

Industry Investments and the Economic Development of Unconventional Development

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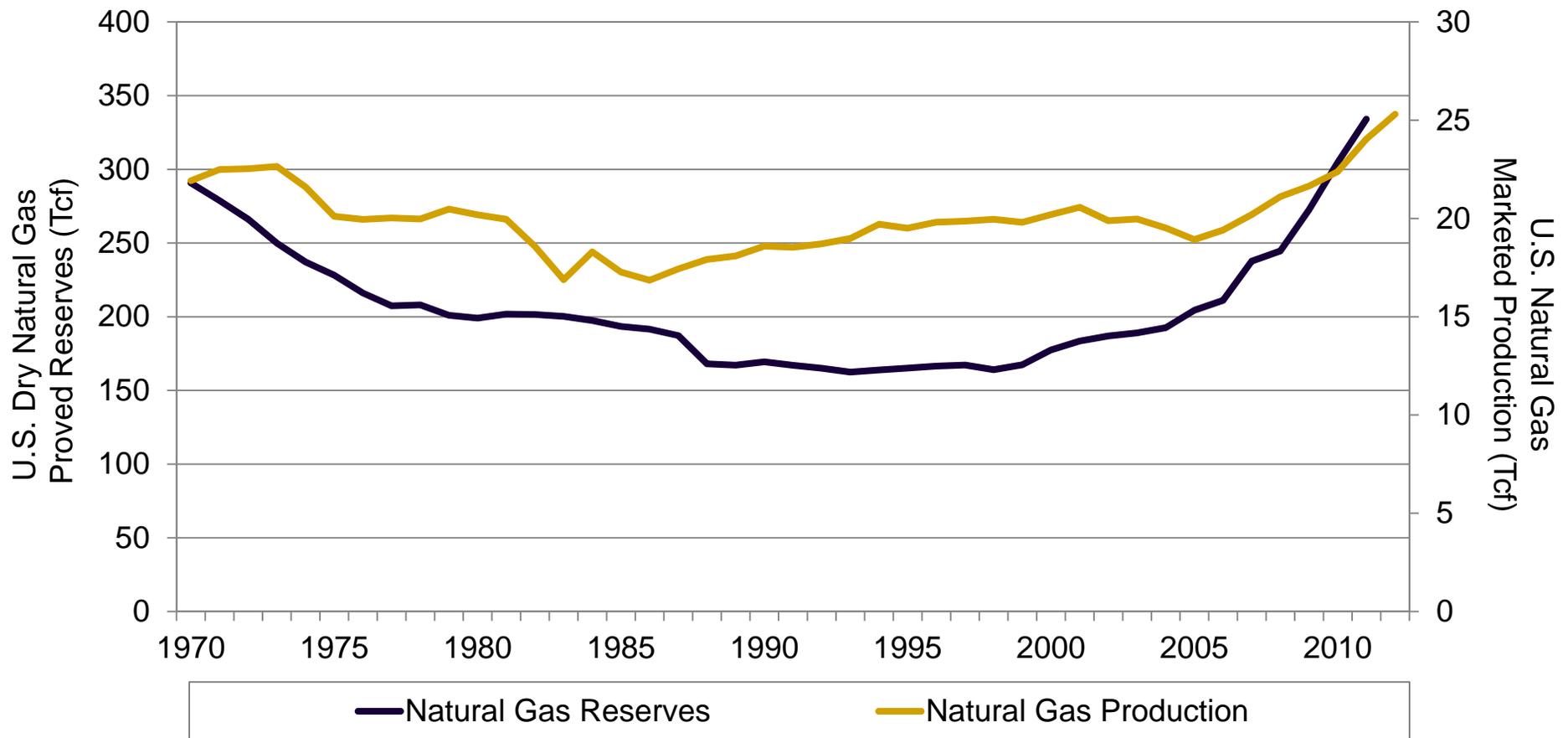


Overview of Unconventional Oil & Gas Development



Changes in Natural Gas Reserves and Production

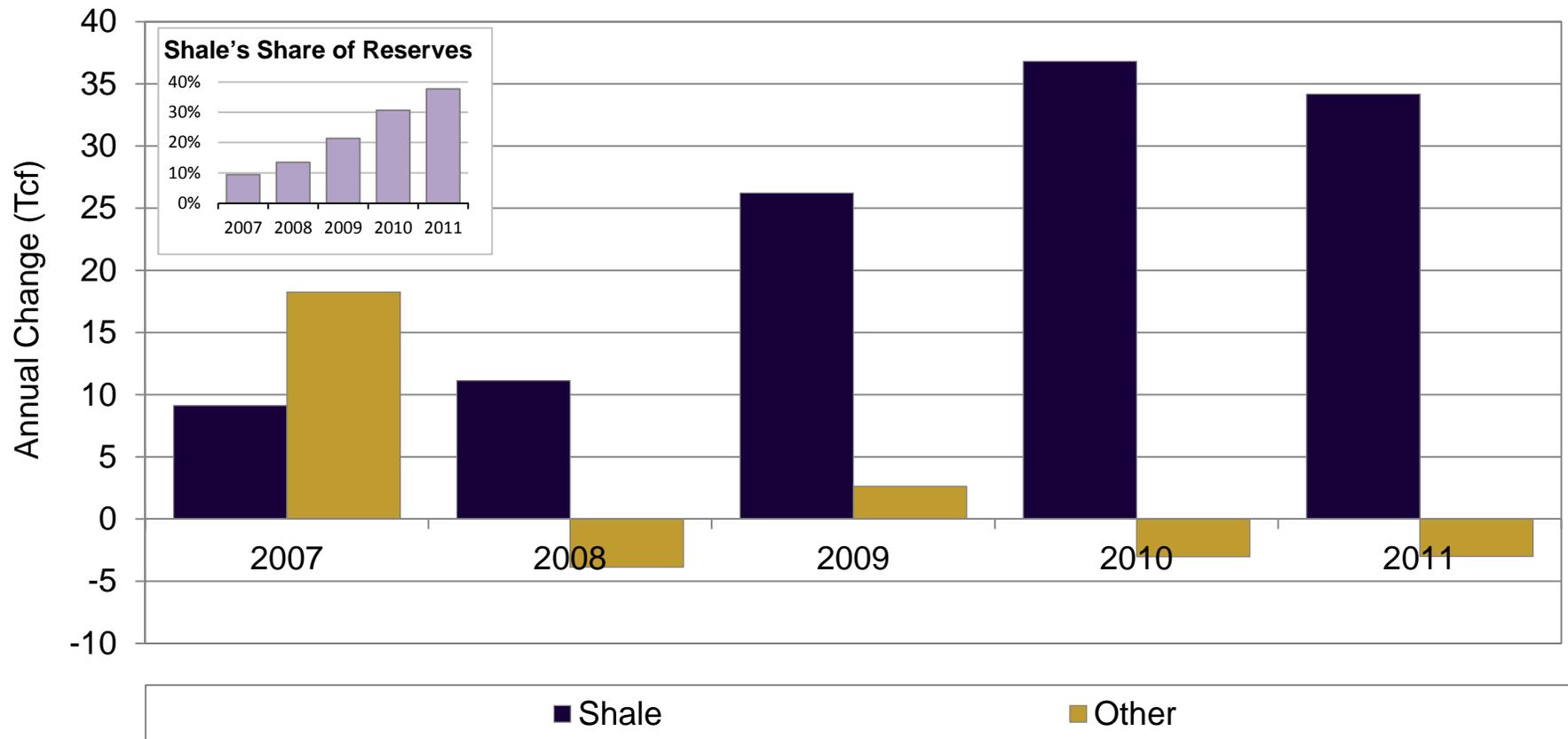
Natural gas production and reserves are at levels not seen since the 1970s and both U.S. natural gas production and reserves are now at an all time recorded peak.





Annual Changes in U.S. Natural Gas Proved Reserves (Shale and Other)

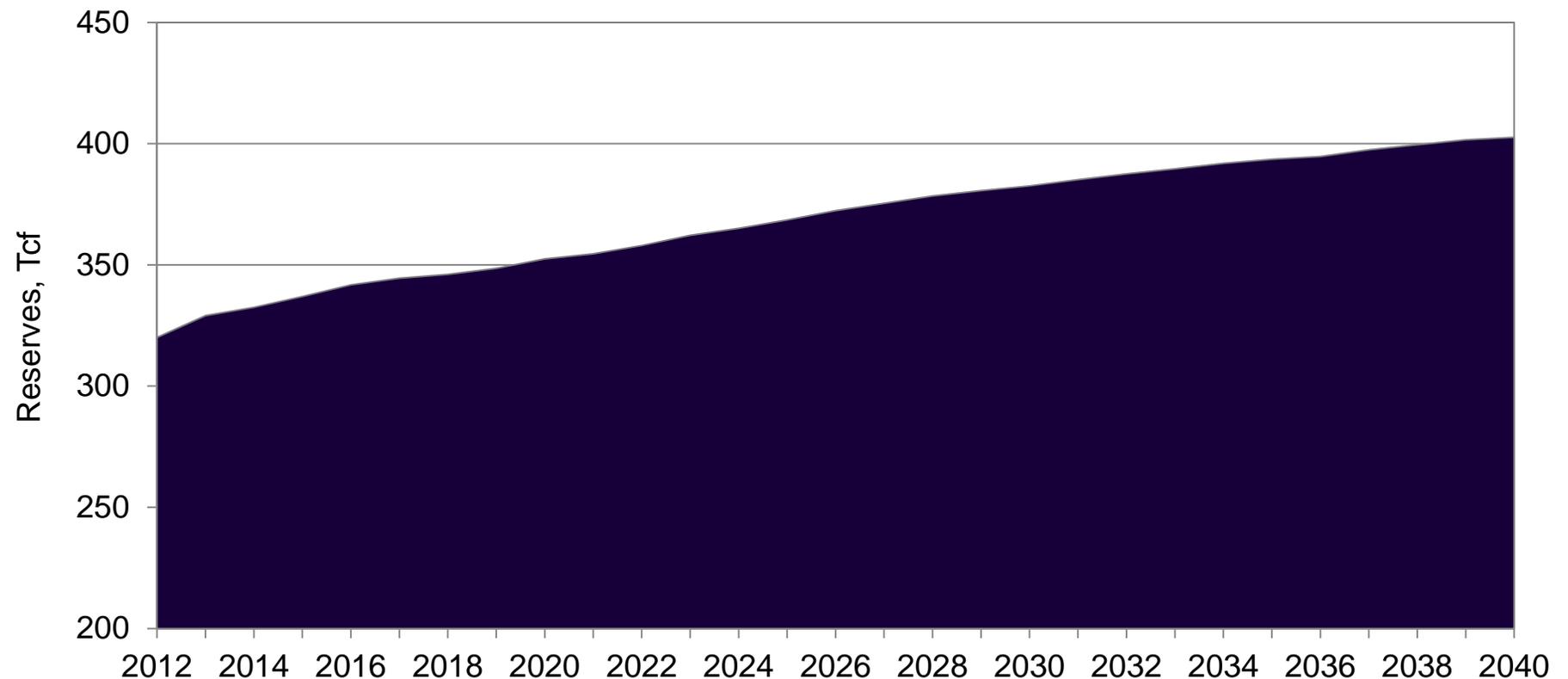
Expanded exploration and development of unconventional resources has driven increases in natural gas proved reserves in recent years. Net additions in shale natural gas reserves totaled 34.2 Tcf in 2011, outpacing the overall net decrease in natural gas reserves from all other sources combined.





