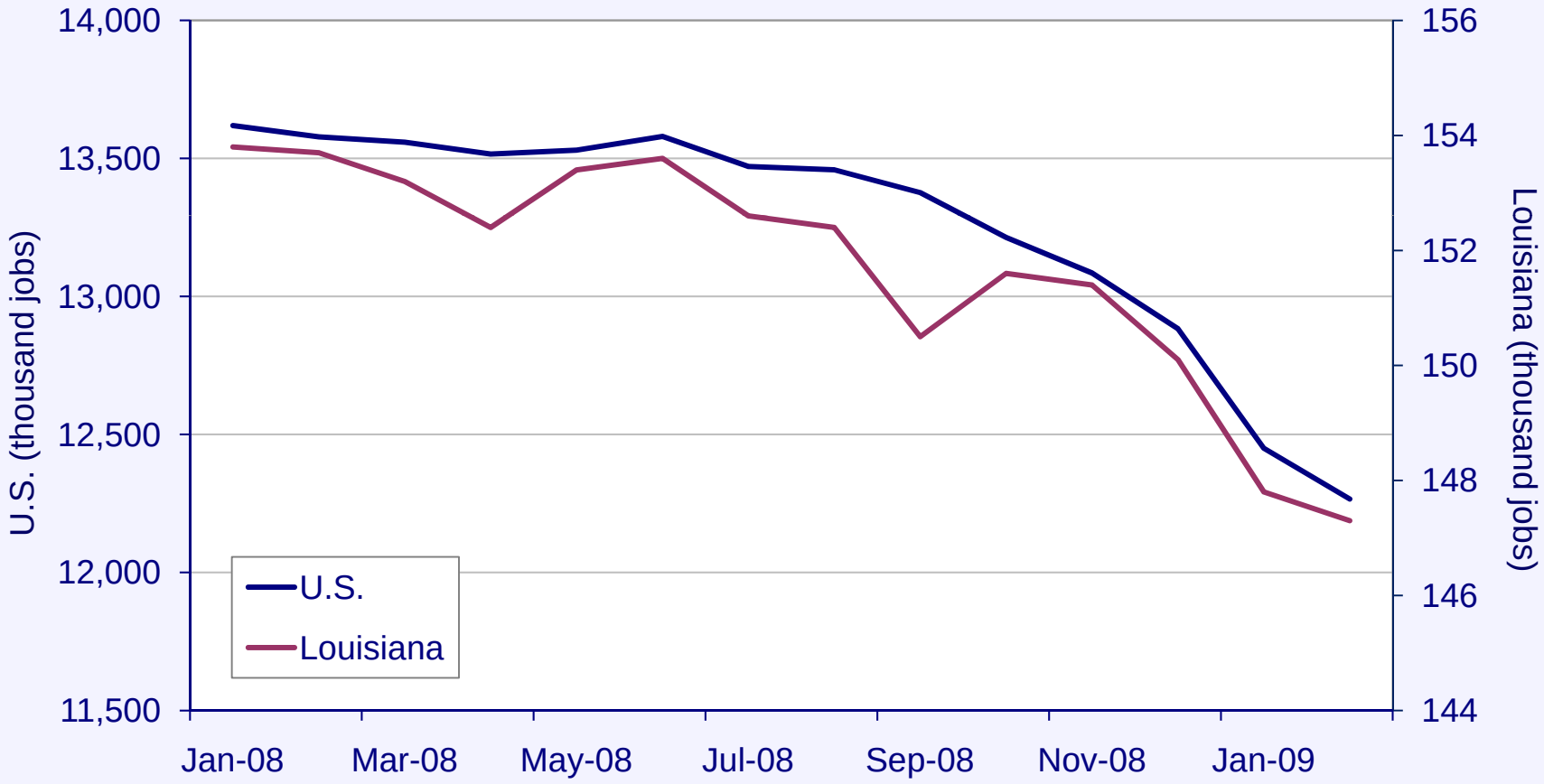
Manufacturing Employment
U.S. and Louisiana

However, manufacturing trends have been disturbing and following similar trends to the national averages.



Source: Bureau Labor Statistics, U.S. Department of Labor.

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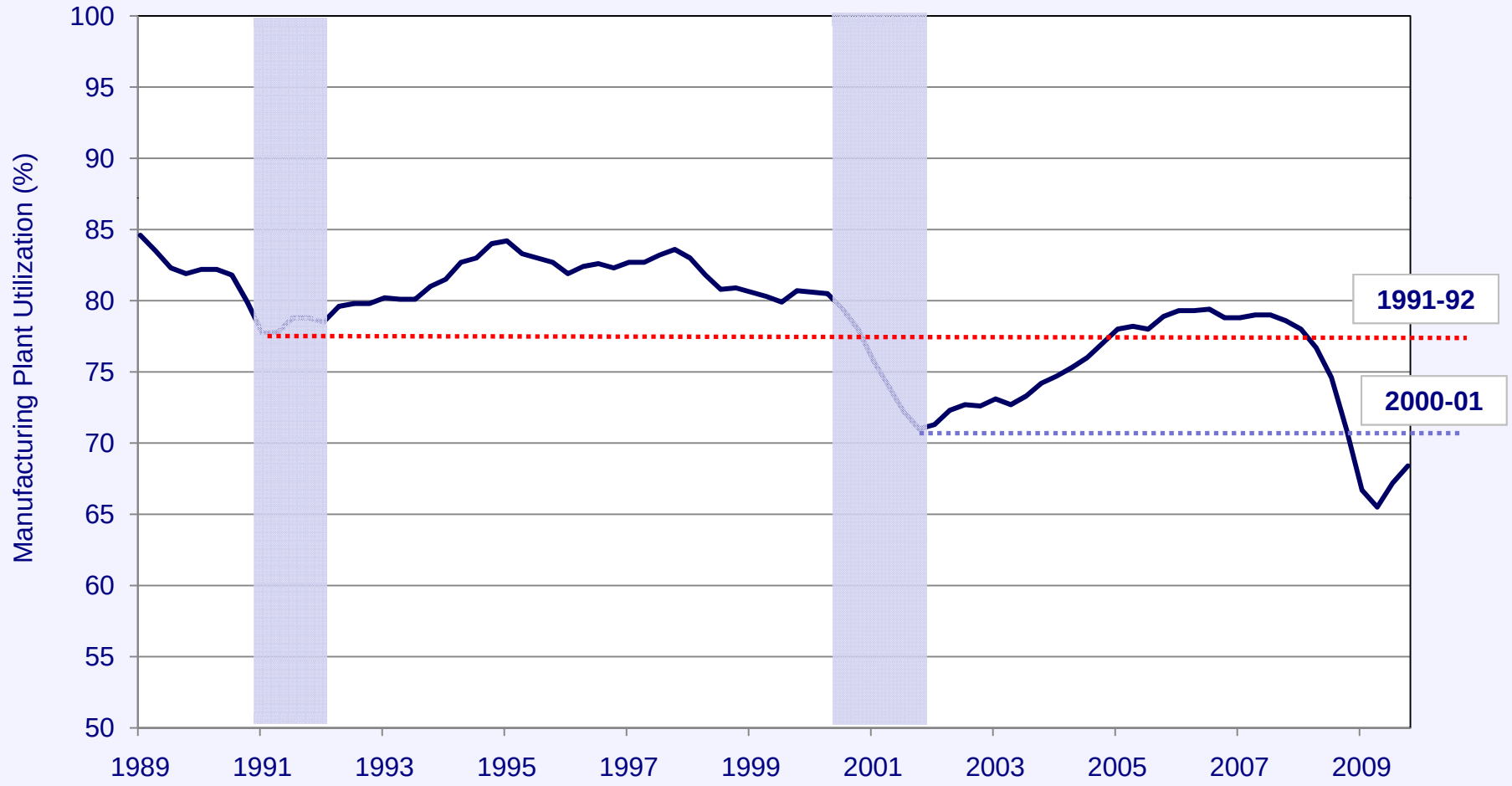
Chemical Industry Capacity Utilization

Manufacturing industry utilization considerably lower than last two recessions, despite recent upturn.



Source: United States Federal Reserve Bank

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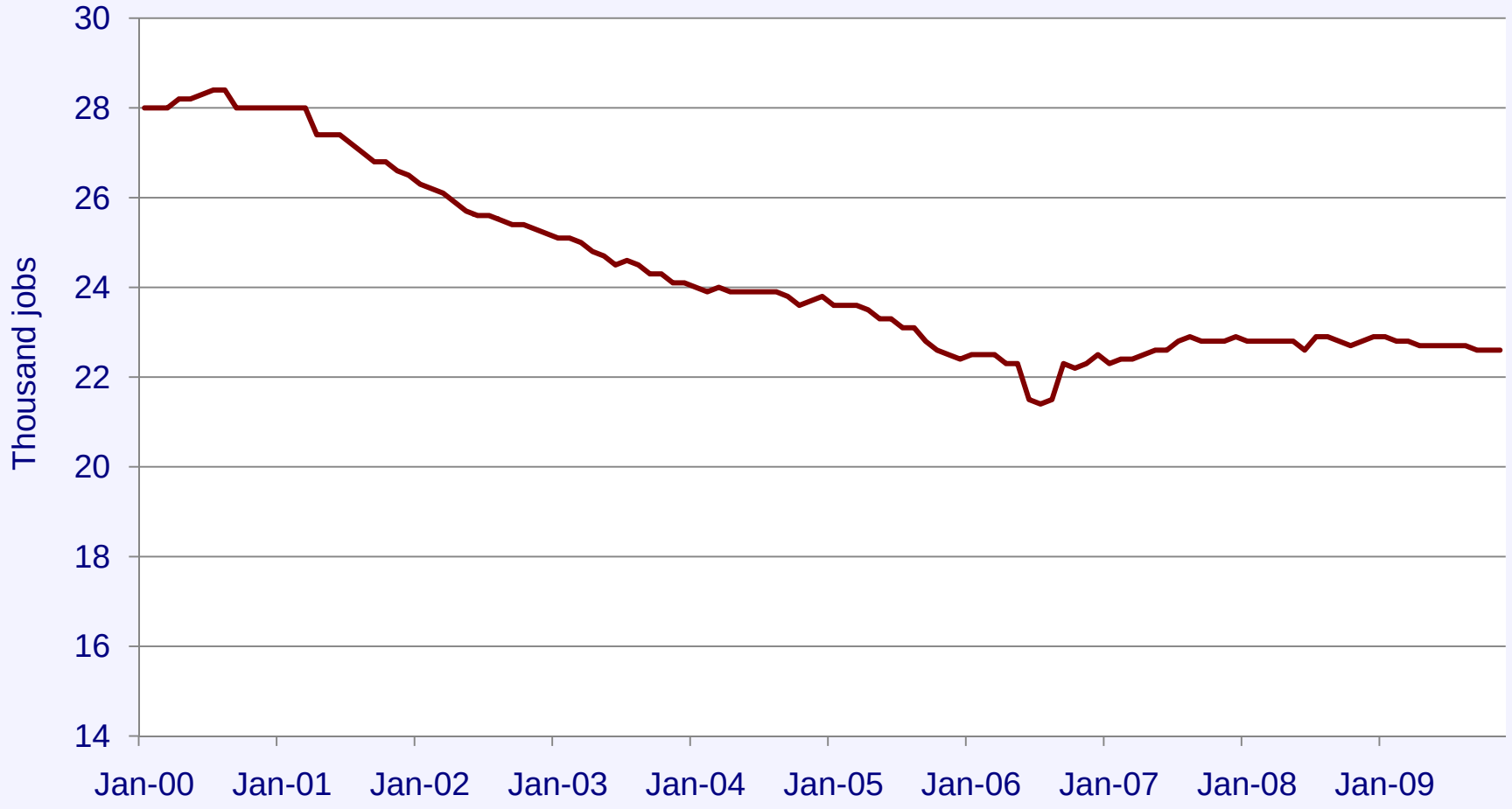
Louisiana Chemical Industry Employment

Louisiana chemical industry has stabilized since last recession, and has been little impacted by the current recession from employment perspective.



Source: Louisiana Workforce Commission.

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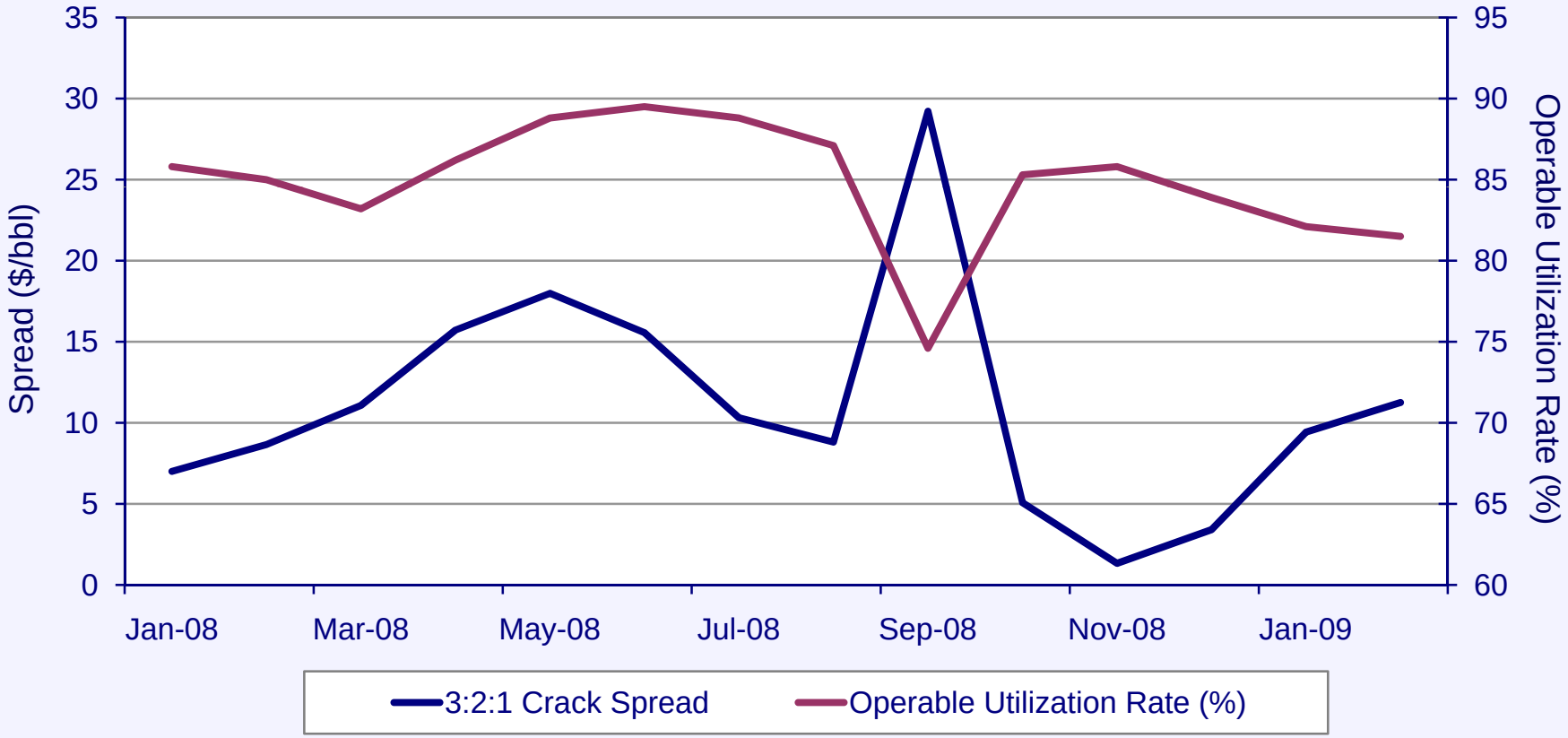
U.S. Refinery Crack Spreads and Capacity Utilization

Refining is showing signs of contraction due to lower profits and demand.



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

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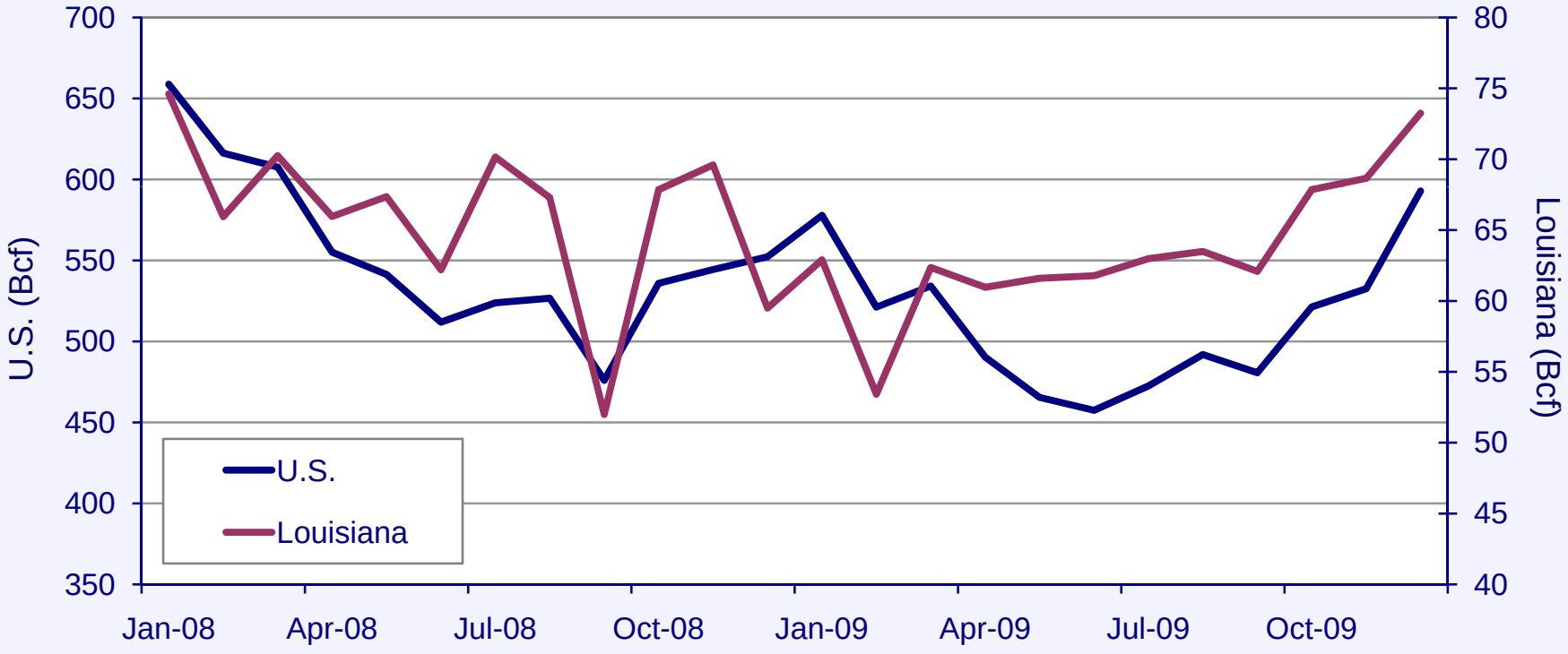
Industrial Natural Gas Consumption

Industrial gas demand starting to rebound – could be signs of recovery.



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

Energy Opportunities

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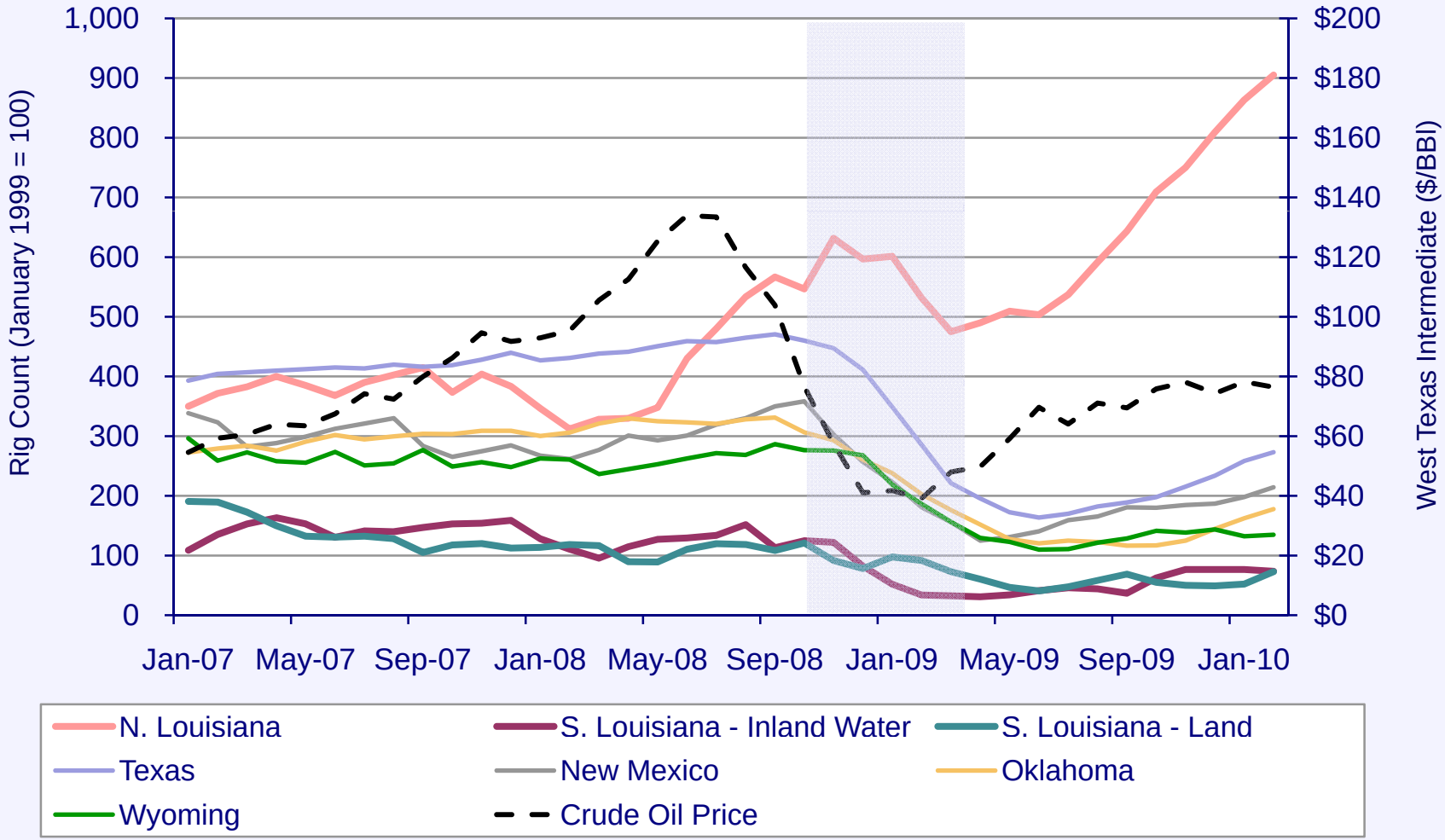
Rig Count and Crude Oil Price
(Each State Measured Relative to 1999 Activity)

North Louisiana has been the shining opportunity in the industry during the course of the recent price downturn/correction.



Source: Baker Hughes

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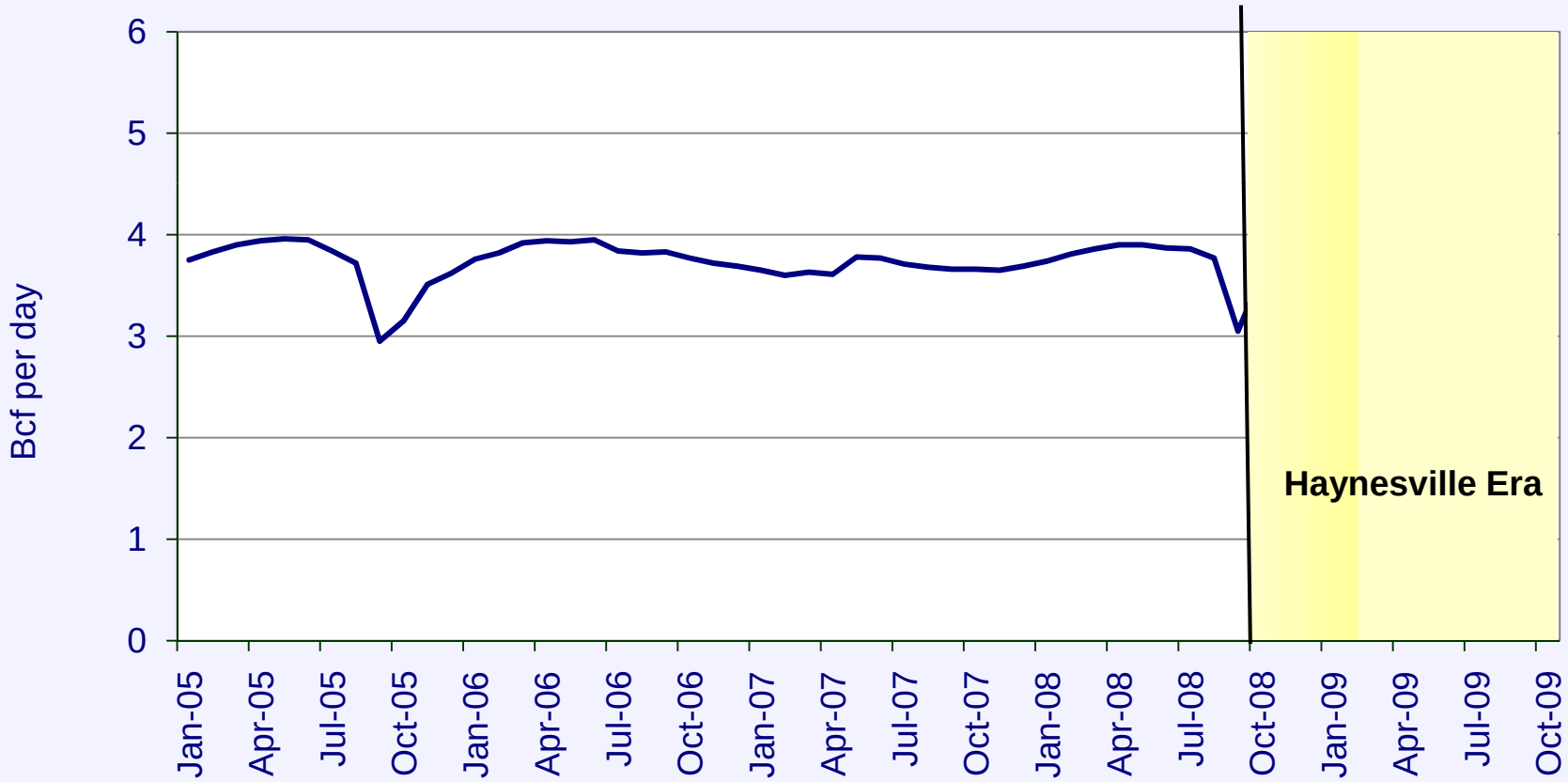
Louisiana Gas Production

Louisiana natural gas production was relatively constant until late 2008. Production became explosive given new production from Haynesville shale parishes.