Annual Energy Outlook, Natural Gas Reserves

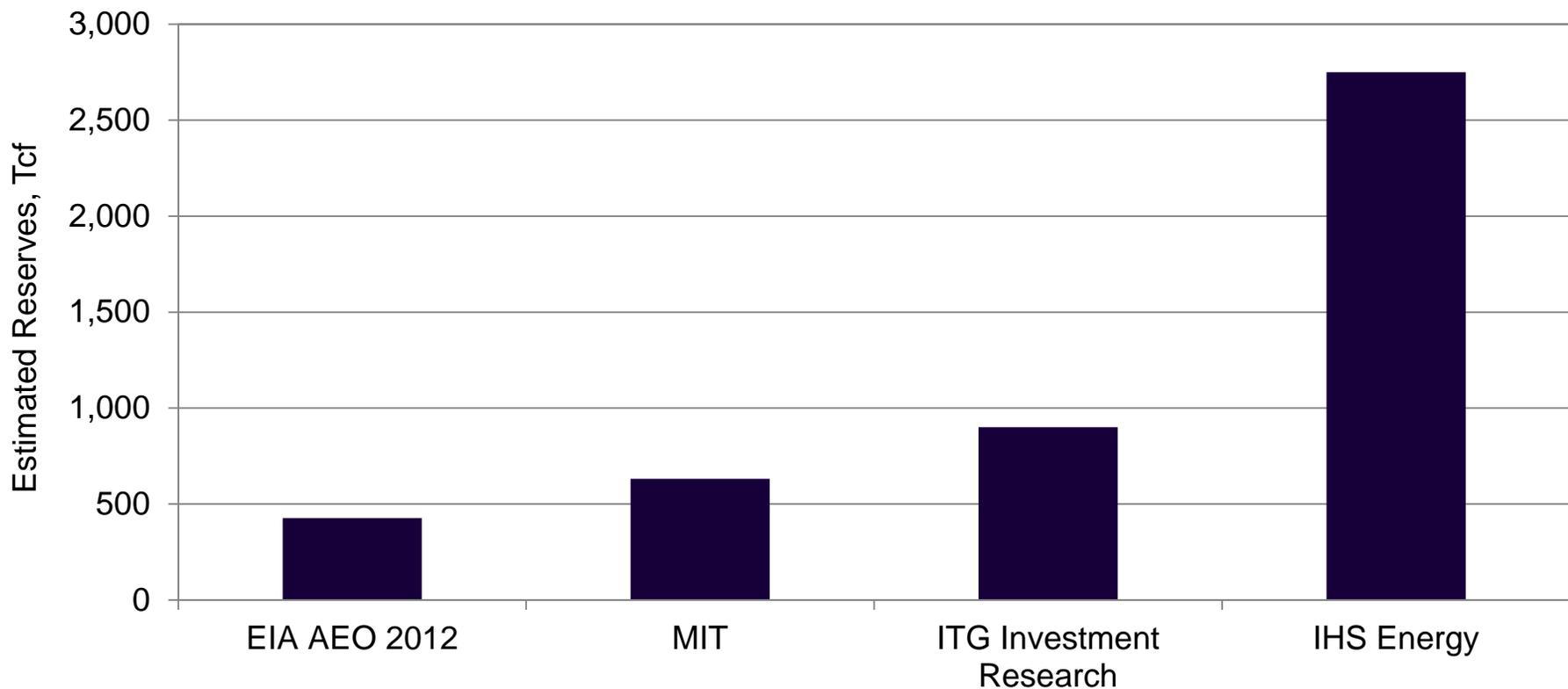
Unconventional resources are not a “flash in the pan” and are anticipated to continue to increase over the next two decades or more.





Alternative Natural Gas Reserve Forecasts

There are a wide range of unconventional shale gas reserve estimates from as low as 436 Tcf to as high as 2,750 Tcf. This represents a range of between 18 years to over 100 years of available natural gas resources based upon current consumption levels.¹



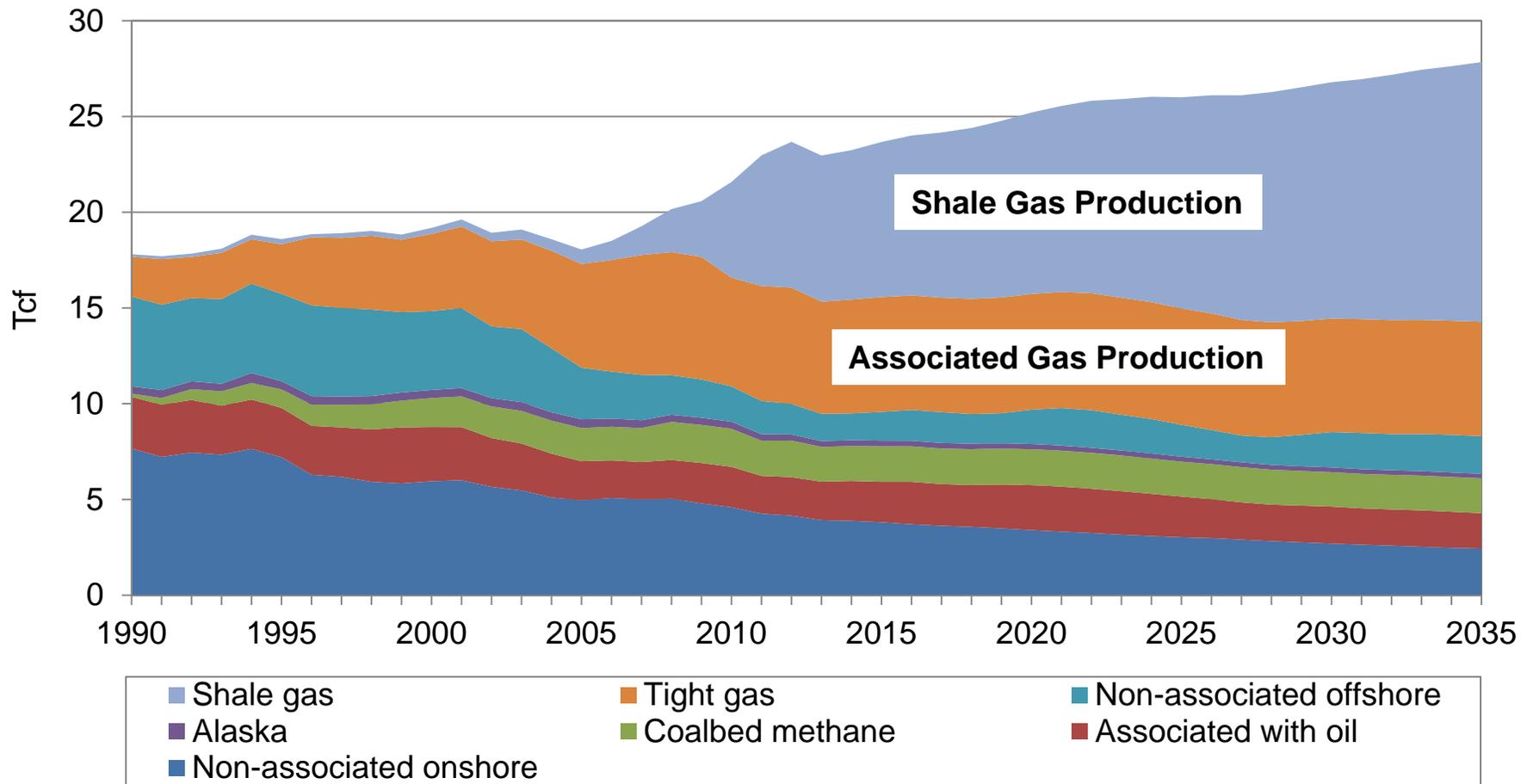
Note: ¹Assumes an annual consumption level of 24.3 Tcf.

The MIT study reached a mean estimate of technically recoverable resources of 631 Tcf with an 80 percent confidence interval of 418 to 871 Tcf. The ITG estimates of recoverable resources is for 10 overlapping plays, totaling 900 Tcf. These are the same 10 plays as estimated by the EIA's AEO (resulting in 426 Tcf). IHS Energy estimates show that total recoverable shale in the U.S. could be as high as 2,750 Tcf, significantly higher than their estimate of 1,268 in 2010.



Forecast U.S. Natural Gas Production

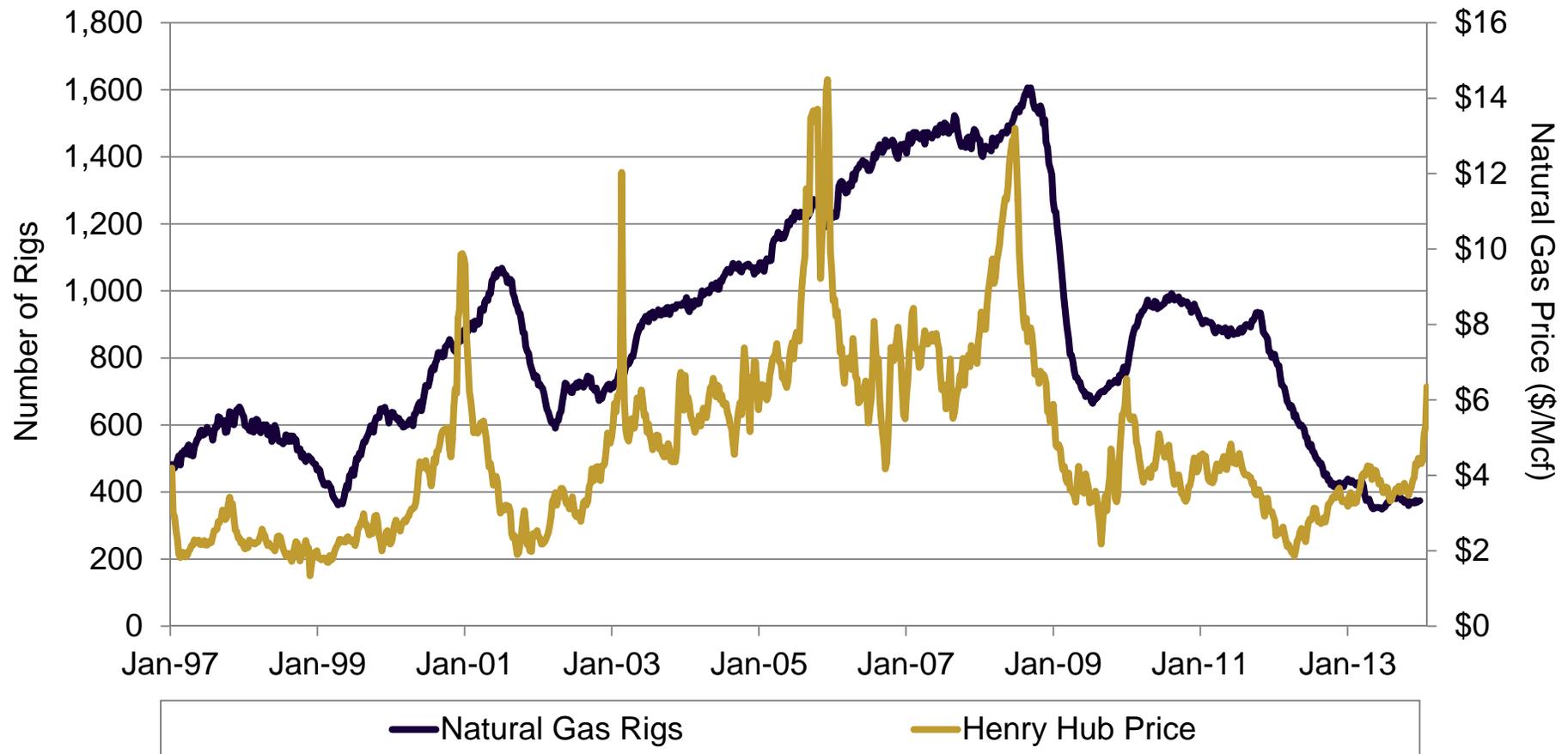
Shale availability will drive U.S. natural gas supply.





U.S. Natural Gas Rig Count and Henry Hub Price

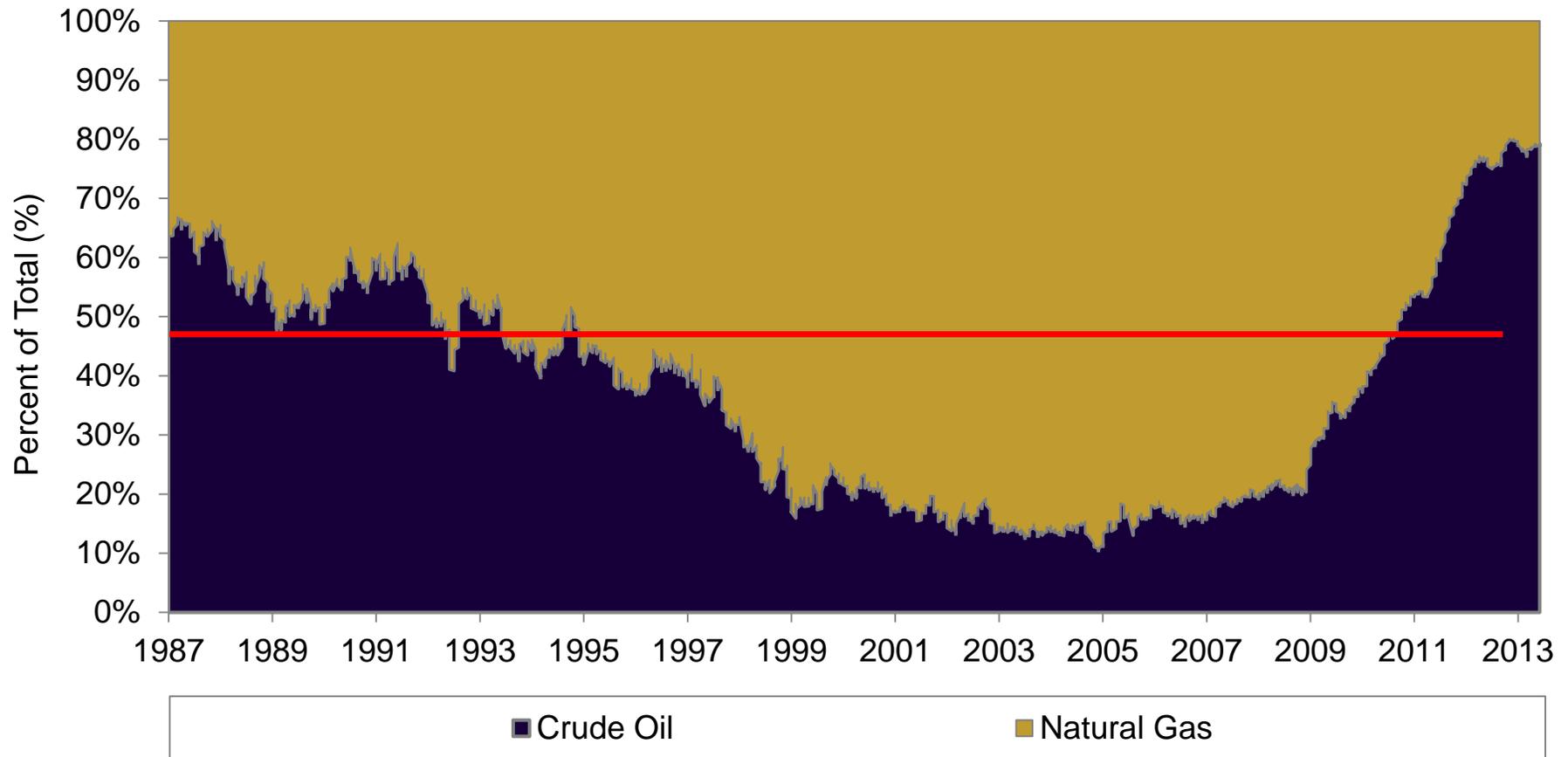
Natural gas rigs closely follow the natural gas spot price. Price decrease that started in 2007 has reduced gas drilling attractiveness.