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

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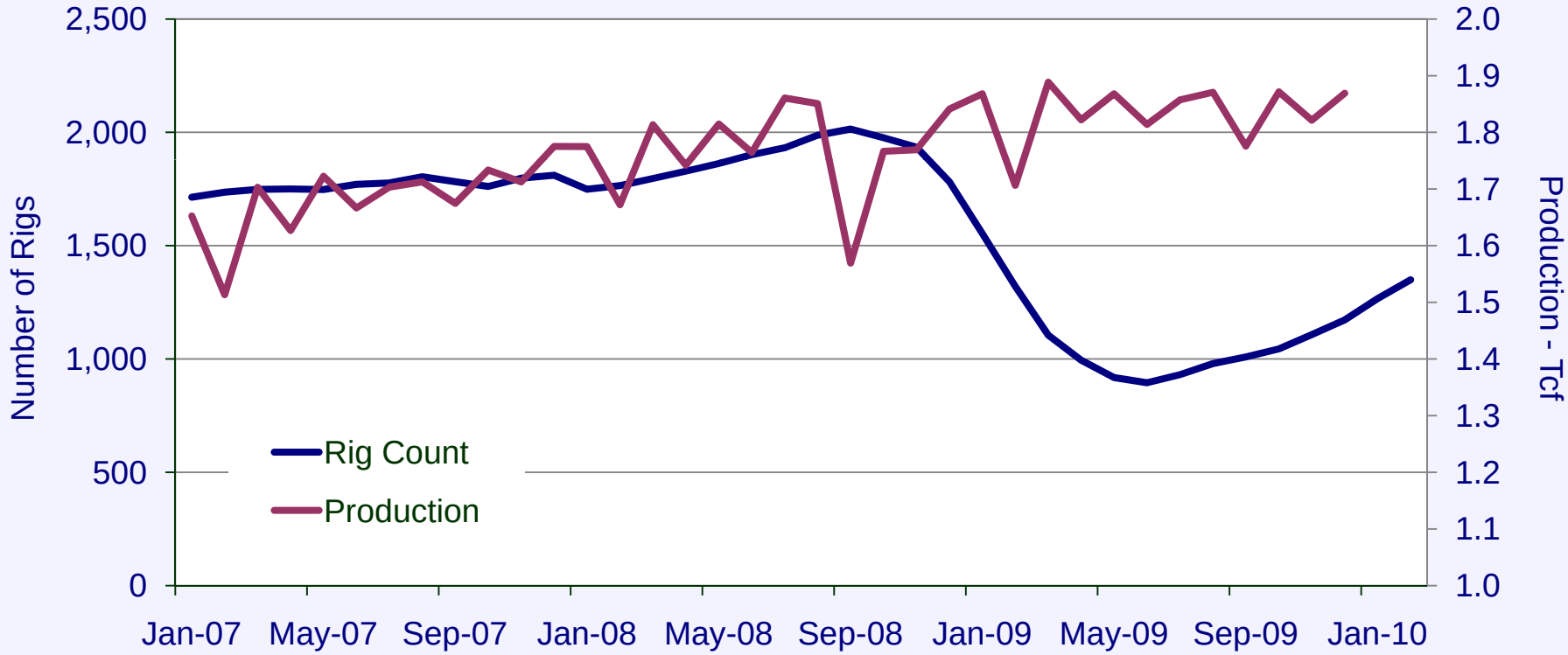
U.S. Active Rig Count and Production

Rig counts have been falling, but production is actually increasing. Significant shift in drilling productivity that was abysmal prior to 2005.



Source: Baker Hughes; and Energy Information Administration, U.S. Department of Energy.

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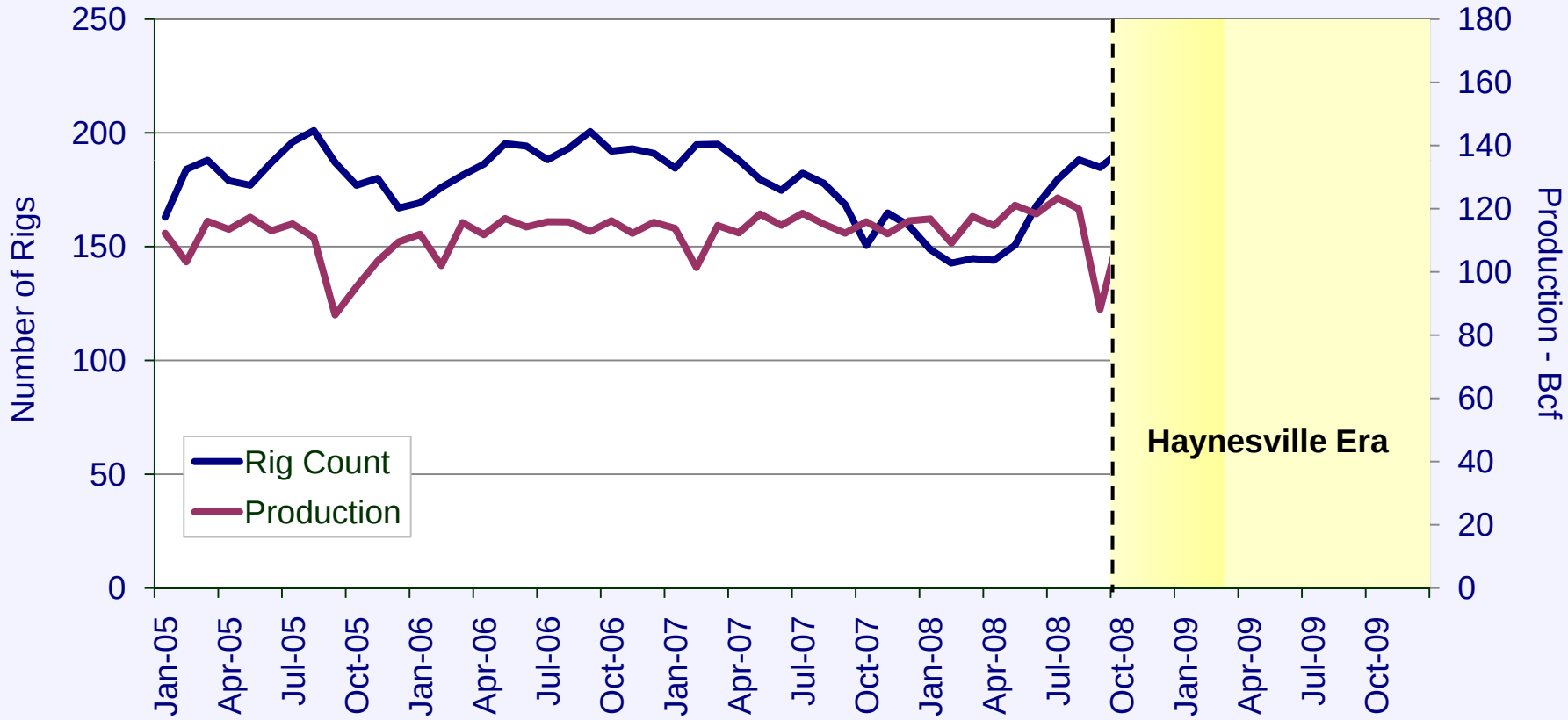

Source: Baker Hughes; and Energy Information Administration, U.S. Department of Energy.

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Haynesville Shale Quick Facts

Duke Energy Gas Transmission Canada

- **$2.4 billion in new business sales within the state of Louisiana in 2008 created by Haynesville Shale activity.**
- **As a result, approximately $3.9 billion in additional household earnings** (much of this from lease and royalty payments).
- **32,742 jobs created in 2008 due to Haynesville Shale activity.**
- **$153.3 million in state and local tax revenues in 2008 due to Haynesville Shale activity.**
- **Conservative estimate.** Data sampled included seven of the largest natural gas extraction firms, leaving out as many as ten other small to mid-size firms operating in the Haynesville Shale.

Source: The Economic Impact of the Haynesville Shale on the Louisiana Economic in 2008.
By Loren C. Scott for the Louisiana Dept. of Natural Resources.

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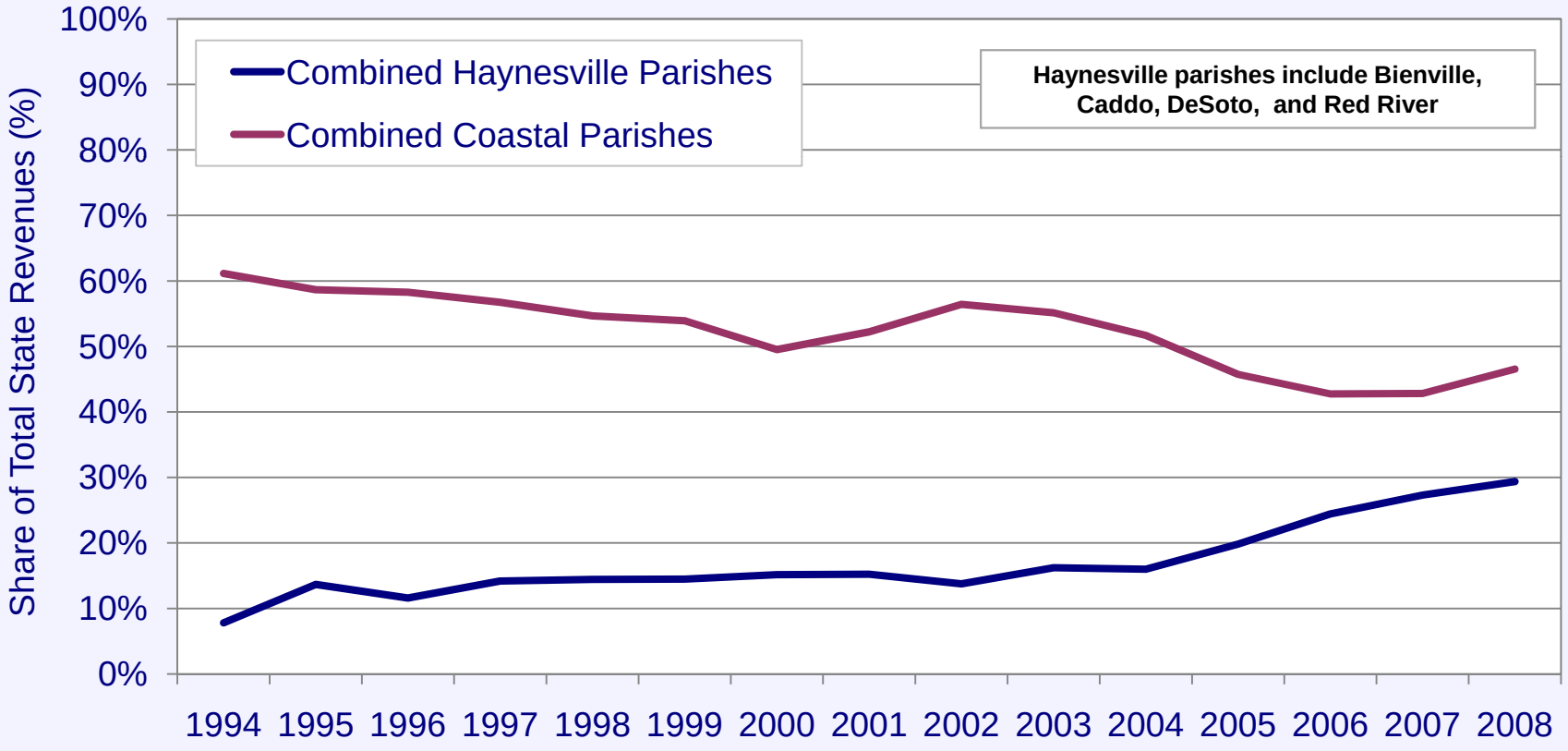
Haynesville and Coastal Parishes Share of Total State Natural Gas Severance Revenue

The Haynesville parishes' share of total severance revenue receipts has increased from less than 10 percent in 1994 to almost 30 percent in 2008.



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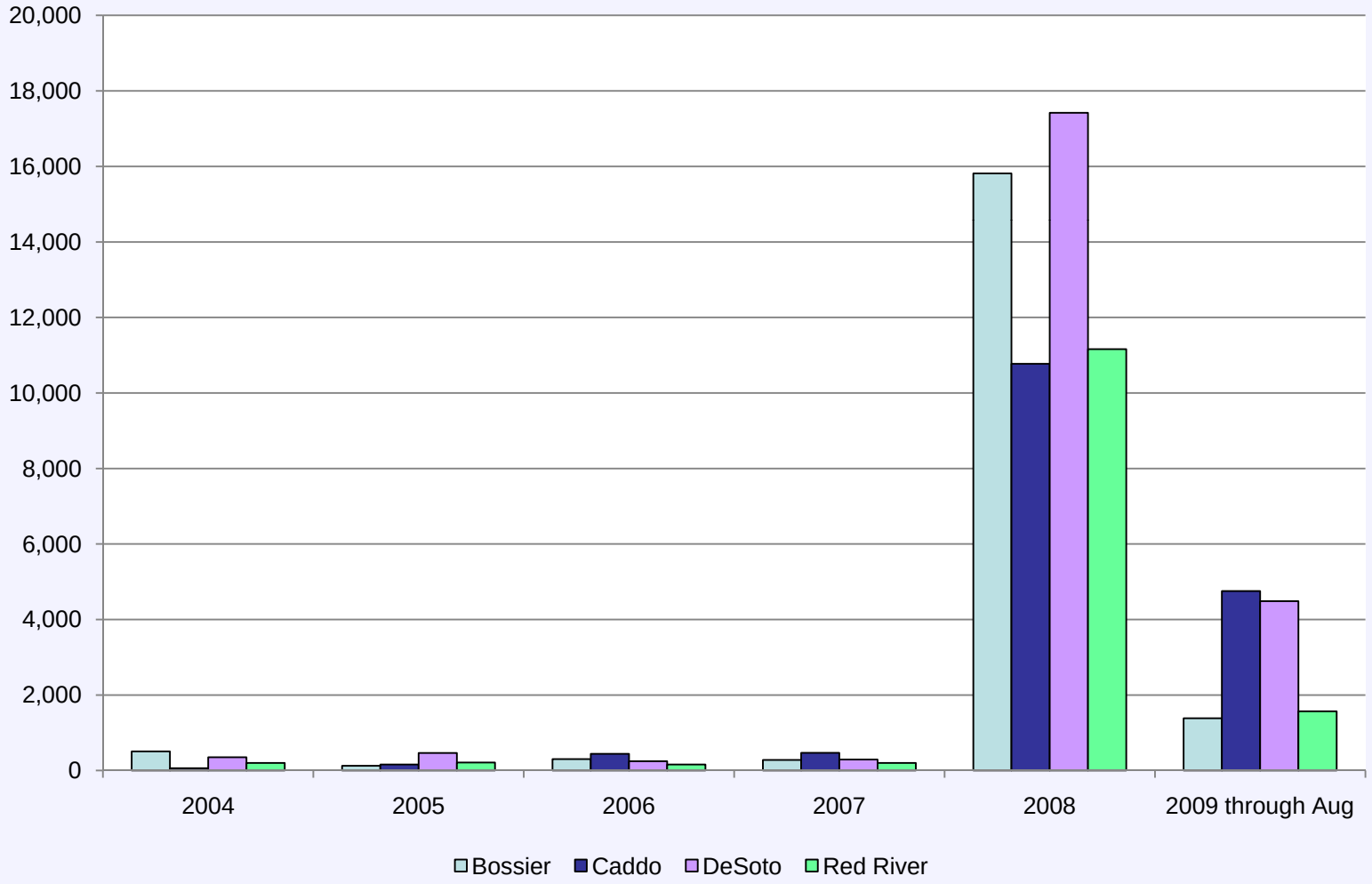
Haynesville Parishes
Bonus Bids per Acre (State Lands)

Bonus bids created a number of new millionaires in North Louisiana virtually overnight through most of 2008.



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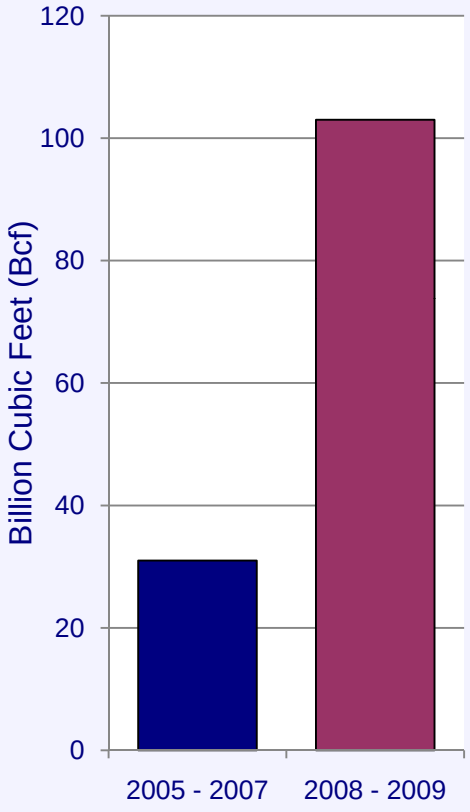
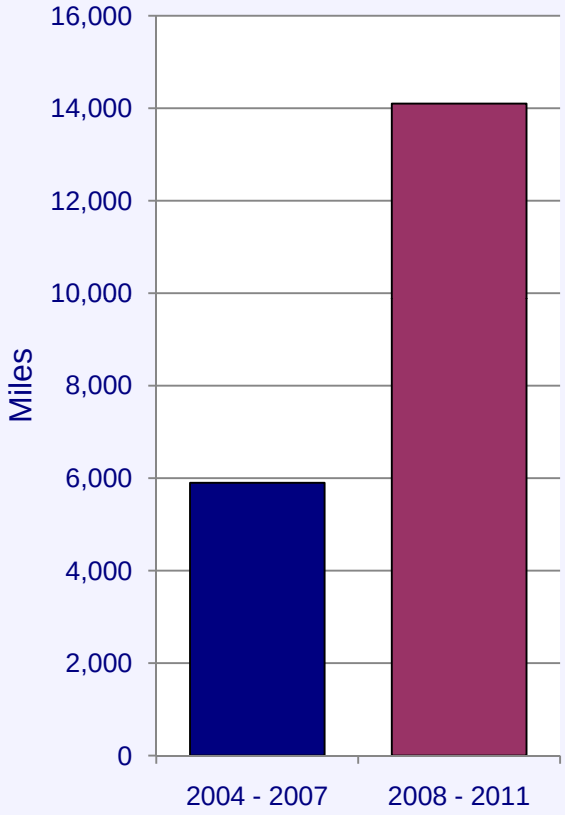
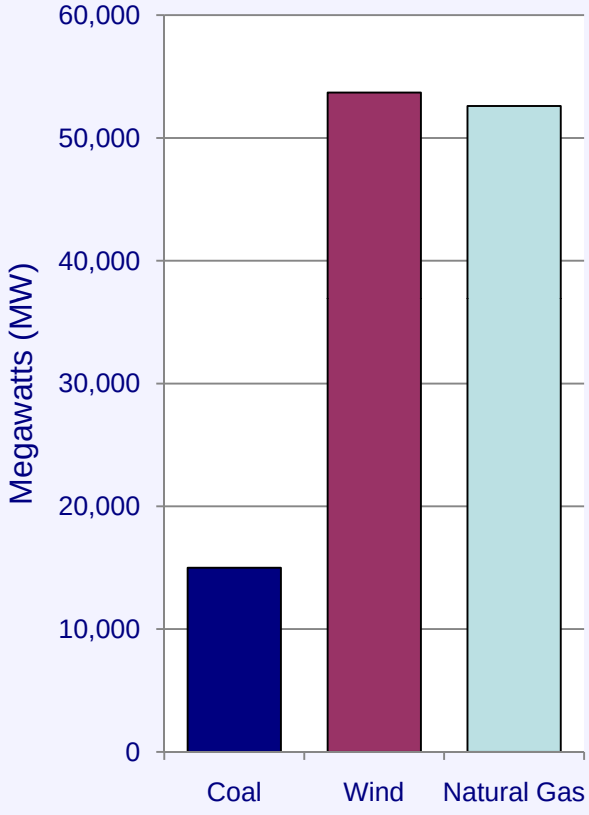
Market Recognizes Future Role of Natural Gas



New Natural Gas Storage Capacity



New Natural Gas Pipelines



New Capacity for Electricity Generation

Sources: EIA, Energy Ventures Analysis, Natural Gas Supply Association

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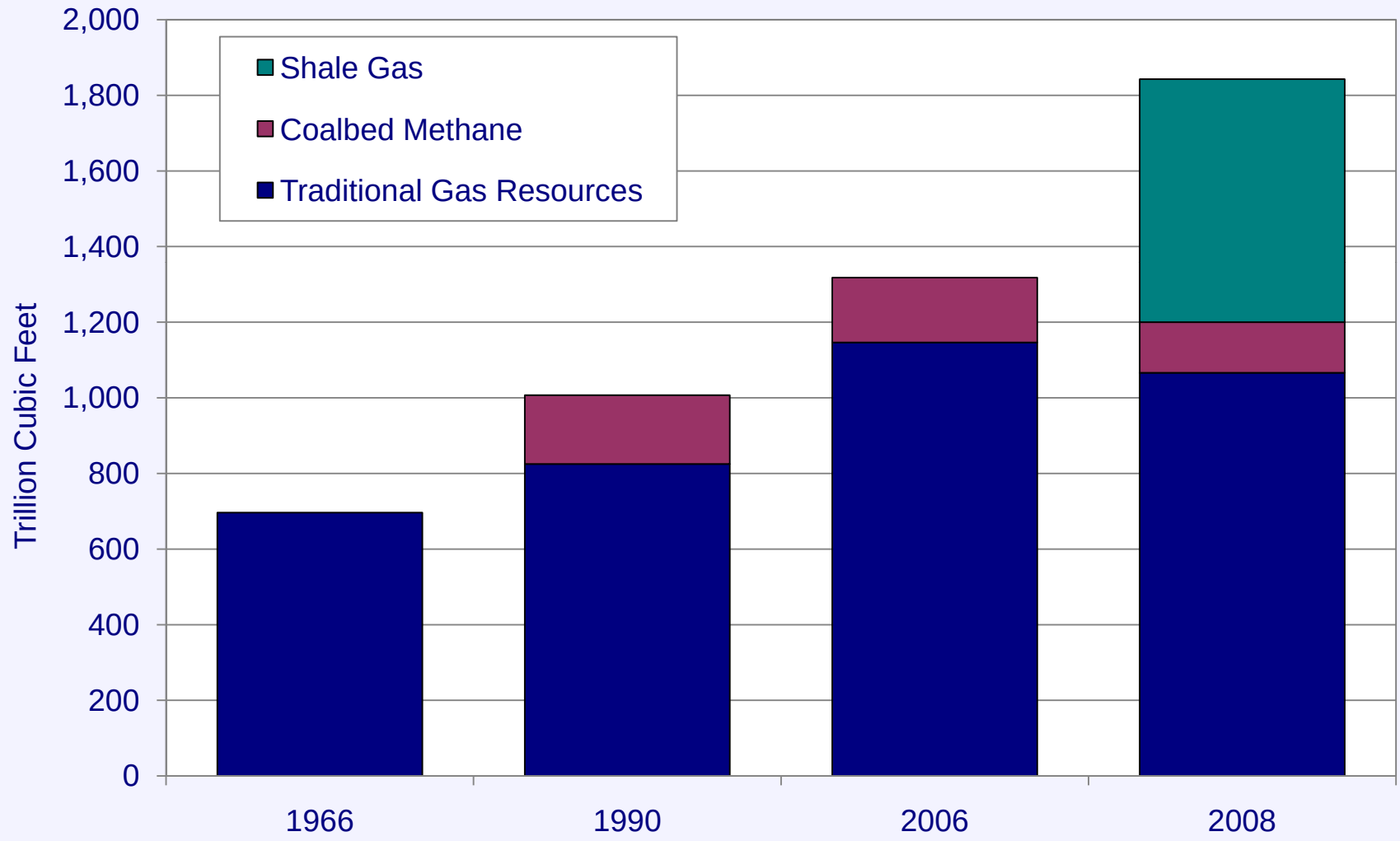
Estimated Size of U.S. Natural Gas Resources



Source: Natural Gas Supply Association

Challenges and Diversity

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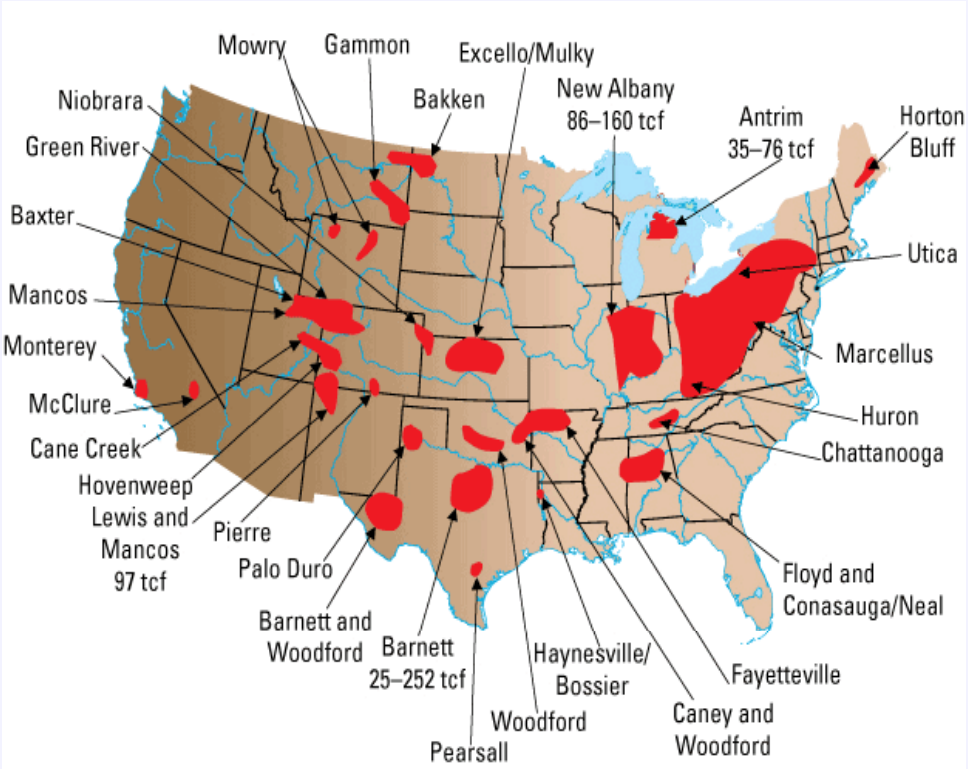
Forward-Looking Challenges



- **Analysis of shale resources over the past three years has focused very heavily on identifying and characterizing the resource.**
- **Significant emphasis on understanding its magnitude.**
- **This has been an important contribution since many producers now have a good appreciation for the opportunities in shale development.**

- **Other stakeholder groups, such as investors, policy makers, regulators, interest groups and the general public are also starting to understand and appreciate the importance of these resources.**
- **Challenge over the next three to five years will be in understanding the winners and losers within the various plays.**
- **Can be as much variation in production within some of these plays and between them.**

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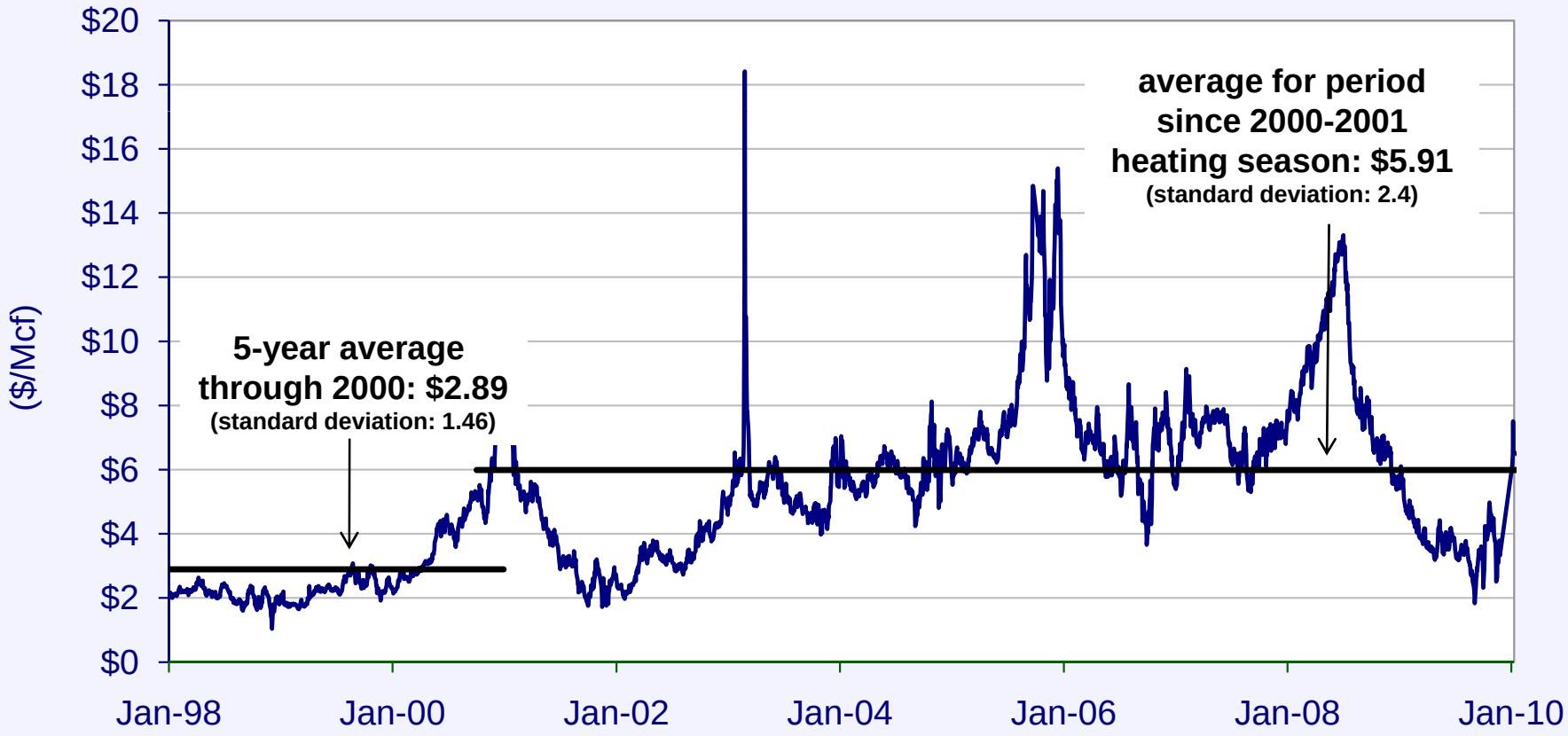
Daily Henry Hub Prices (1998-Present)

While price volatility is always an issue for energy investments, the sheer free-fall of gas prices from their July, 2008 high has been staggering.