U.S. Oil/Gas Rig Split

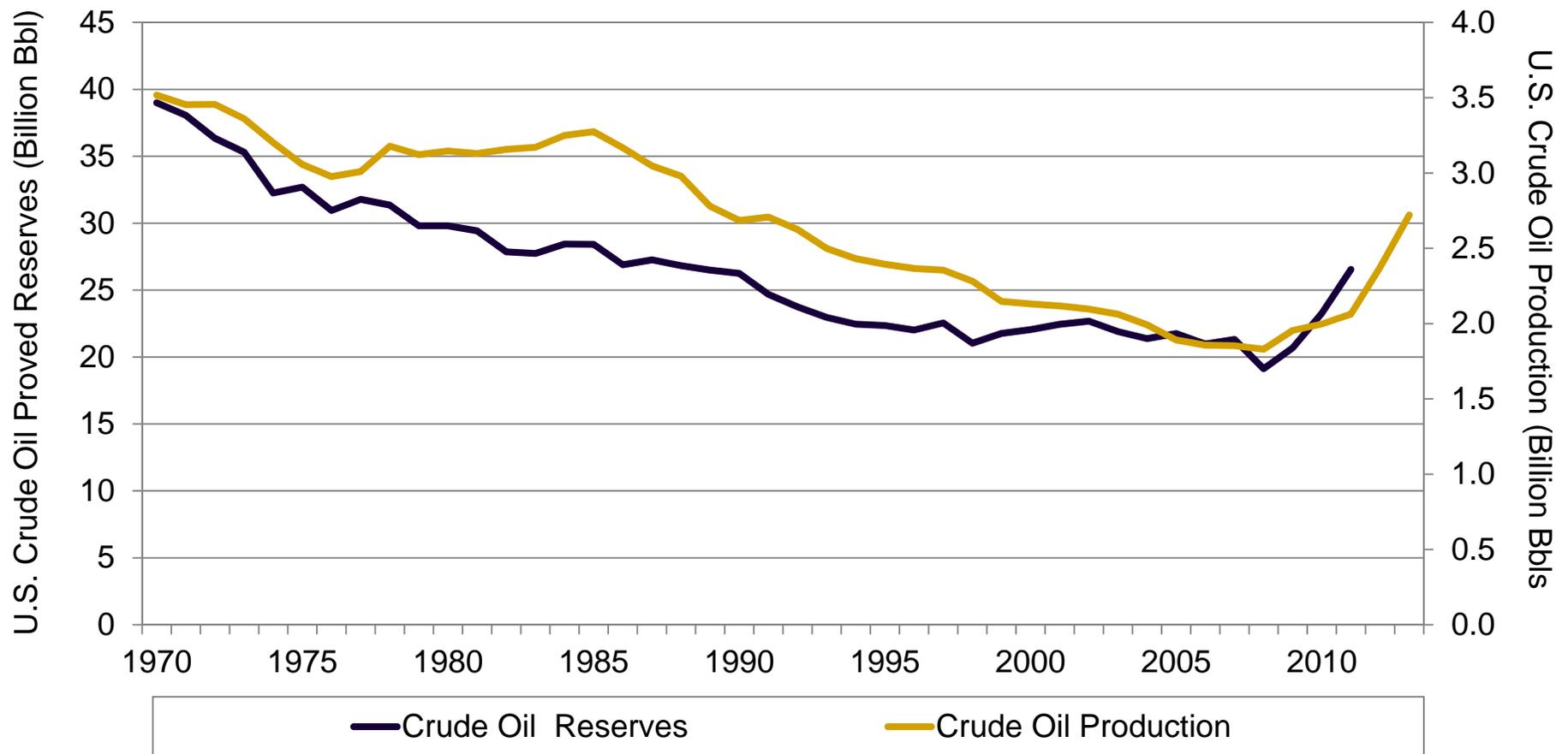
Drilling emphasis over the past 20 years has almost exclusively concentrated on developing new natural gas wells. This has shifted to crude oil drilling emphasis over the past two years.





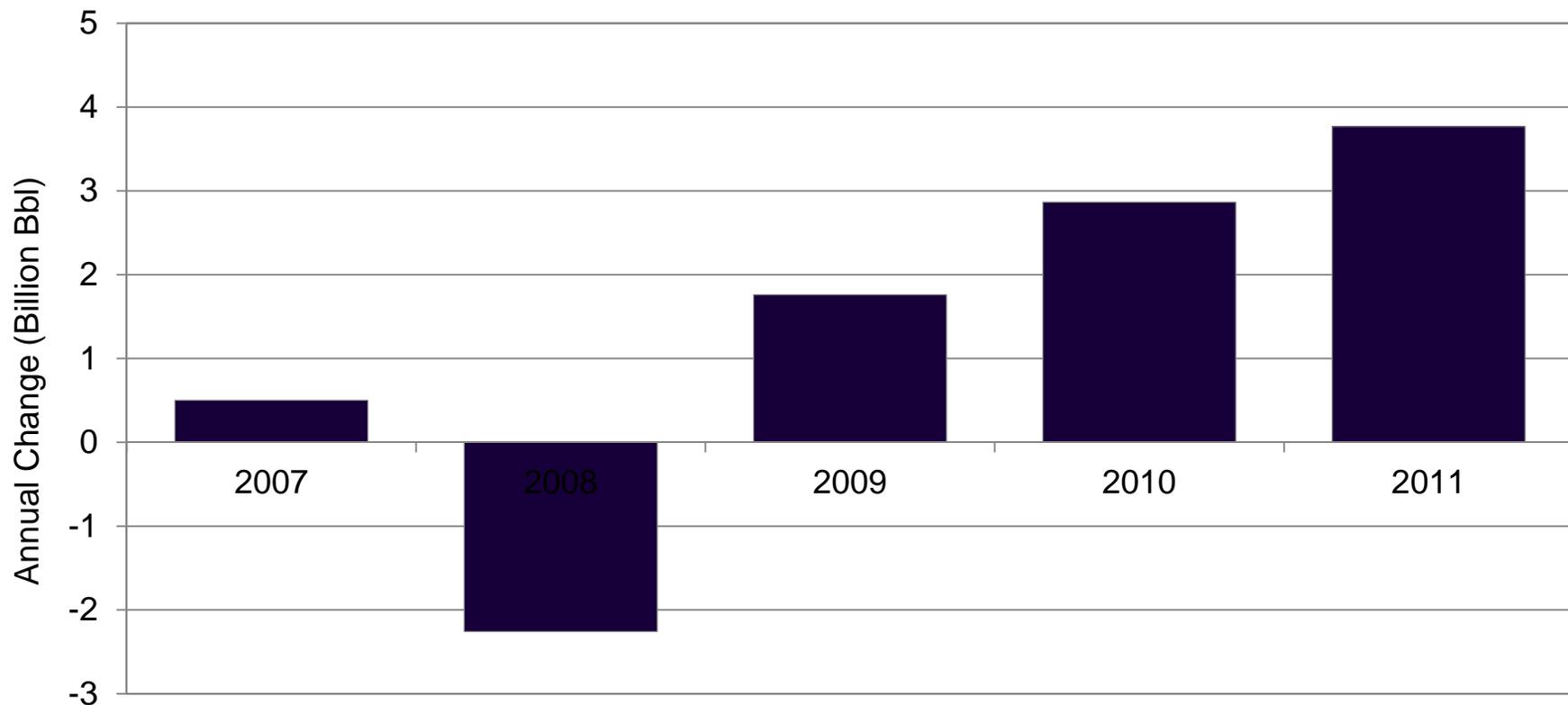
Changes in Crude Oil Reserves and Production

Crude oil production and reserves are climbing back to levels not seen since the 1980s.





Annual Changes in U.S. Crude Oil Proved Reserves (Shale and Other)

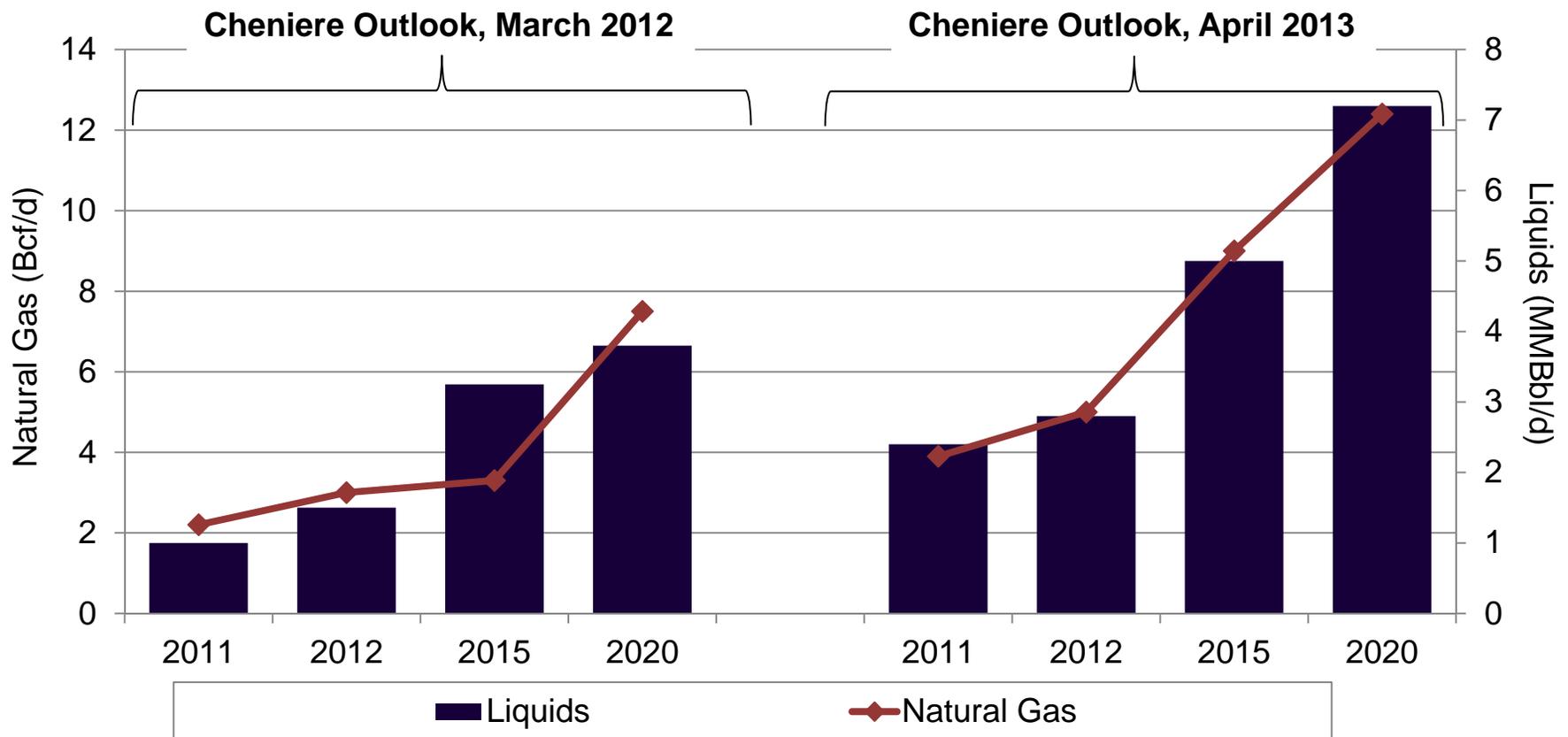


Note: Includes crude oil and lease condensate.
Source: Energy Information Administration, U.S. Department of Energy.