Survival in a low-gas price environment is one of the single biggest challenges for shale producers throughout the U.S.



Source: Intercontinental Exchange.

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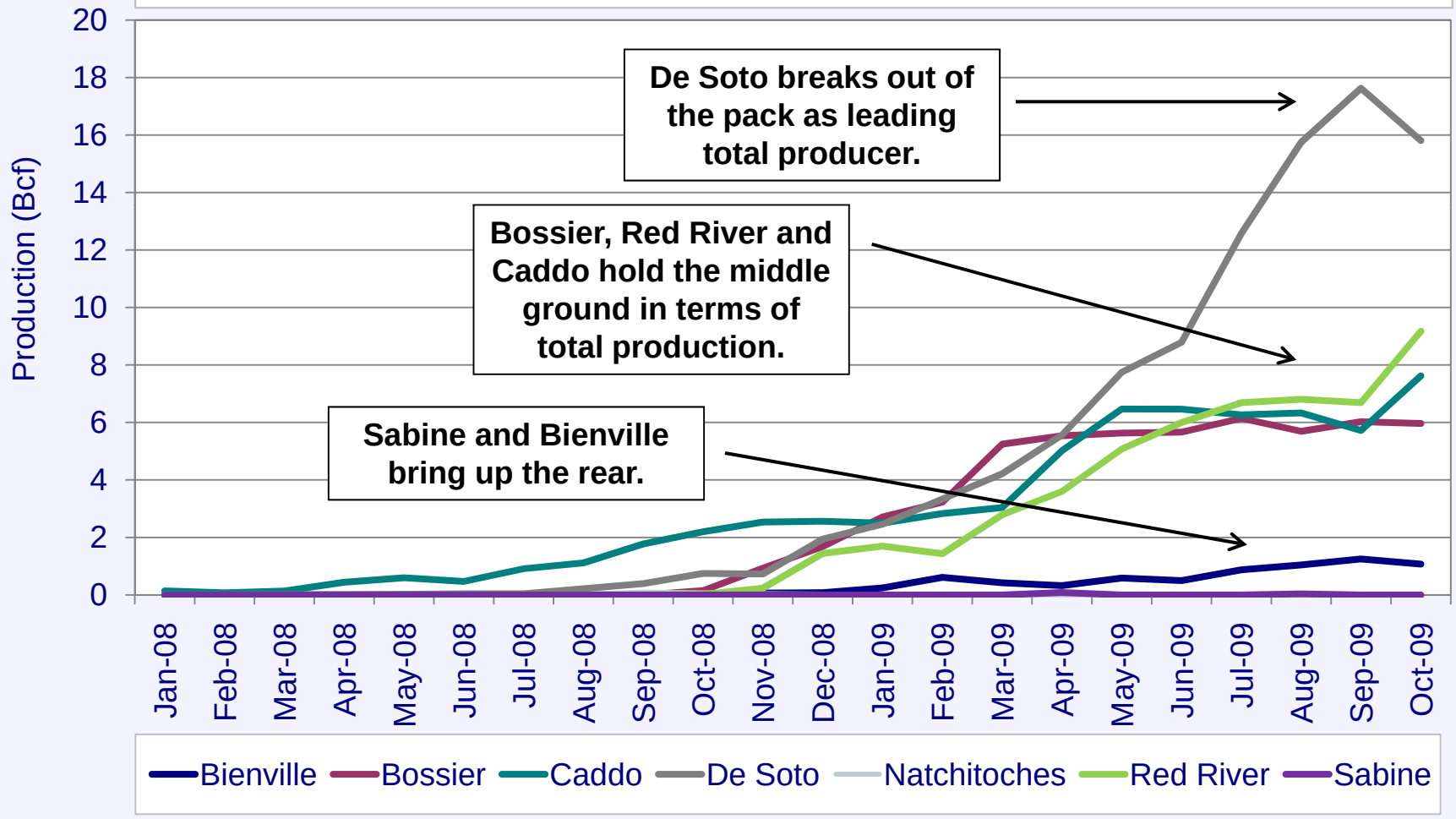
Total Louisiana Haynesville Production by Parish

Prior to January 2009, there was relatively close movement in production trends across the six major Haynesville producing parishes. Afterwards, you see a break into three different camps.



Source: Preliminary work compiled by the Center for Energy Studies.

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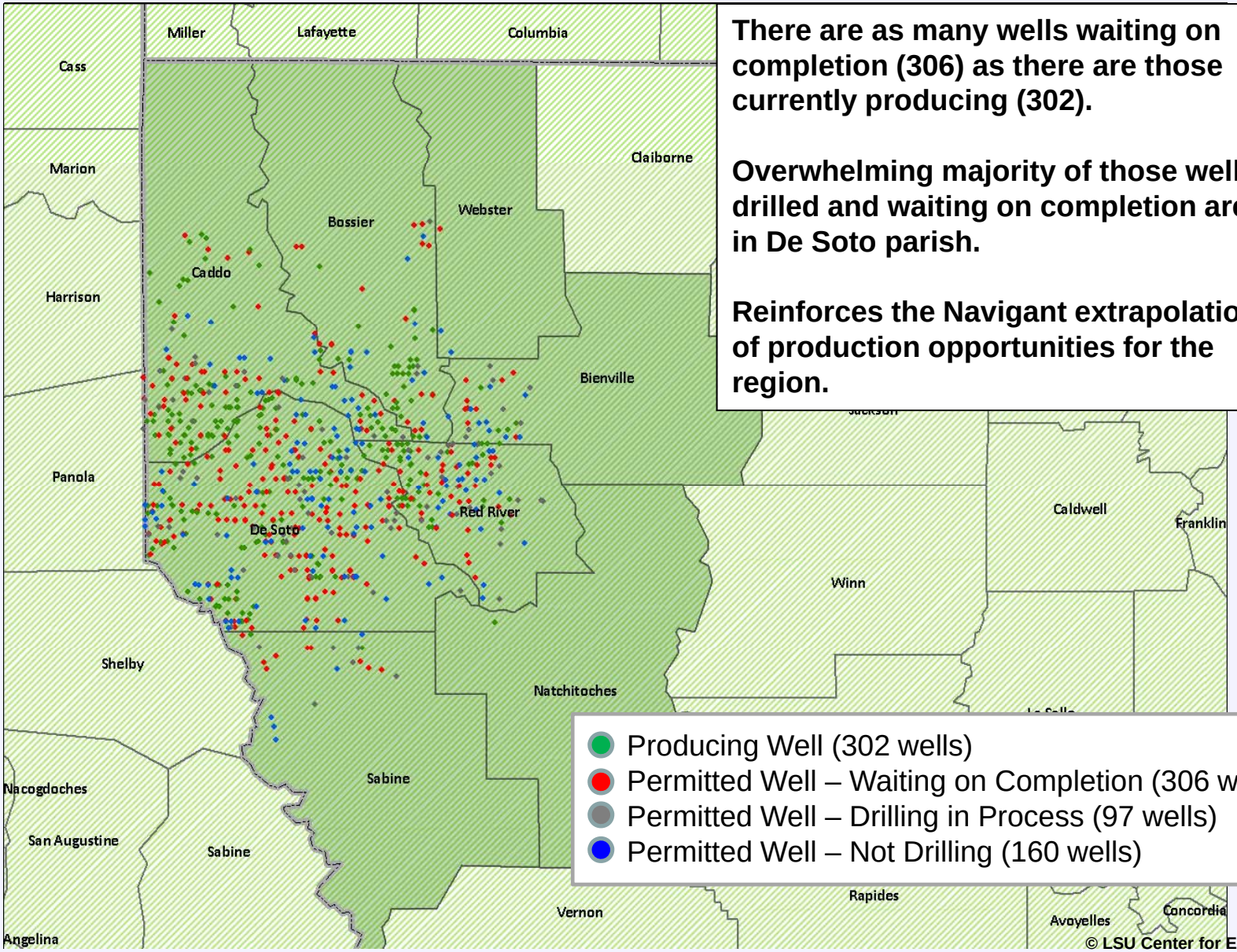
Distribution and Status of Haynesville Wells



There are as many wells waiting on completion (306) as there are those currently producing (302).

Overwhelming majority of those wells drilled and waiting on completion are in De Soto parish.

Reinforces the Navigant extrapolation of production opportunities for the region.

Public Policy Challenges for Shale Production

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New Changes in Natural Gas and Oil Taxes

The IPAA estimates that taken together, these tax changes would strip over $30 billion from US natural gas and oil production investment.

Intangible Drilling and Development Costs (IDC) – Tax treatment designed to attract capital to natural gas and oil production. Eliminating this option would remove $3 billion that would have otherwise been invested in new U.S. production.

Percentage Depletion – Provides capital for independents and is important for marginal well operators. Removal is estimated to cost $8 billion in investment.

Geological and Geophysical (G&G) Amortization – Early recovery of G&G costs allows for more investment in finding new resources. Extending the amortization period would remove over $1 billion from efforts to find and develop new U.S. production.

Marginal Well Tax Credit – Countercyclical tax credit that creates a safety net for marginal wells during periods of low prices. Enacted in 2004, the marginal well tax credit has not been needed, but it remains a key element of support for U.S. production.

Enhanced Oil Recovery (EOR) Tax Credit – Designed to encourage oil production using technologies that are required after a well passes through its initial phase of production. Currently, the oil price threshold for the EOR tax credit has been exceeded and the oil value is considered adequate to justify EOR efforts. But, at lower prices EOR becomes uneconomic and these costly wells would be shutdown.

Manufacturing Tax Deduction – Another tax provision that provides capital to U.S. independent producers to invest in new production.

Excise Tax on GOM Production – Creating a new tax designed to add a $5 billion burden on U.S. offshore development will drive producers from the GOM, reducing new U.S. production of natural gas and oil.

Passive Loss Exception for Working Interests in Oil and Gas Properties – If, in the future, income/lossarising from the ownership of oil and natural gas working interests, is treated as passive income/loss, the primary reason for individuals to invest in oil and gas working interests would be significantly diminished.

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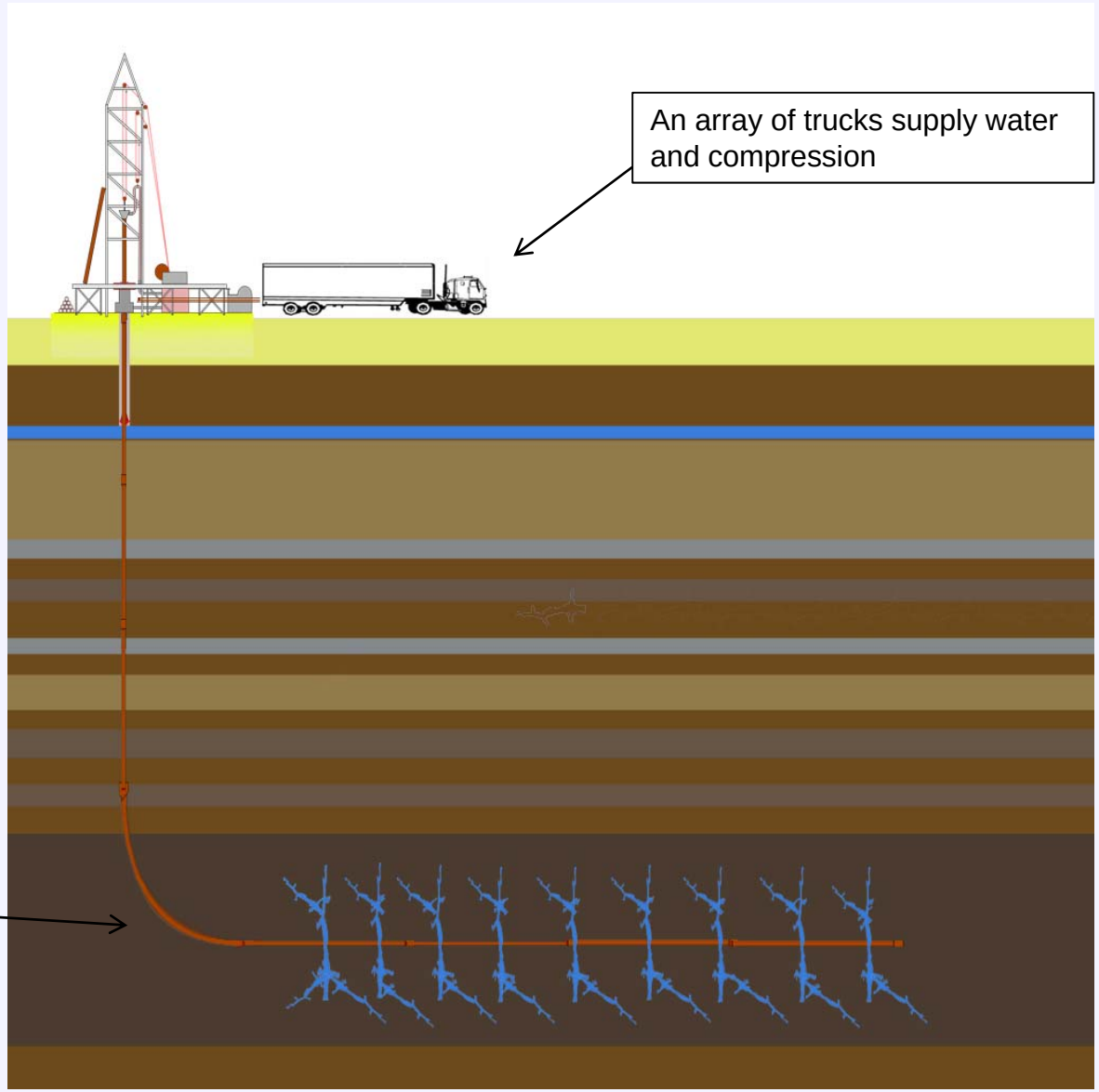
Unconventional Natural Gas: Hydrofracturing