Annual Production from Unconventional Reservoirs

In just one year, Cheniere has revised its forecasted natural gas production in 2020 from slightly less than 8 Bcf per day to more than 12 Bcf per day; and liquids production from 6 MMBbls per day to 7 MMBbls per day.

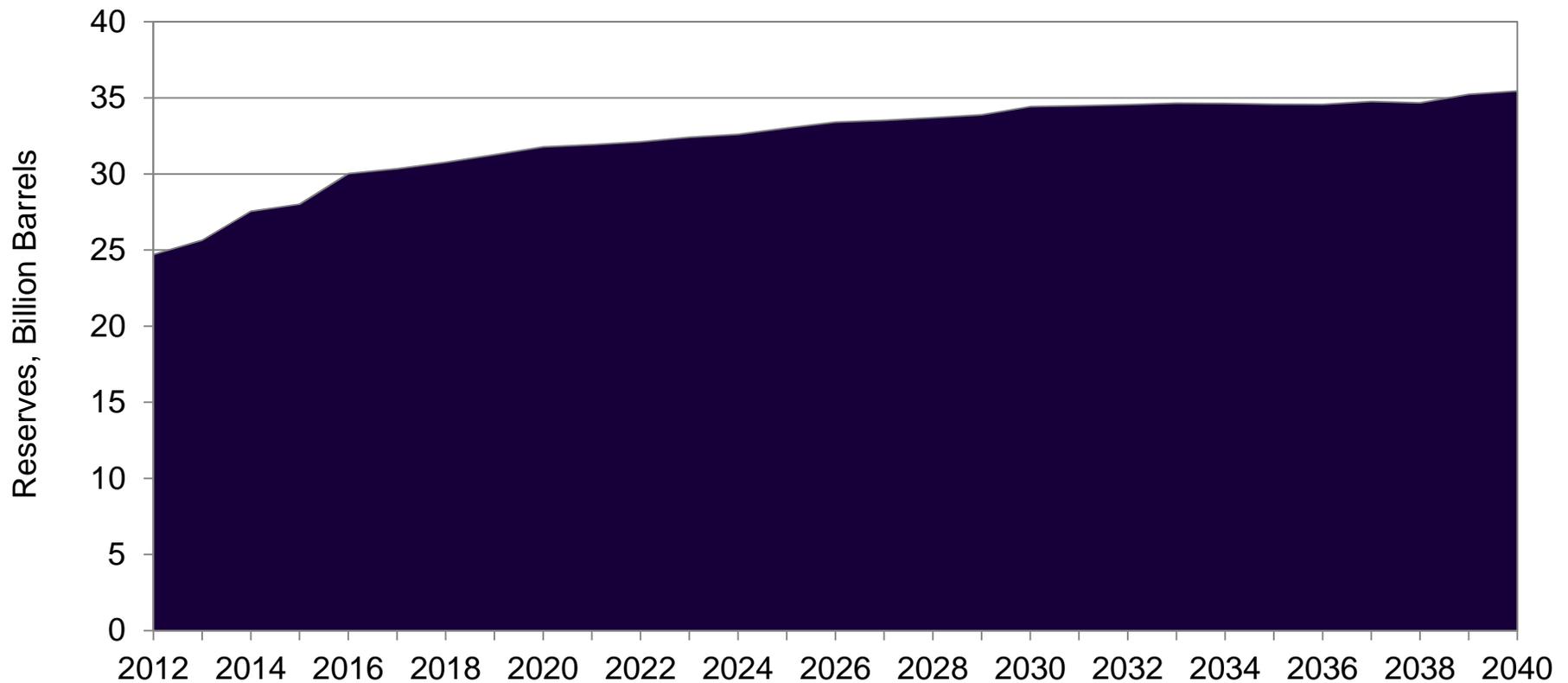


Source: Cheniere Energy Inc., Corporate Presentations. Available at: <http://phx.corporate-ir.net/phoenix.zhtml?c=101667&p=irol-presentations>.



Annual Energy Outlook, Crude Oil Reserves

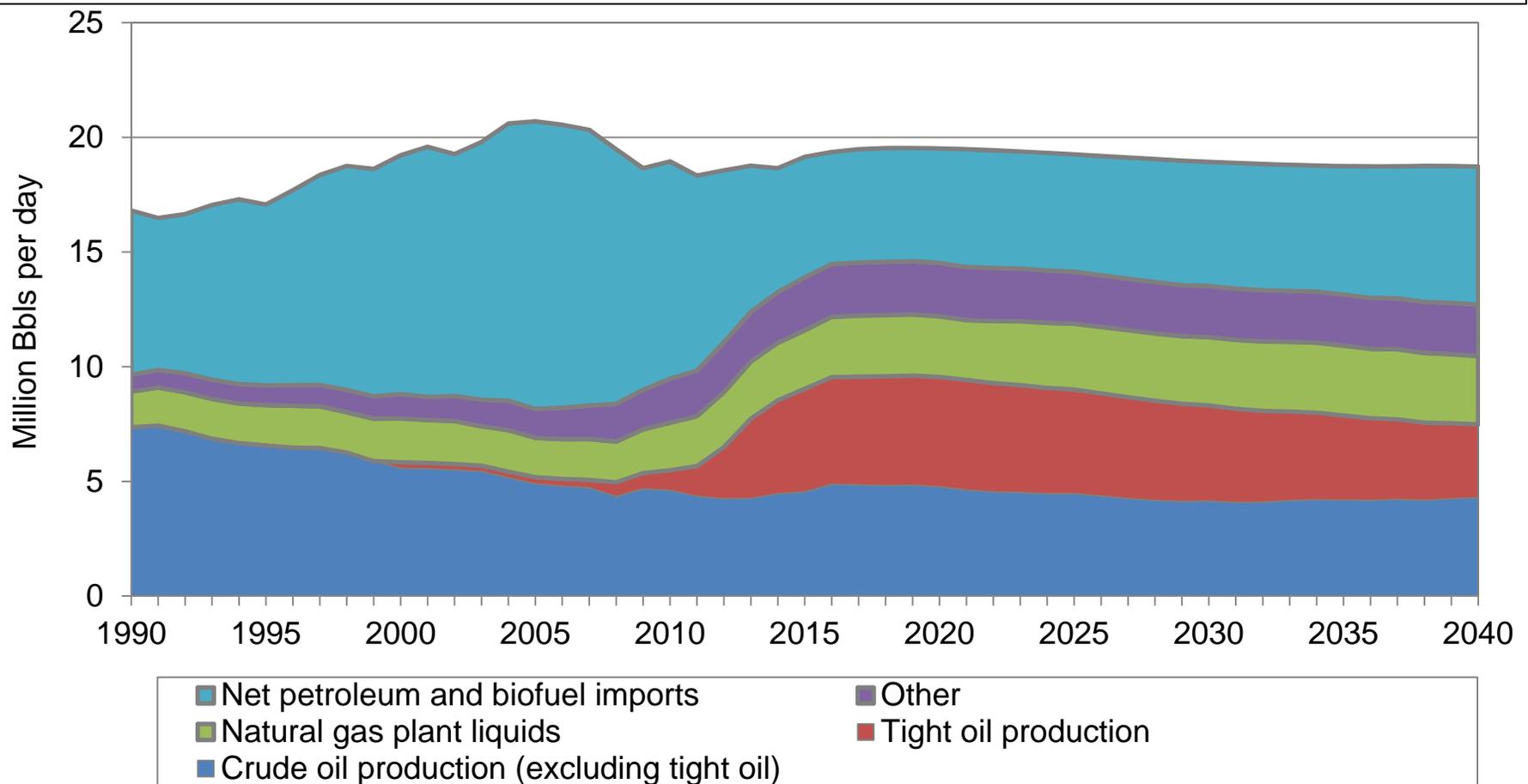
Crude oil reserves are expected to increase over 20 percent by 2016 and then gradually increase by 18 percent another to 2040.





Forecast U.S. Crude Oil Production

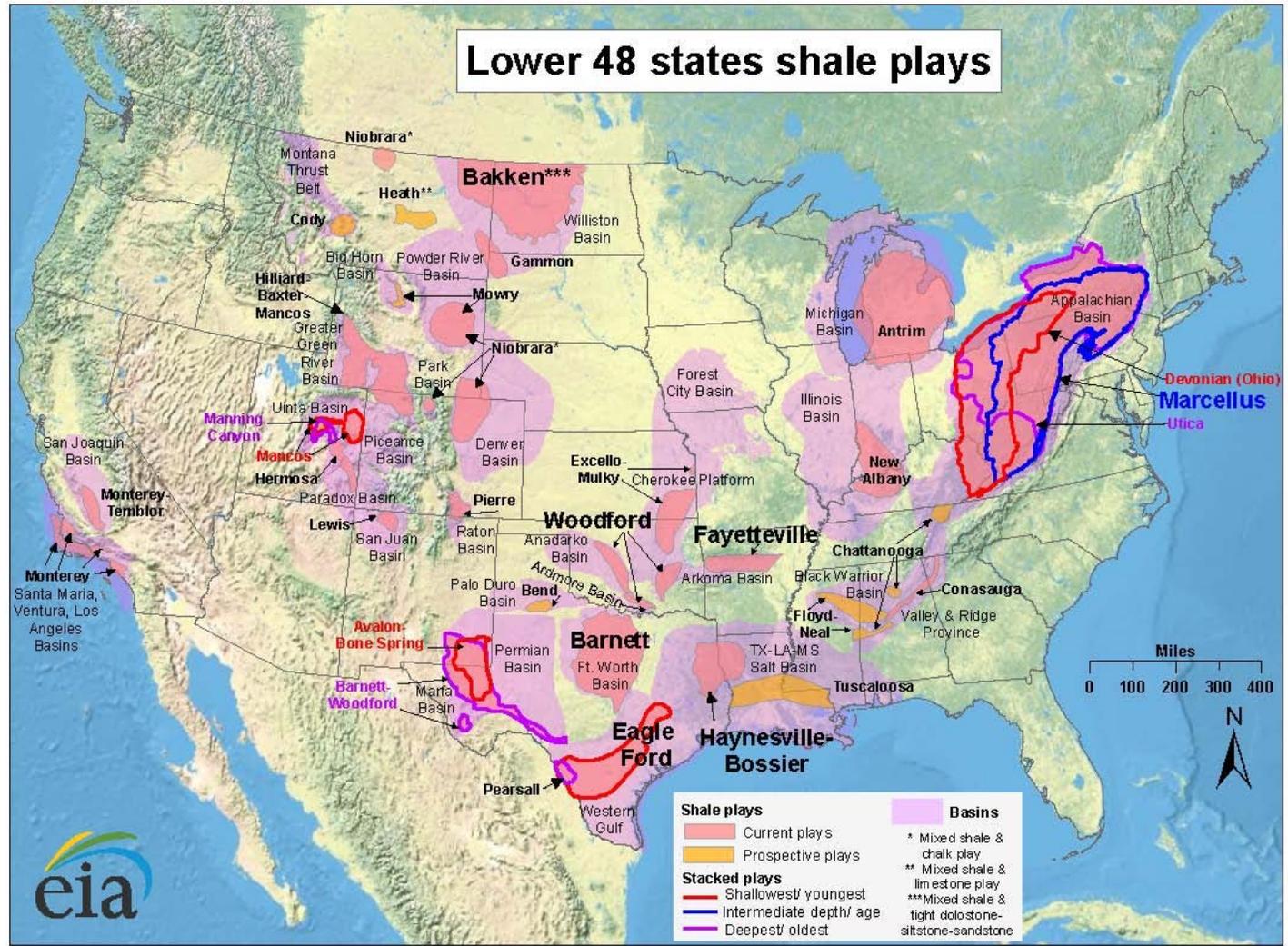
U.S. production of crude oil is expected to increase at an average annual rate of four percent through 2016. Tight oil production increases from 1.31 million barrels per day in 2011 to 4.8 million barrels per day in 2020, an increase of 266 percent.





Domestic Shale Gas Basins and Plays

Unlike conventional resources, shale plays (natural gas, liquids, and crudes) are located almost ubiquitously throughout the U.S. and are the primary reason for the decrease in overall and regional natural gas prices.



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

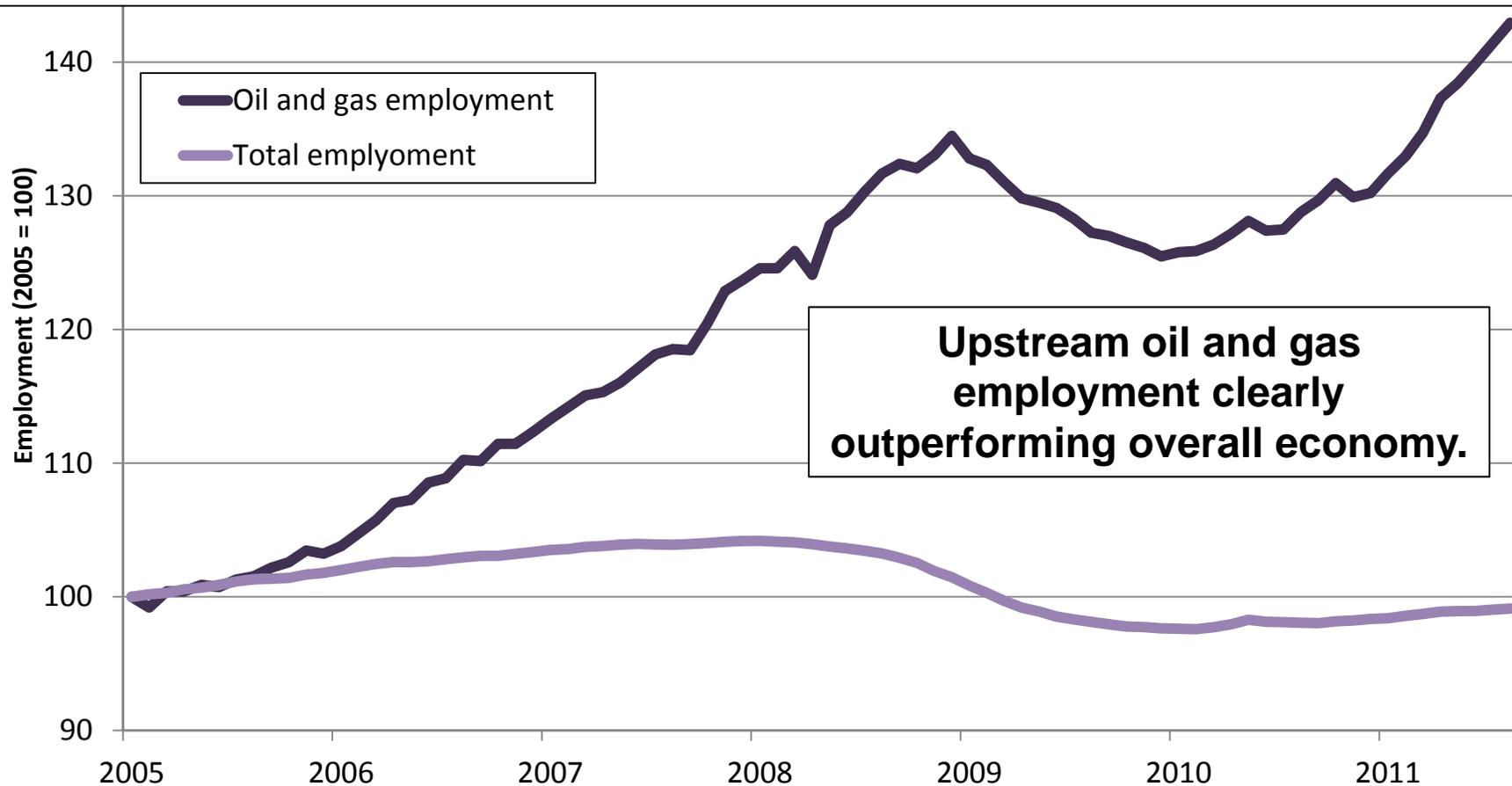


**Economic Development Benefits
from Upstream Development**



U.S. Oil and Gas Employment v. Economy-wide Trends (2005 = 100)

Oil and gas employment is almost 40 percent above its 2005 level while total U.S. employment struggles to regain four years of losses.

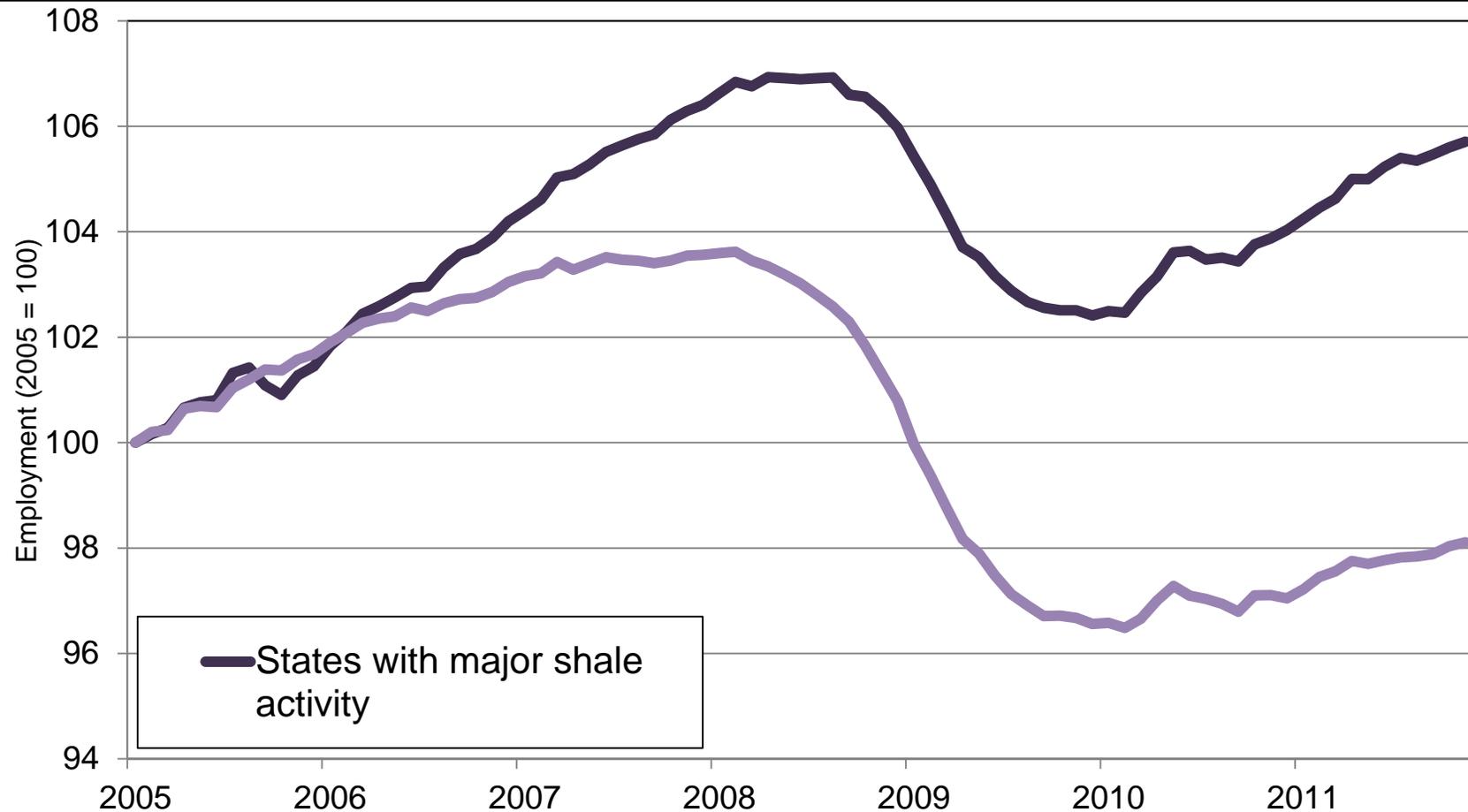


Upstream oil and gas employment clearly outperforming overall economy.



U.S. Employment Trends (2005=100): Total Employment, Select States

The “multiplier” effects of upstream development have likely had significant beneficial impacts on shale-producing states.