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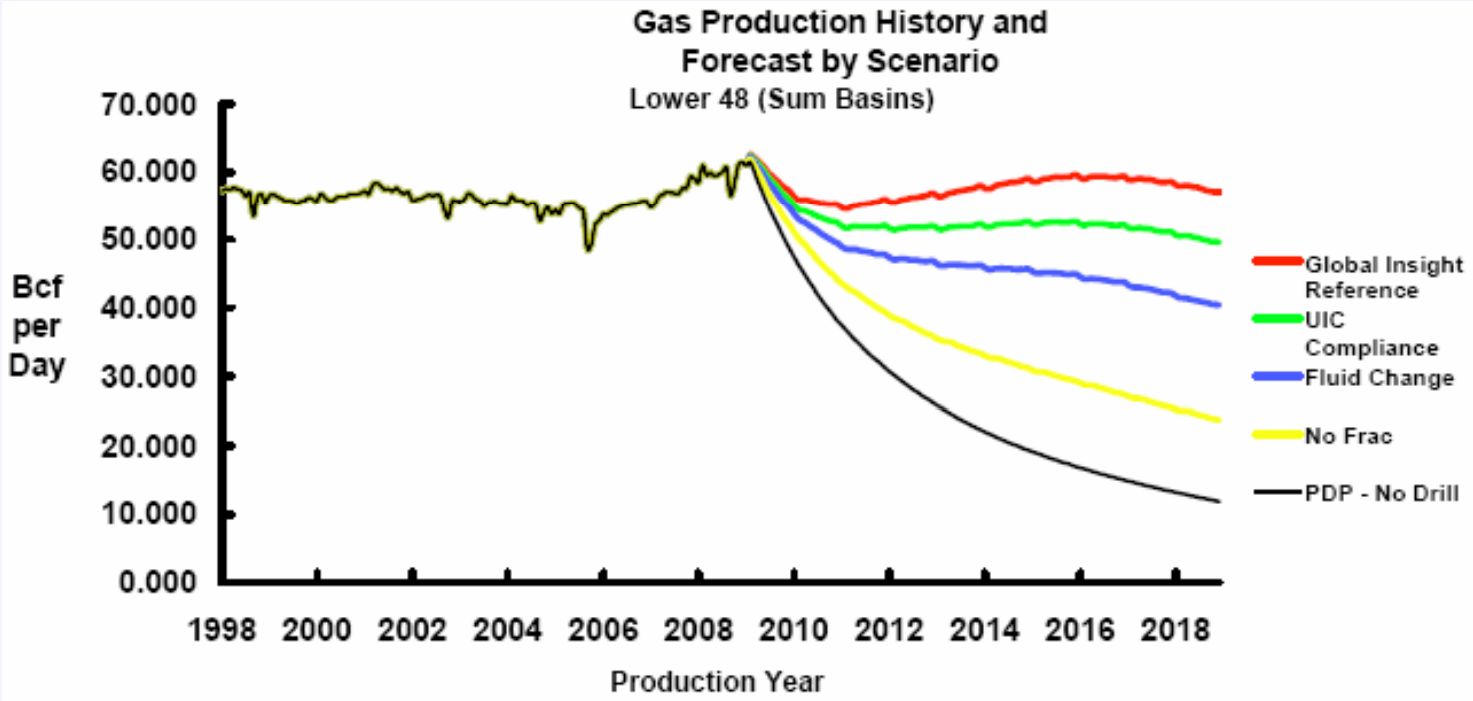
Estimated Effects of Regulating Hydraulic Fracturing



Change in Natural Gas Production (Trillion Cubic Feet)

	2008	2014	Change From Reference Change	Percent Change
Global Insight Reference	20.9	20.4		
UIC Compliance		18.3	-2.1	-10%
Fluid Change		16	-4.4	-22%
No Fracturing		11.3	-9.1	-45%
No Drilling		7.2	-13.2	-65%

Source: IHS Global

What About Other Resources?

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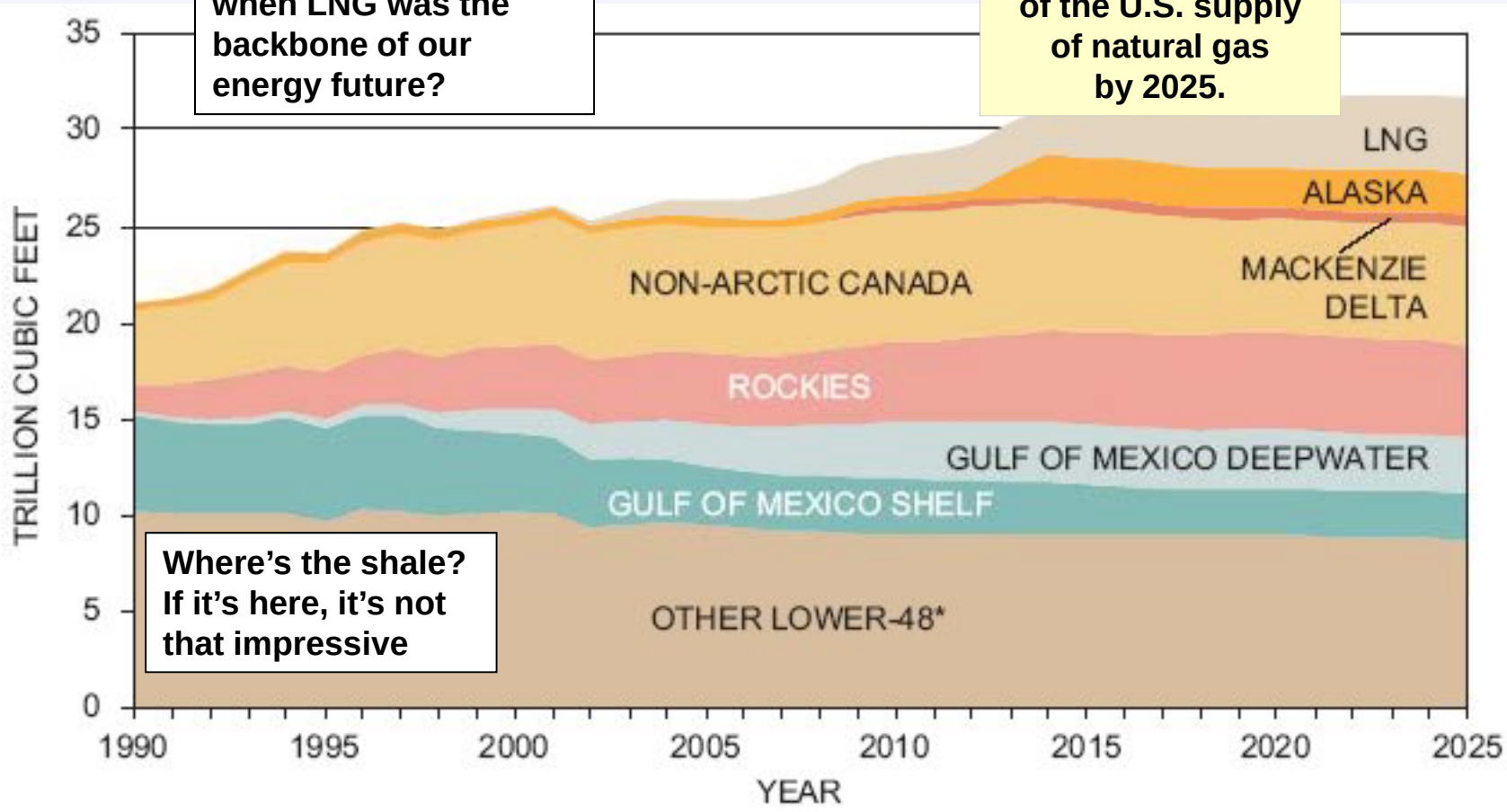
U.S. and Canadian Natural Gas Supply

Anybody remember when LNG was the backbone of our energy future?

LNG provides 14% of the U.S. supply of natural gas by 2025.



Where's the shale? If it's here, it's not that impressive

* Includes lower-48 production, ethane rejection, and supplemental gas.

Source: National Petroleum Council

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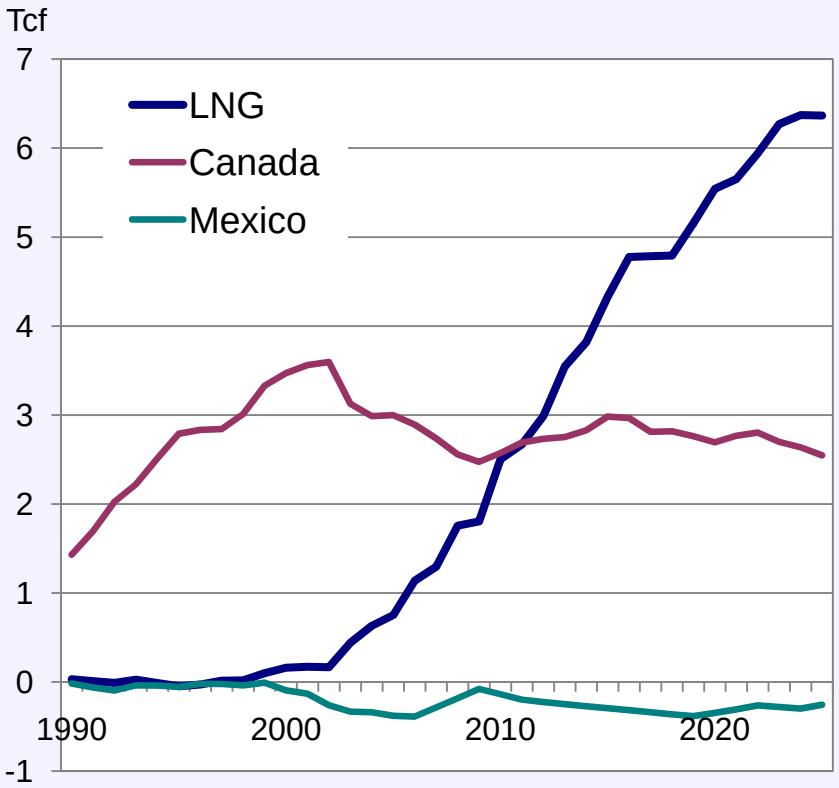
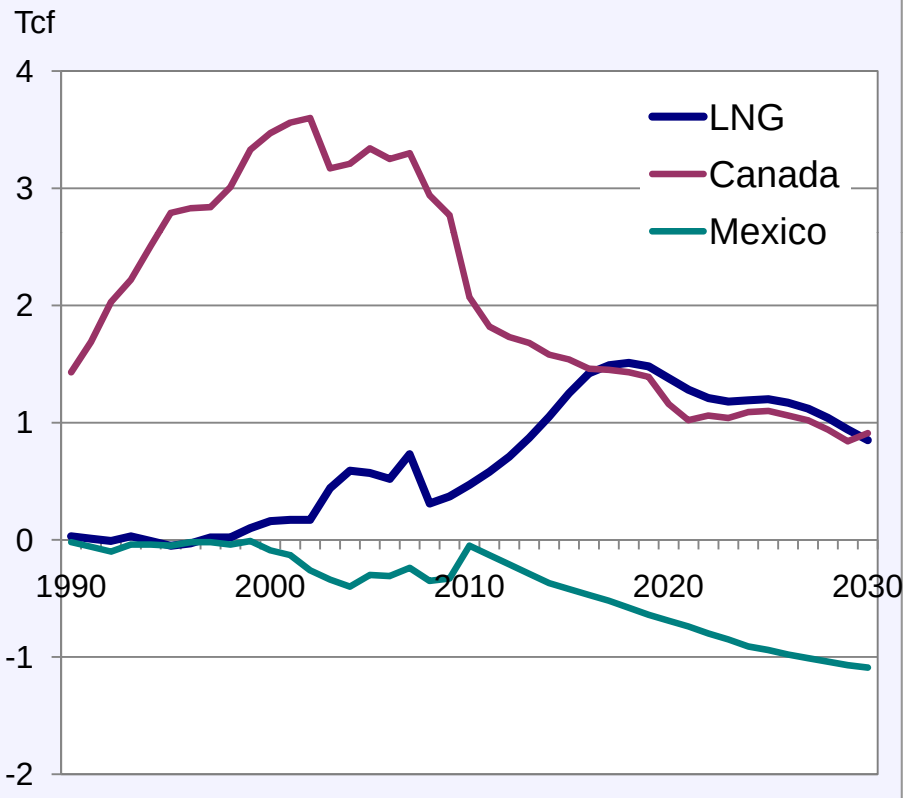
Net U.S. Imports of Natural Gas 2005 Versus 2009 Outlook

What a difference four years can make….