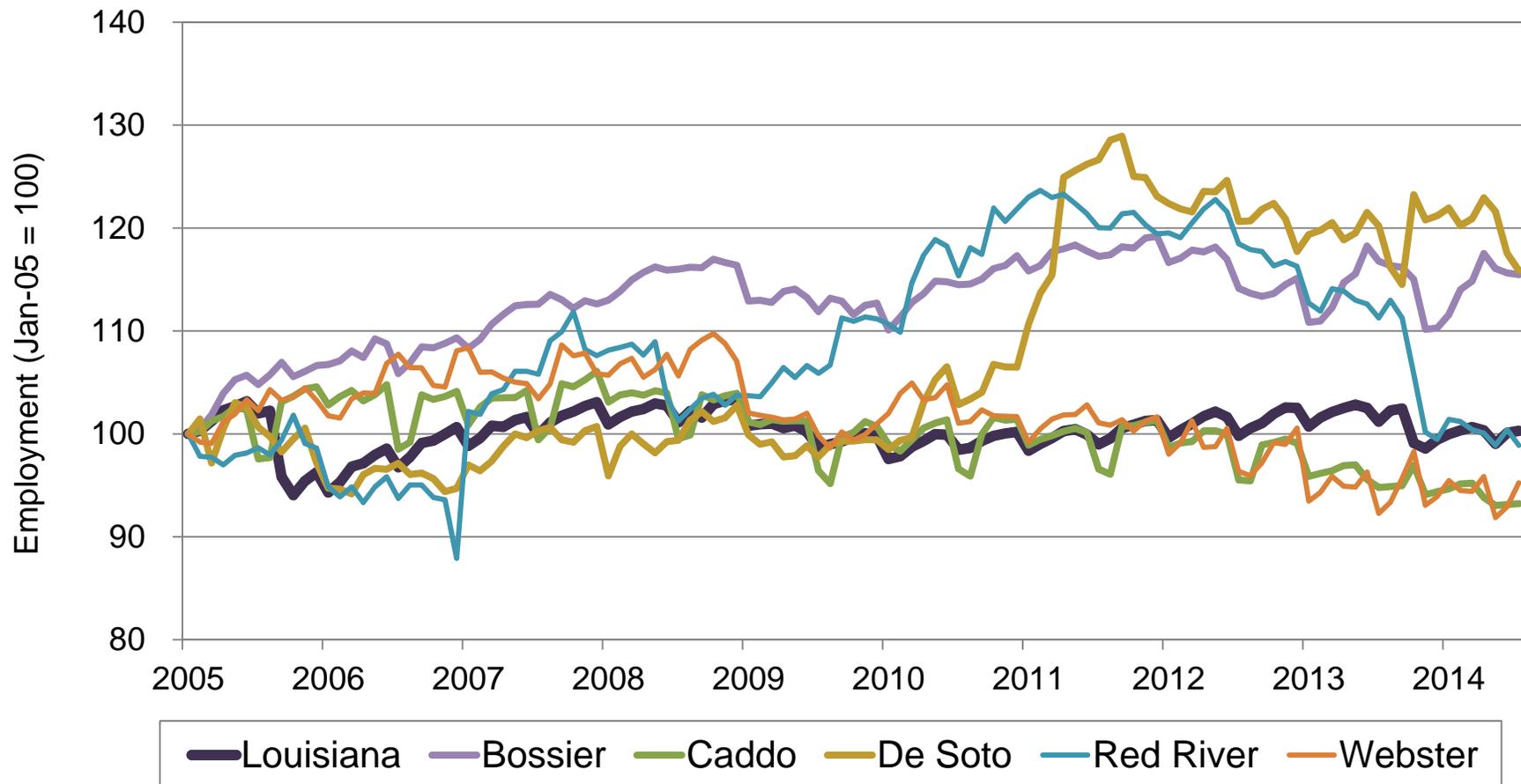


Shale states: LA, TX, AR, ND, UT, CO, & PA
Source: Bureau of Labor Statistics



Employment by Parish and State

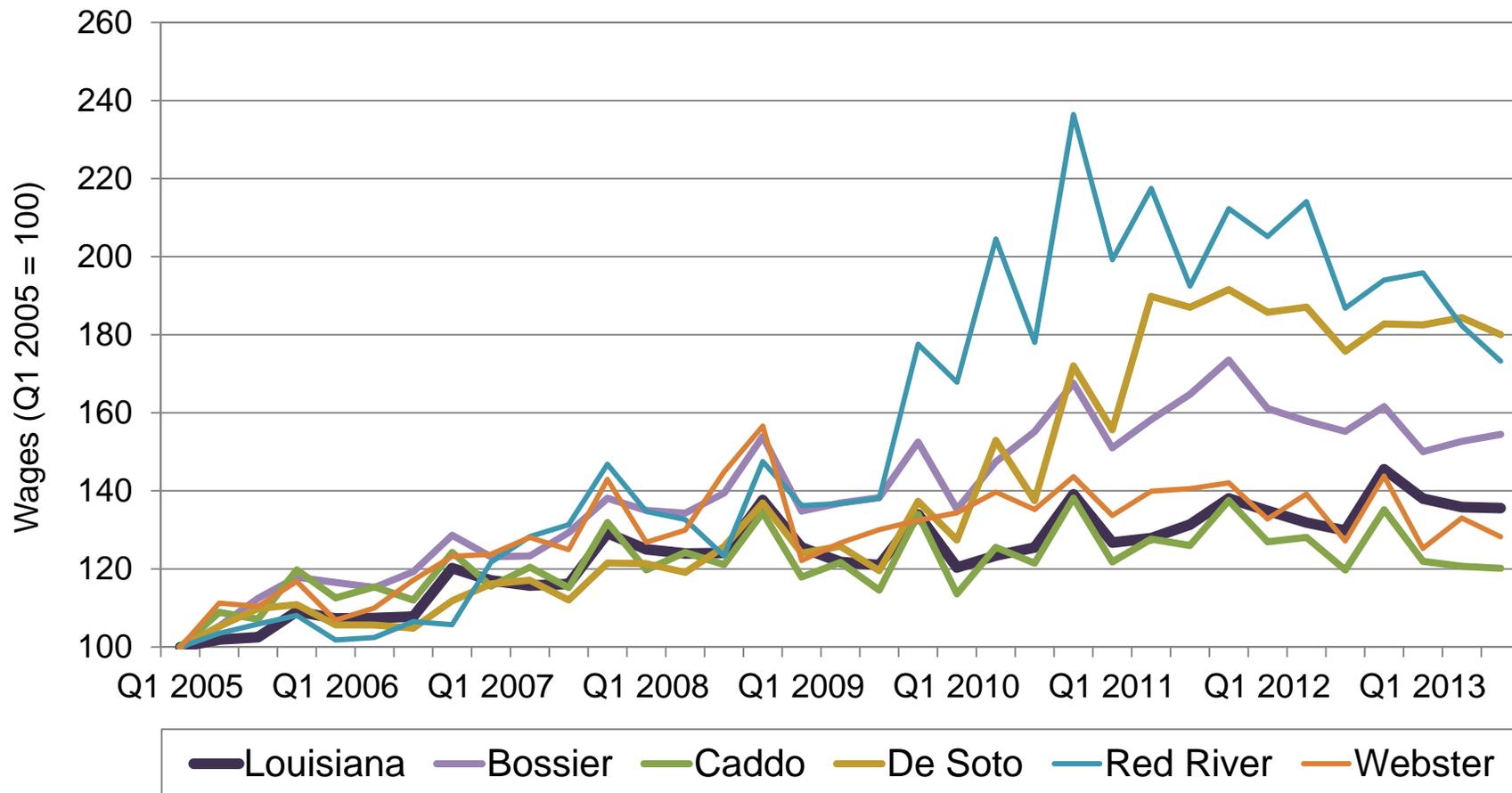
Growth in employment in most of the Haynesville parishes have outpaced the State average.





Total Wages by Parish and State

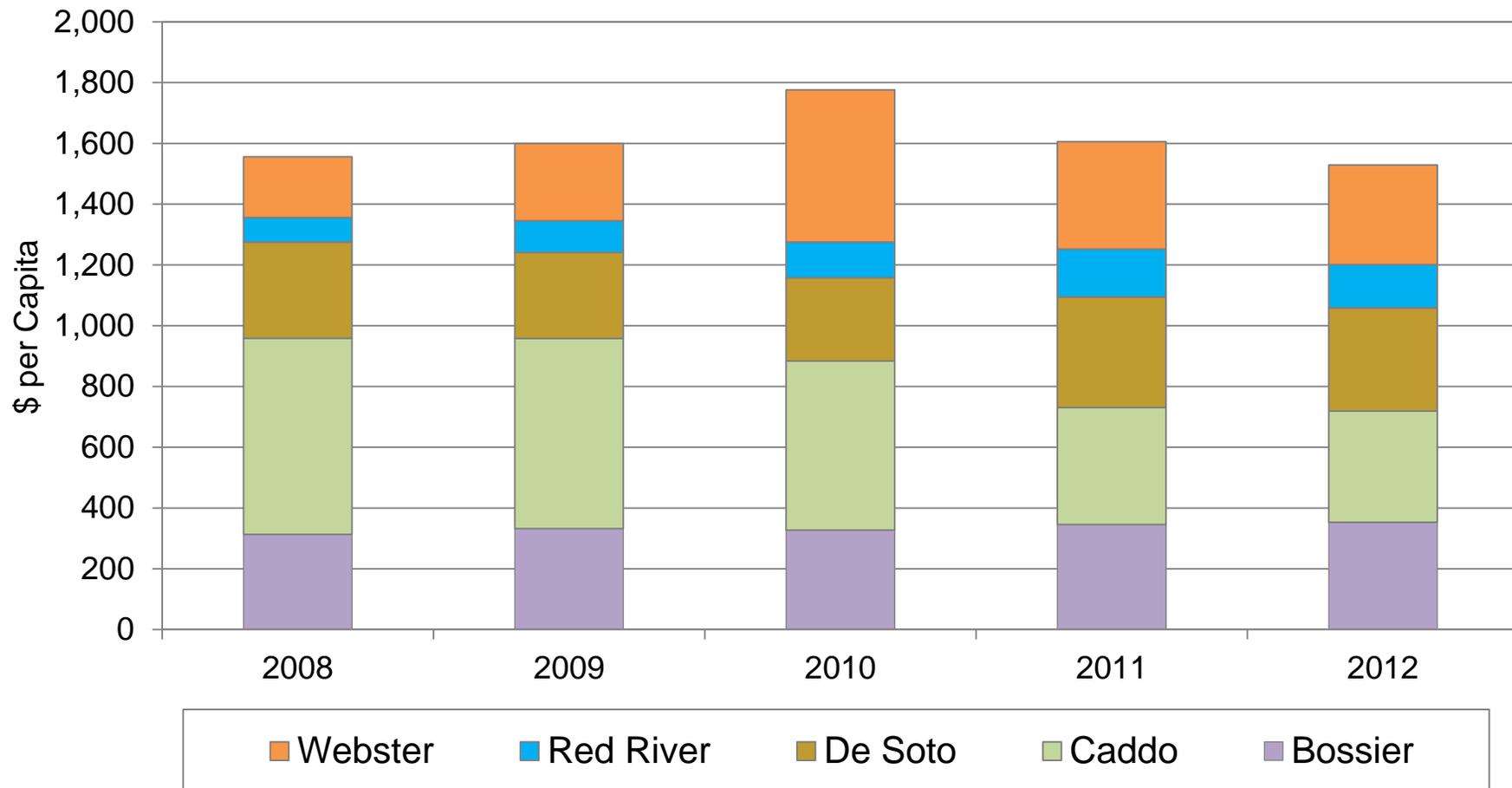
Growth in total wages in the Haynesville Parishes have outpaced the State average.





Per Capita Sales Tax by Parish

Local tax revenues have also increased with drilling/production induced economic activity in these areas.





**Economic Development
Opportunities In Downstream
Industries**



Manufacturing Renaissance

Affordably-priced and abundant natural gas supplies are currently being leveraged to create a new manufacturing renaissance in the U.S. Billions of new capital investments have been announced over the past two years that have the ability to transform American manufacturing.

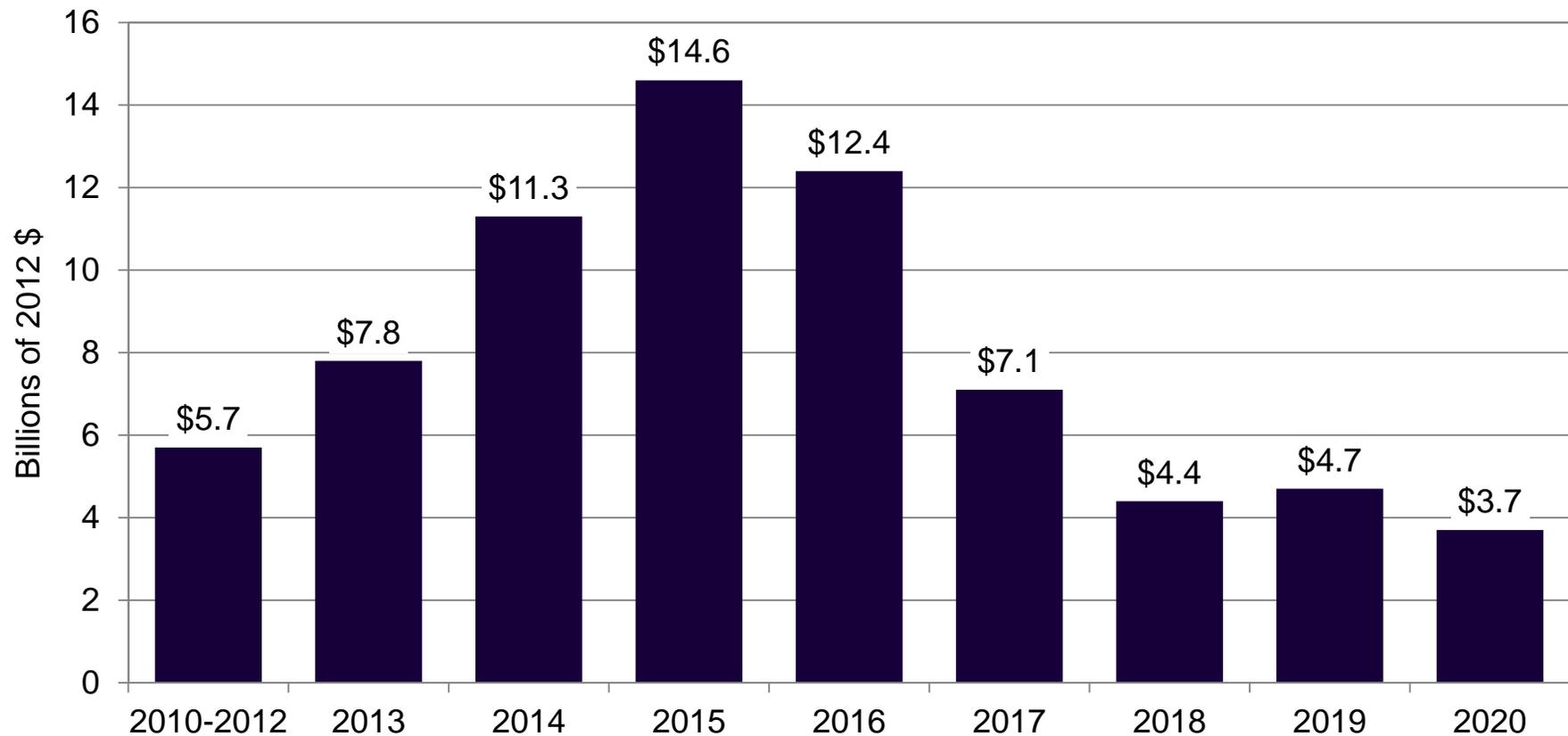
To date, most of the new project development, and existing project expansions, have been geographically concentrated along the Gulf coast. These projects are anticipated to be completed within the next three to eight years, and are all associated with energy-based manufacturing. Some of the investments are new “greenfield” developments while several others represent expansions at existing manufacturing facilities or abandoned sites.

Energy-based industrial development can be categorized broadly into such areas as: (a) petrochemical (ethane cracker/polymers); (b) methanol/ammonia; (c) gas-to-liquids projects; and (d) liquefied natural gas export facilities.



Incremental U.S. Chemical Industry Capital Expenditures

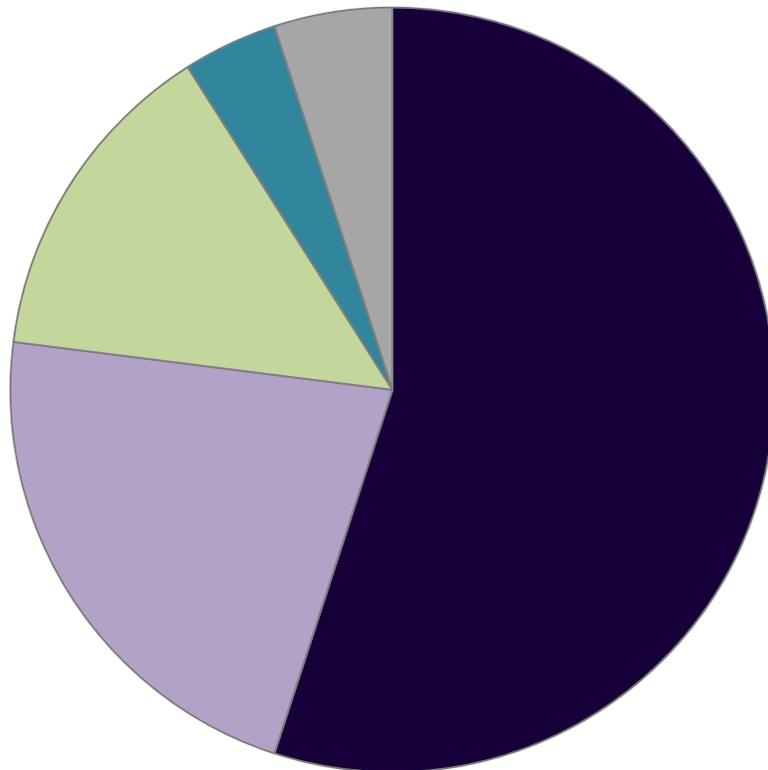
The American Chemical Council estimates that U.S. chemical industry capital investments alone will total \$71.7 billion through 2020. These investments are based on a “renewed competitiveness from shale gas.”





ACC Study: Composition of Capital Investment by Chemical Industry Segment

The ACC study notes that projects announced to date have been trending toward bulk petrochemical production, using mainly steam crackers for ethylene and on-purpose propylene production. Projects for producing methanol and ammonia as well as fertilizer products have also been announced.

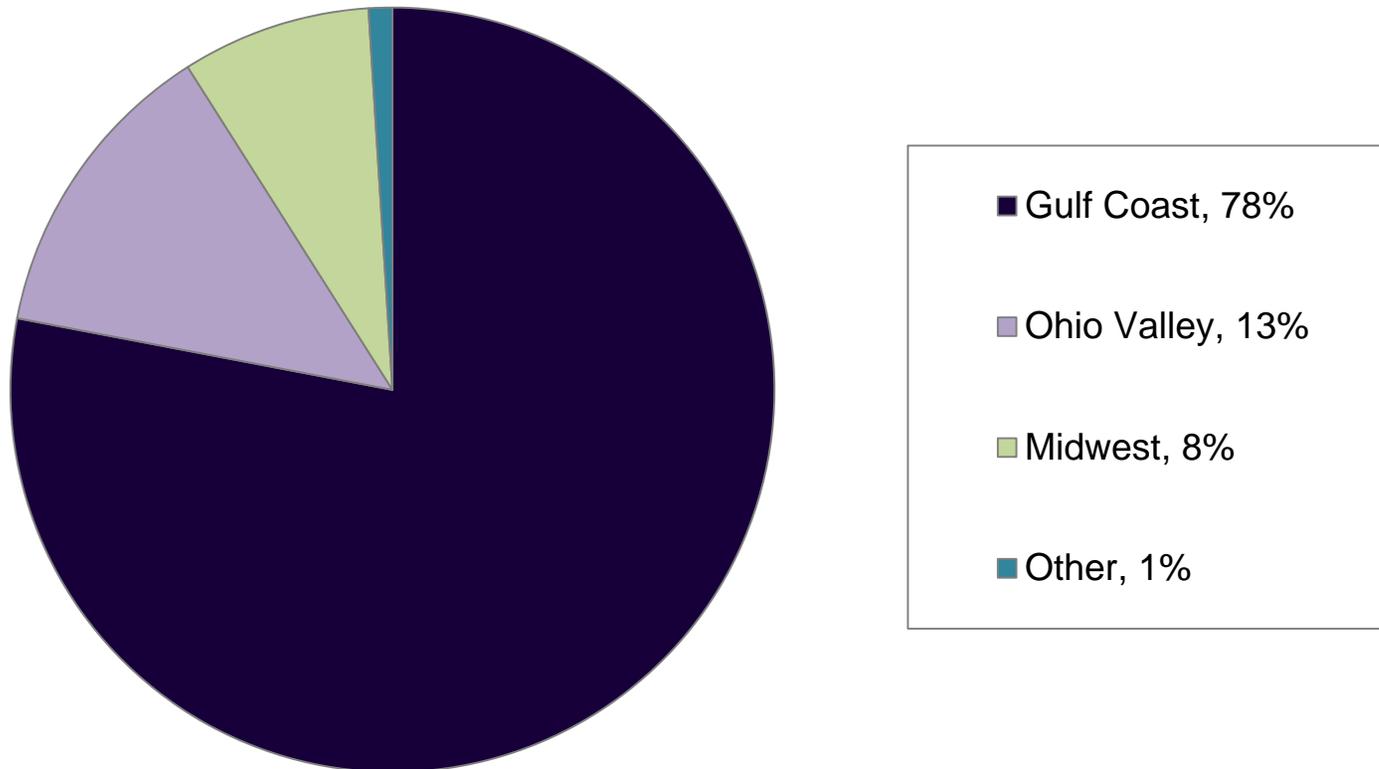


- Bulk Petrochemicals, 55%
- Plastic Resins, 22%
- Fertilizers, 14%
- Inorganic Chemicals, 4%
- Other, 5%



ACC Study: Projected Chemical Industry Employment by Region

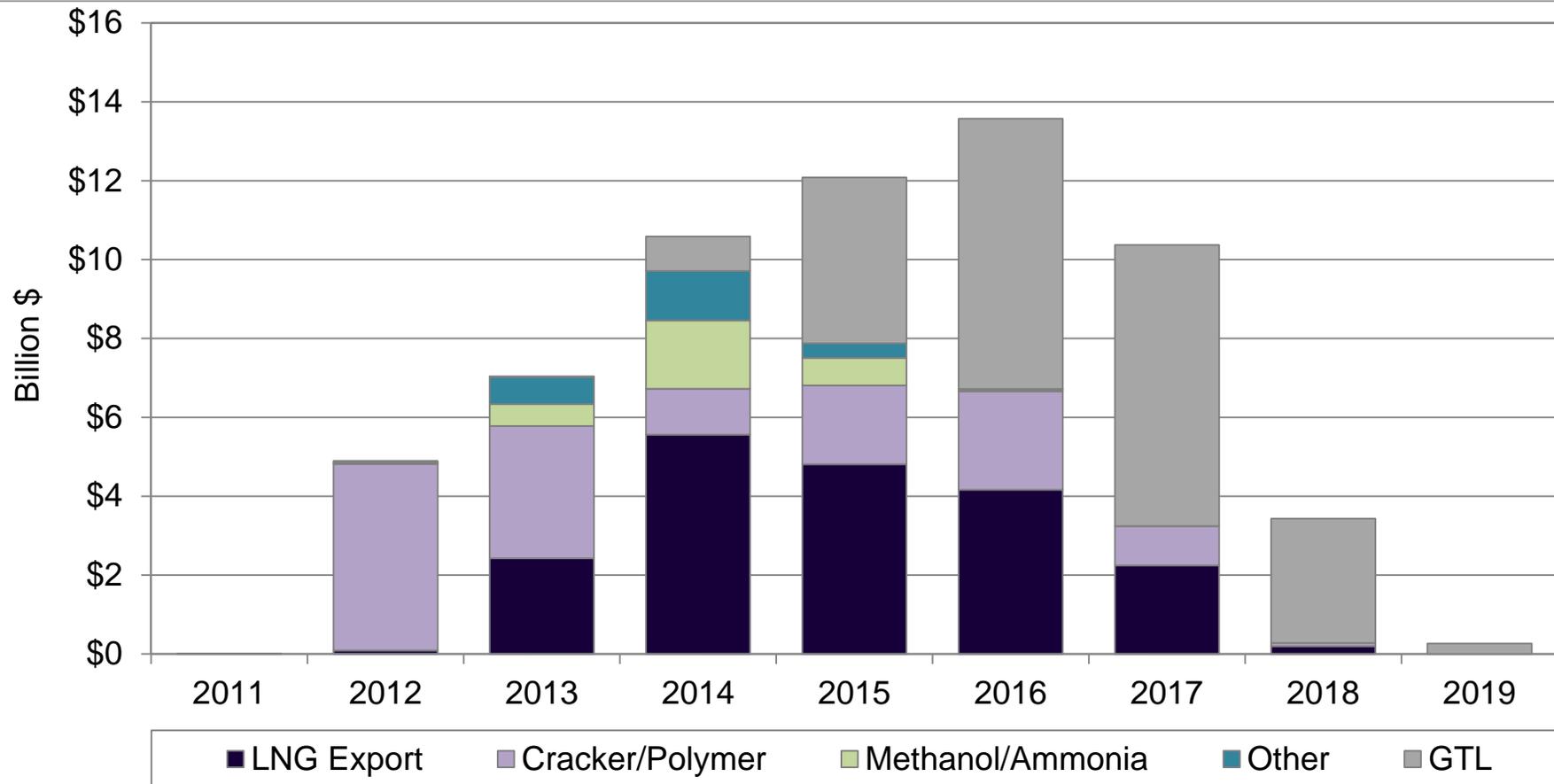
Not surprisingly, the majority of projects will be located in the GOM region. New investments resulting from the renewed competitiveness from shale gas will mostly occur in the Gulf Coast, as well as the Ohio Valley and some in the Midwest.





LSU-CES Study (2013): Louisiana Total Capital Expenditures by Sector

A recent LSU Center for Energy Studies (CES) reports an estimated \$62 billion in new energy-based manufacturing development, most of which is anticipated to occur between 2014 and 2019.

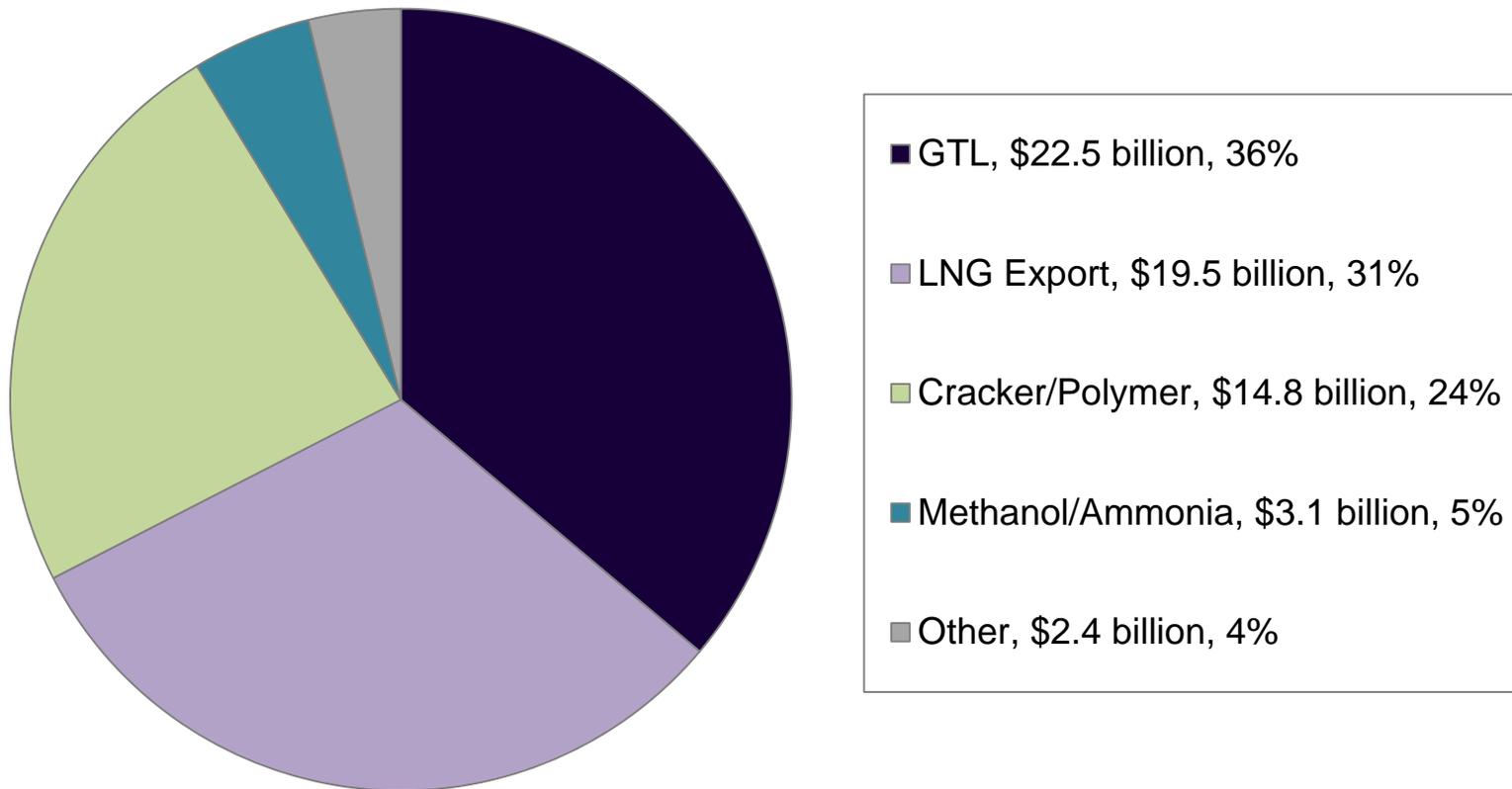


Source: David E. Dismukes (2013). *Unconventional Resources and Louisiana's Manufacturing Development Renaissance*. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.



Manufacturing Renaissance

Of the proposed facility expansions in Louisiana identified in the LSU-CES study, gas-to-liquids and LNG export comprise the majority of proposed capital spending.





**How Does this Relate to the Central
Gulf Coast Region?**



Leveraging Unconventional Development

Mississippi has two potential opportunities in this changing new world.

The first, is leveraging the state's considerable infrastructure to facilitate potential new energy-based manufacturing.

The second, is taking advantage of the upstream opportunities in production that traverse a good part of the southwestern part of the state.

Governor Bryant’s Energy-Based Manufacturing Strategy

On October 2012, Governor Phil Bryant released Mississippi’s Energy Roadmap.¹ One of the important “next-steps” identified in his *Strategy for Energy-Based Economic Development* includes:

Promoting Mississippi’s competitive advantages, maximizing the use of the state’s abundant energy resources, and adding value to them through manufacturing, conversion, and processing to encourage job creation and investment.