EIA Annual Energy Outlook, 2005



EIA Annual Energy Outlook, 2009



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

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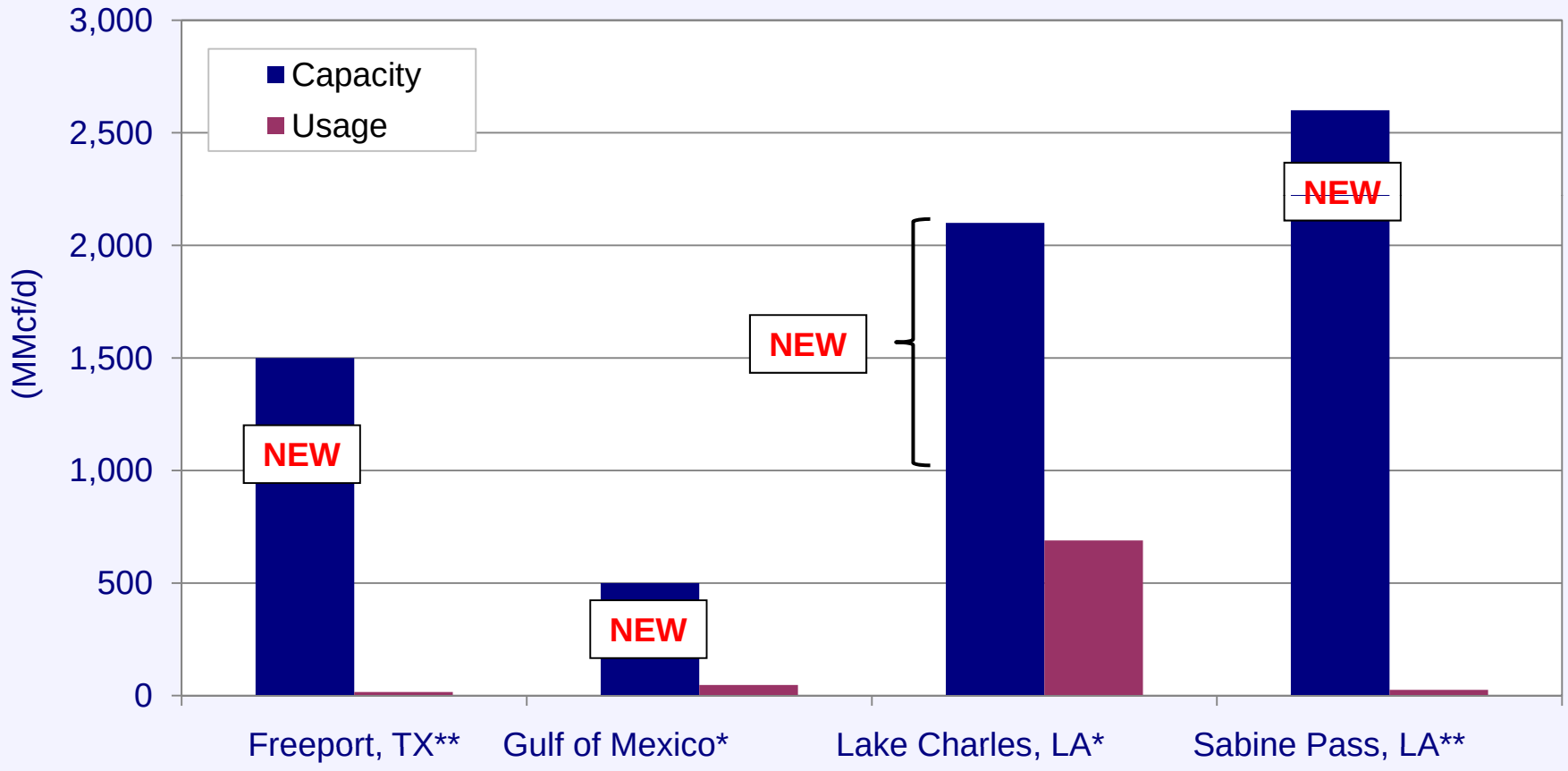
GOM LNG Terminals
Usage vs. Capacity, 2007 and 2008

Significant new GOM regasification capacity has been added over the past two years.



Note: * indicates 2007 data; ** indicates 2008 data.

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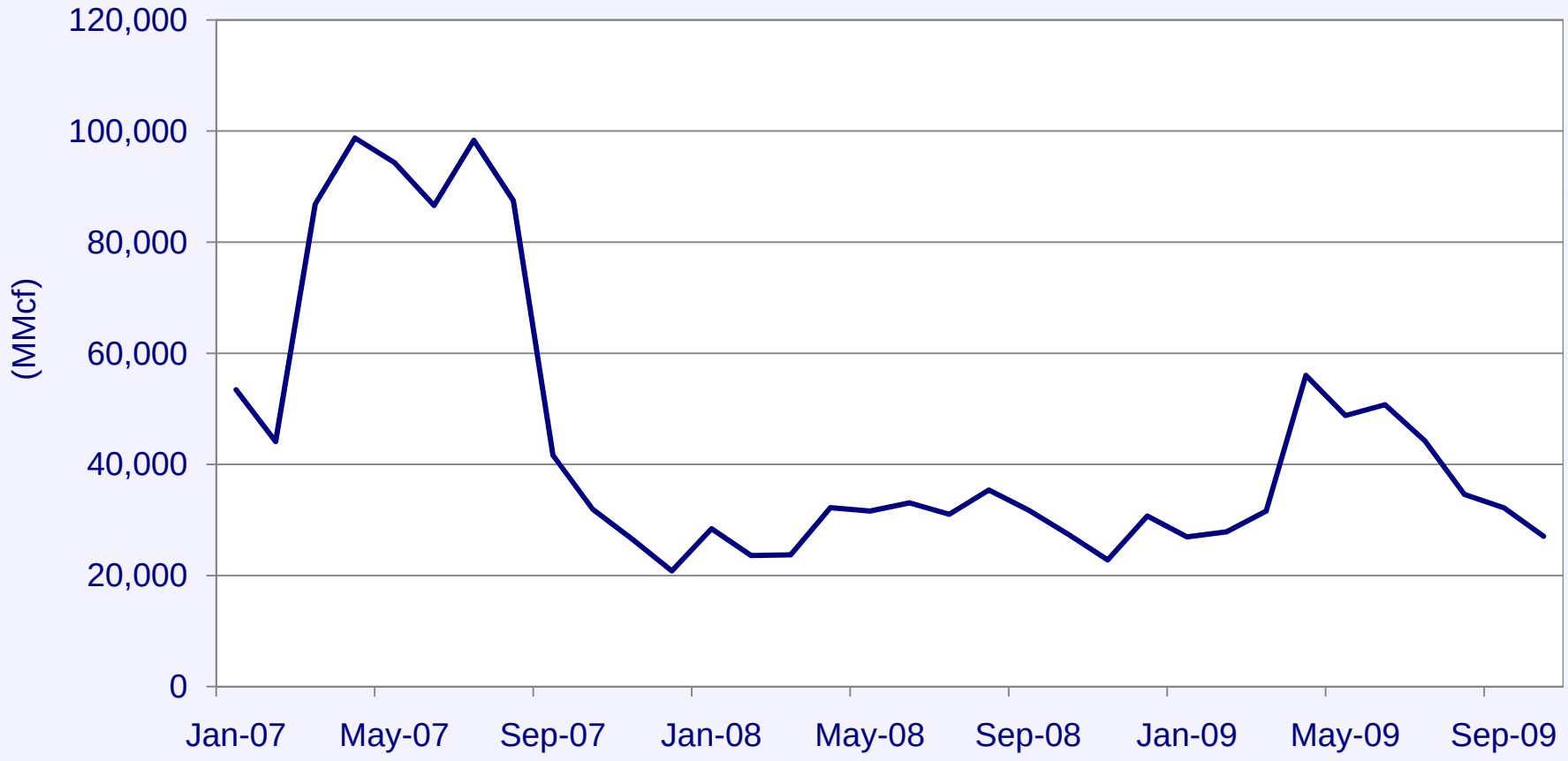
U.S. LNG Imports

Despite capacity increases, import volumes are down substantially leaving a lot of excess regasification capacity. Substantial change in trends considering the relatively low marginal cost for imports.



Note: * indicates 2007 data; ** indicates 2008 data.

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McMoran Exploration Co. Find

- On January 20th, McMoran Exploration Co. announced a Davy Jones ultra-deep well find.
- Oil and Gas Journal: 2 Tcf or more.
- Located in 20 feet of water 10 miles south of Marsh Island
- Drilled to 28,603 feet.
- 200 net feet of sand natural gas pay.
- O&GJ: "The exploration could revive exploration on the GOM shelf. It could be one of the largest discoveries in decades."

Over $100 million per year in investment for the last 10 years – close to $1.3 billion total.

Source: McMoran Exploration Co, Oil and Gas Journal

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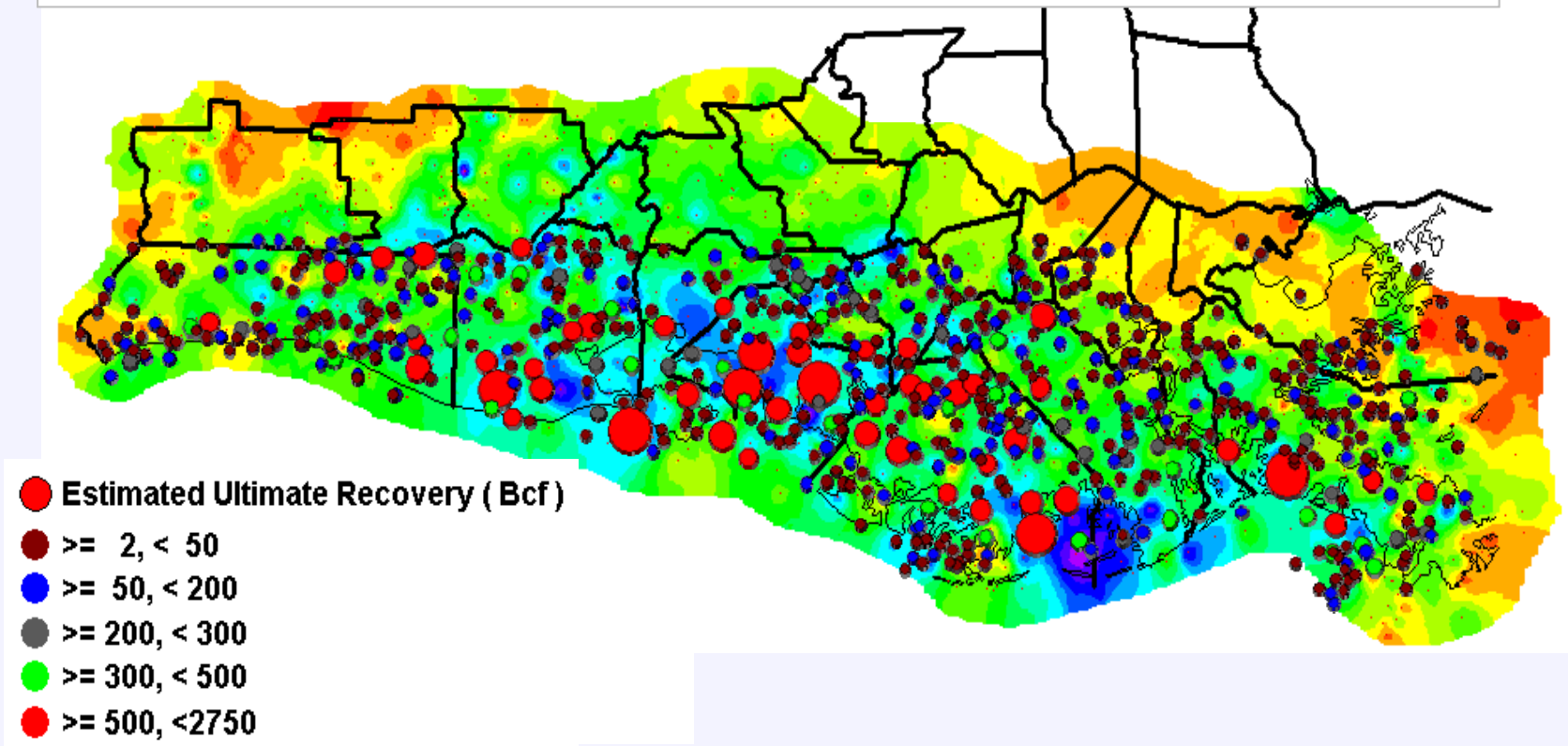
Schlumberger Estimates of Field Size Distribution for South Louisiana Deep Wells (2002 Estimate)

The potentials for deep drilling in the shallow areas of the GOM could be the next version of Haynesville – but investment requirements are considerable (roughly $100 million per well).



Source: Schlumberger Estimates, PTTC Workshop on Deep Drilling, LSU Center for Energy Studies, 2002.

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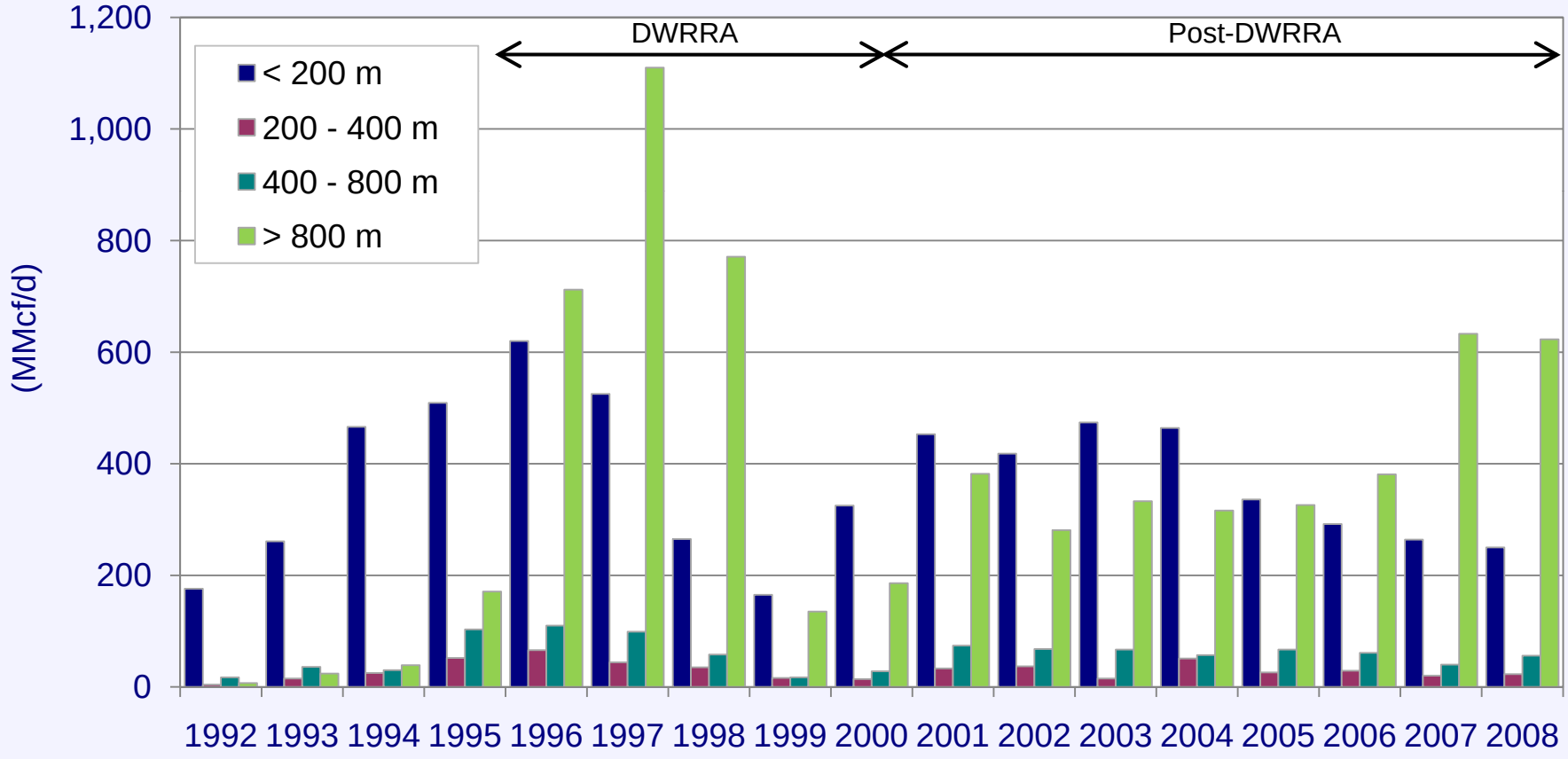
Number of Leases Issued by Year and Water-Depth Category

In 2008, over 65 percent of all GOM leases issued were in water depths greater than 800 feet.



Source: Minerals Management Service

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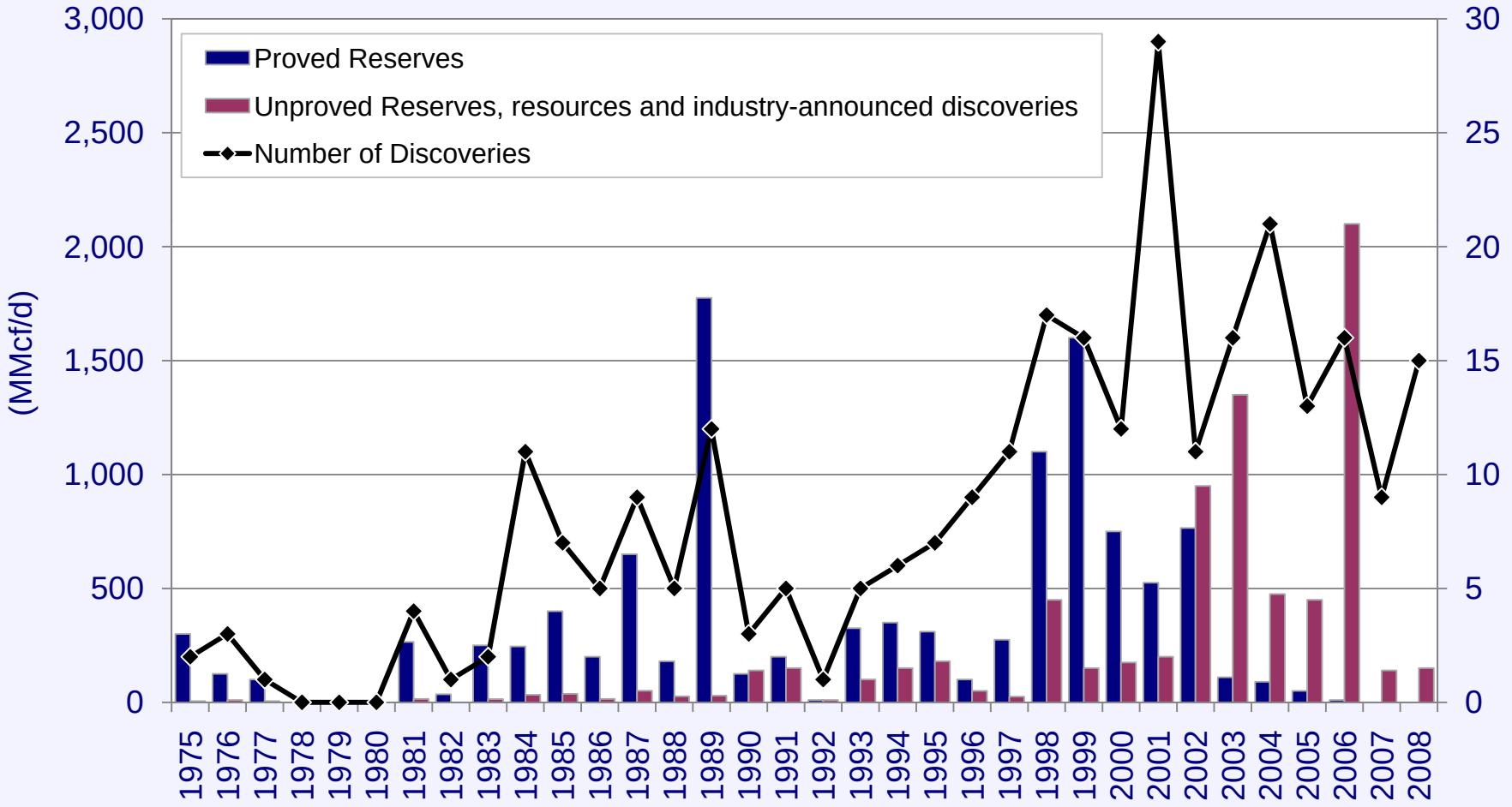
Number and Volume of Deepwater Discoveries

While there continues to be formidable natural gas reserves, deepwater is materializing as more of a big crude play than gas.



Note: Graph is estimated.
Source: Minerals Management Service

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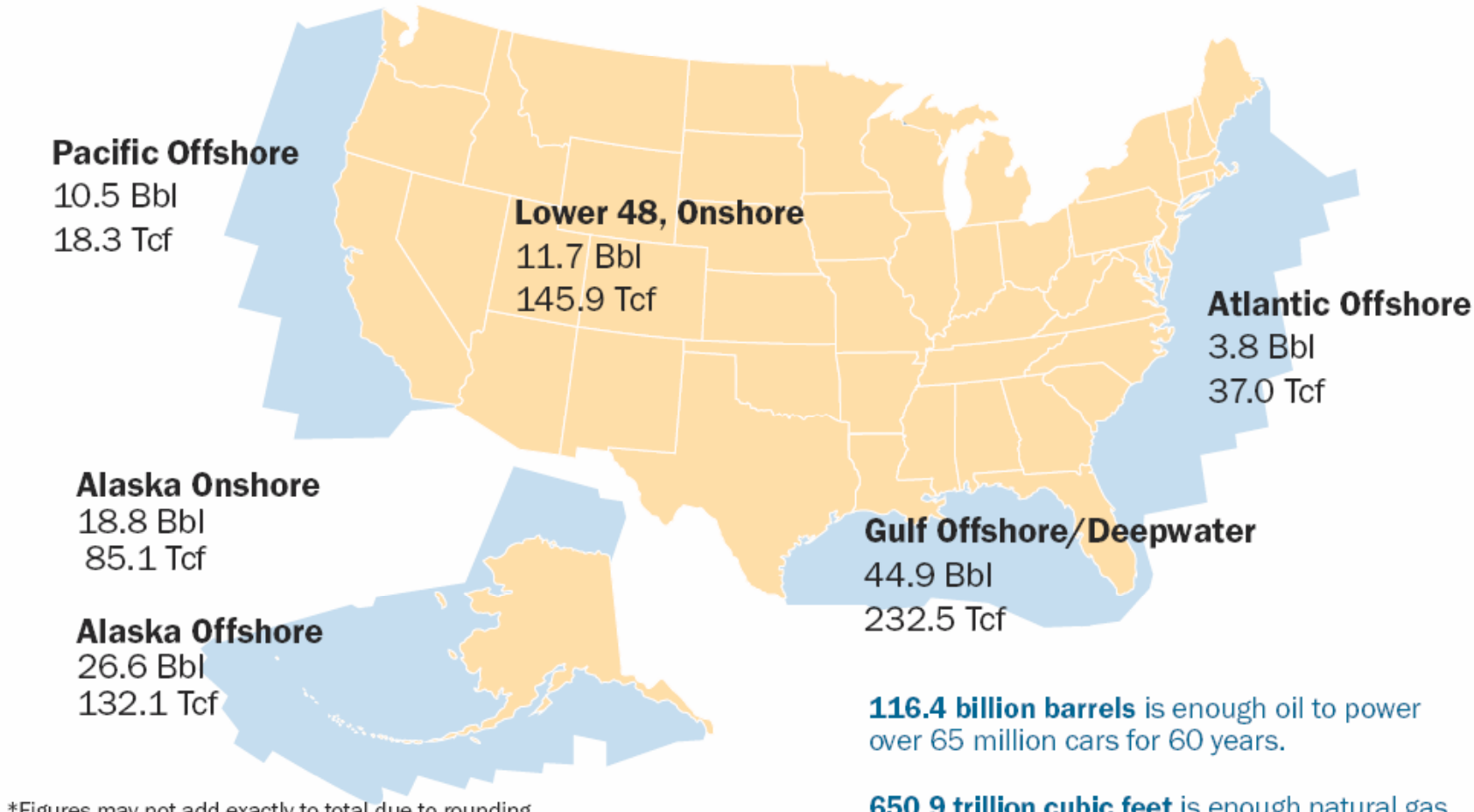
U.S. Crude Oil and Natural Gas Resources
(Undiscovered, Technically Recoverable Federal Resources)

Continued debate on where and how resources should be developed. Clearly, the resource base is there.



Source: MMS, BLM, and API Calculations

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OCS Lower 48 "Moratoria" Resources
(Undiscovered, Technically Recoverable Federal Resources)

Compromise issues often surround allowing "first access" to areas further out: problem is that those areas can be expensive to tap.

Pacific Coast*

Current Resource Estimate:
Oil (Bbbls) = 10.53
Gas (Tcf) = 18.29

Share of Resources Located:

0–50 miles
Oil = 90.8%
Gas = 91.7%

50–100 miles
Oil = 6.4%
Gas = 6.3%

Over 100 miles
Oil = 2.8%
Gas = 2.1%

Gulf of Mexico**
Oil (Bbbls) = 3.7
Gas (Tcf) = 21.5

Atlantic Coast*

Current Resource Estimate:
Oil (Bbbls) = 3.82
Gas (Tcf) = 36.99

Share of Resources Located:

0–50 miles
Oil = 27.5%
Gas = 25.9%

50–100 miles
Oil = 33.6%
Gas = 32.2%

Over 100 miles
Oil = 38.9%
Gas = 42.0%

* Moratoria removed as of October 1, 2008
** Off limits until 2022

Source: API projections based on MMS resource estimates by water depth for Outer Continental Shelf

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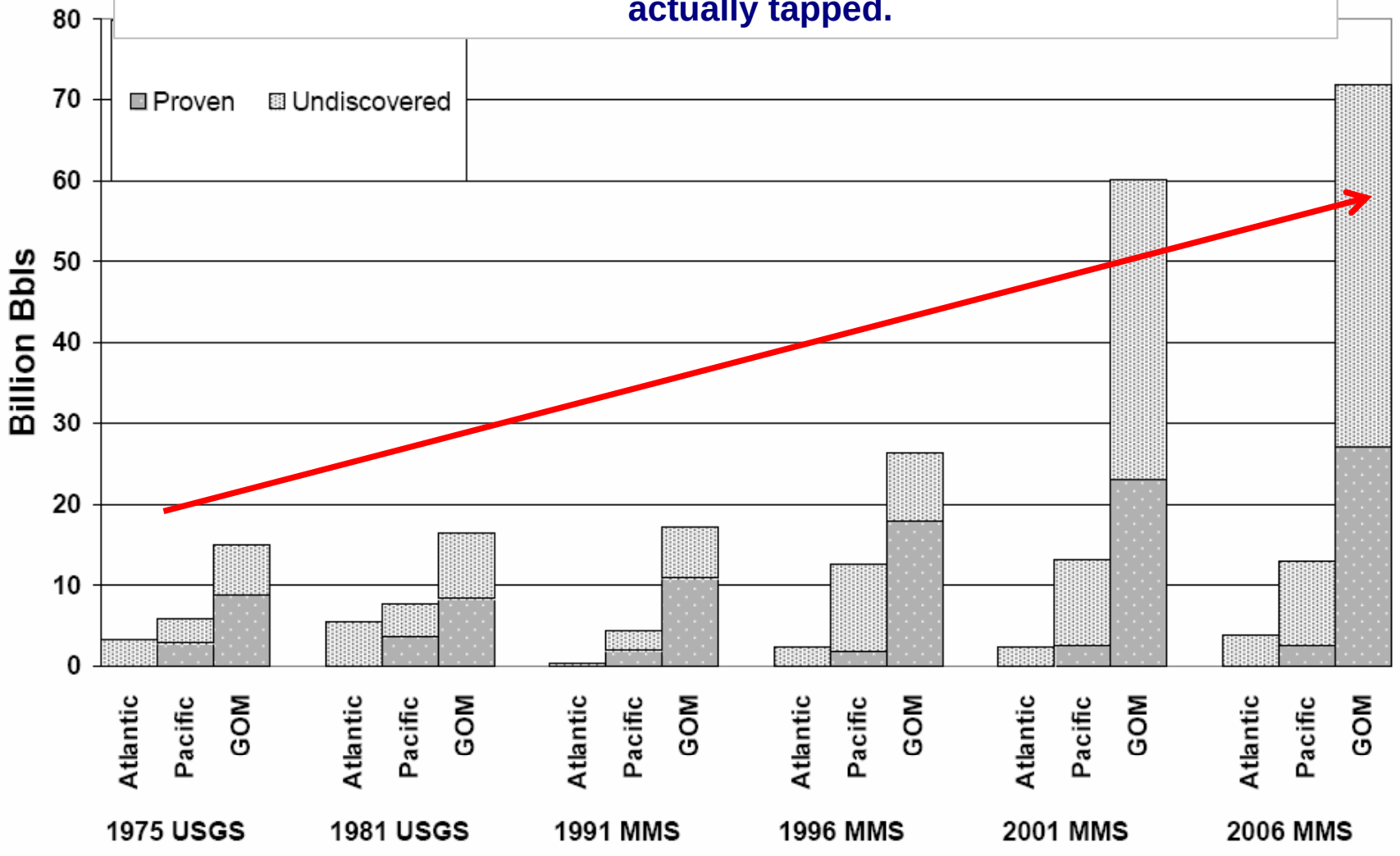
History of MMS Oil Assessments

The more we learn, the more we know. Very likely these resource assessments will yield higher estimates as the resource base is actually tapped.



Source: ICF International

Conclusions

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Take-Away Points

- **Understatement to note shale is a game changer – the large unknowns are to what extent, and how far, these opportunities can spread – particularly abroad.**
- **LNG will always provide discipline to the market (margin cost of importing can be very low).**
- **Existing opportunities (Rockies, Alaska, deepwater, LNG) are still there and new opportunities (frontier areas, deep drilling) continue to materialize (i.e., substitutes and alternatives).**
- **Policy still has an impact, several initiatives that could unwind resource gains (hydrofracturing regulation). Important to not take our eye off the ball and neglect the importance of these resources (i.e. tax increases, dramatic changes in state mineral revenue regimes, environmental regulations)**

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Questions, Comments, & Discussion

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