Energy Works:
Mississippi’s Energy Roadmap

Governor Phil Bryant



¹ Governor Phil Bryant. *Energy Works: Mississippi’s Energy Roadmap*. Jackson, MS: Office of the Governor, October, 2012.



- Mississippi could be sitting in the crossroads of economic development opportunities for energy-based manufacturing development. Literally billions of opportunities (individually, collectively) associated with this type of industrial development.
- Energy-based industries require low cost, stable access to both inputs and outputs – both of which Mississippi has in abundance.
- Energy-based industrial development, to date, has been highly concentrated in Louisiana and Texas, largely due to the ability to leverage existing (brownfield) sites and historic industrial linkages – however, constraints are like to arise in the future.
- Mississippi will have to vigorously compete for these opportunities – they will not materialize without concerted, uniform effort.
- Big “bang” for your economic development bucks.

Energy-based manufacturing leads to big economic footprint

	Ammonia	Methanol	Ethylene	Electric	LNG
Plant Capacity (million metric tons, Bcf/d, MW)	1.9	1.0	2.0	620.0	2.1
Capital Investment (million \$) 	\$ 1,370.0	\$ 1,100.0	\$ 1,556.0	\$ 568.5	\$ 9,664.5
Average Investment Cost (\$/ton, Bcf, MW)	\$ 721.9	\$ 1,100.0	\$ 778.0	\$ 917.0	\$ 12.6
Typical Construction Duration (years)	2.3	2.3	4.0	2.5	5.0
Estimated In-State Purchases (million \$) 	\$ 383.6	\$ 308.0	\$ 404.6	\$ 213.6	\$ 1,932.9
Estimated Direct Construction Employment (jobs)	1,450	800	800	675	3,000
Estimated Wages (million \$)	\$ 70.9	\$ 39.1	\$ 39.1	\$ 33.0	\$ 146.6
Estimated Natural Gas Use (Bcf) ¹	65.5	34.0	76.8	24.9	85.5
Estimated Annual Electricity Use (million MWh) ²	17.1	5.5	8.3	n.a.	7.7
Estimated Annual Water Use (million gallons) ³	398.5	509.7	2,788.1	635.5	n.a.
Estimated Annual Non-Energy Expenditures (million \$)	\$ 121.4	\$ 156.3	\$ 164.1	\$ 13.9	\$ 625.0
Estimated Annual Direct Employment (jobs) 	85	125	125	25	125
Estimated Annual Direct Wages (million \$)	\$ 10.4	\$ 18.4	\$ 19.4	\$ 3.0	\$ 16.8

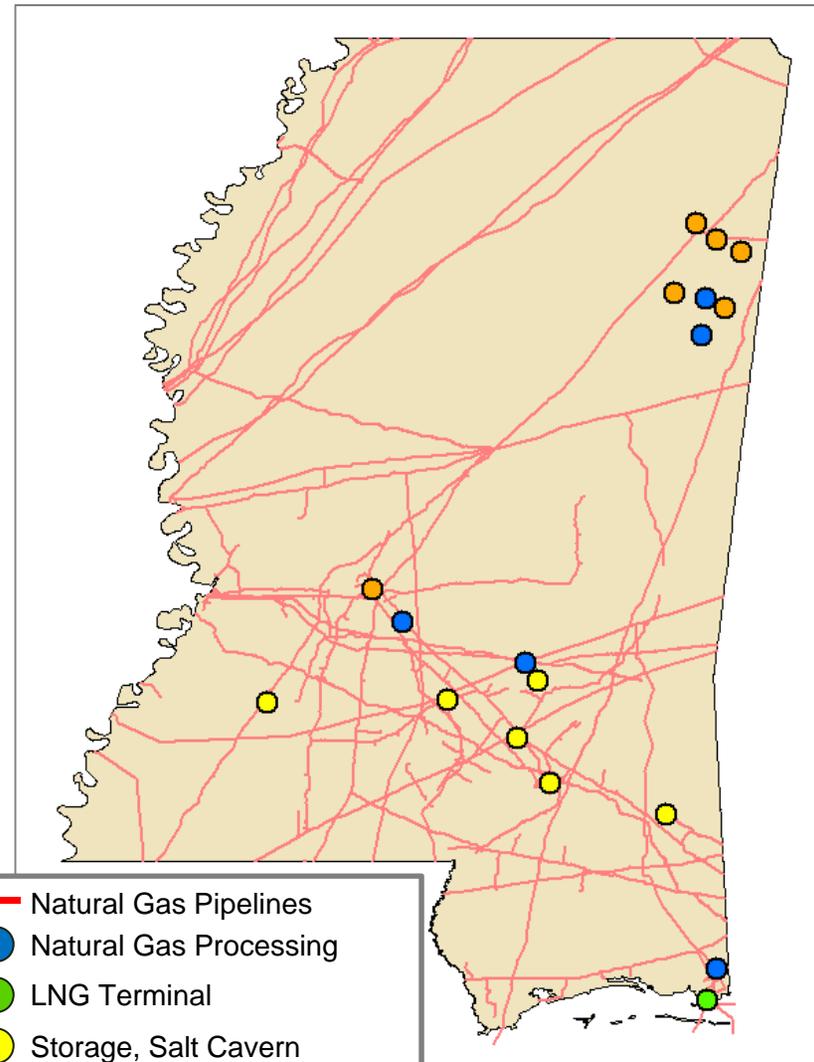
Note: All expenditure, employment and wage estimates are direct impacts only; and in-state only. In-state purchases, wages and non-energy expenditures are estimated using IMPLAN. Detailed assumptions are provided in the full report.



Mississippi Natural Gas Infrastructure

Mississippi has an extensive natural gas pipeline network spanning over 10,400 segment miles. Twelve major interstate pipelines traverse the state along with four smaller intrastate systems. Almost 6 Tcf per year of natural gas flows through the state to other destinations as far east as New York City.

The State is also home to 12 underground natural gas storage facilities, six of which are high-deliverability salt cavern facilities. These underground storage facilities help keep retail natural gas service rates stable since they serve as important physical hedges against volatile natural gas commodity price swings (i.e., inject when prices are low, withdraw when prices are high).

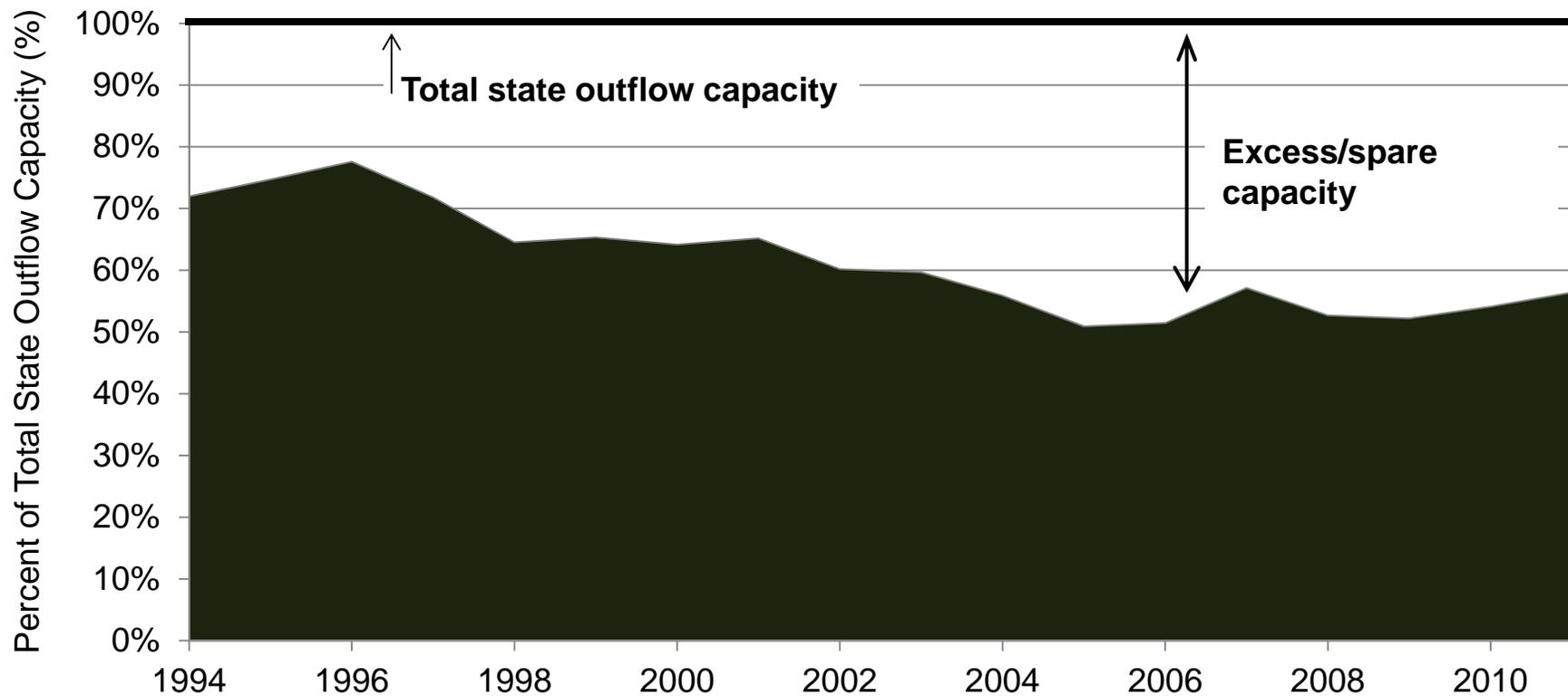


- Natural Gas Pipelines
- Natural Gas Processing
- LNG Terminal
- Storage, Salt Cavern
- Storage, Depleted Reservoir



Mississippi Natural Gas Pipeline Flows

The natural gas pipelines traversing Mississippi currently have the capacity to support additional in-state natural gas flows.

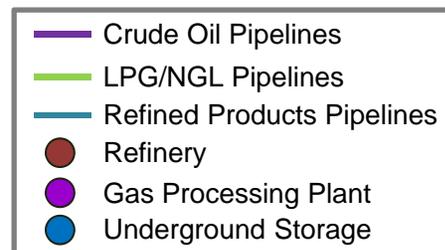
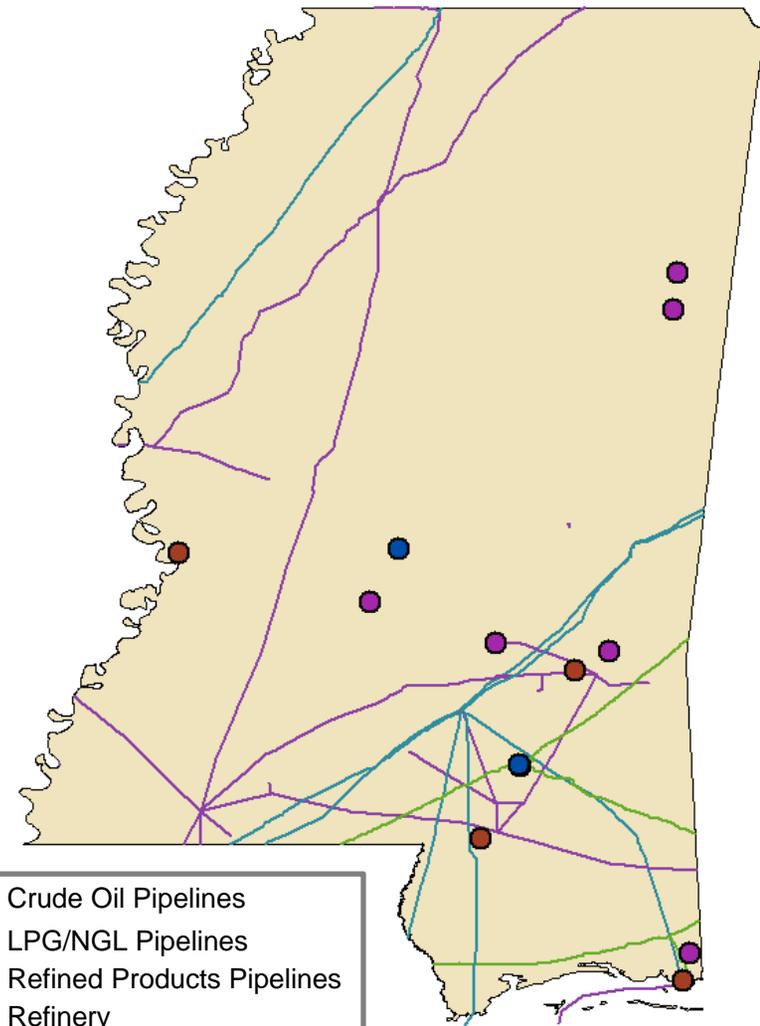




Crude Oil and Liquids Pipelines, Storage, and Processing

There are currently three major NGL pipelines that transverse Mississippi. These include the Tri-States NGL Pipeline, Plantation Pipeline System and Dixie Pipeline. There is also one major gas processing facility, of 1.5 Bcf per day capacity located in Pascagoula.

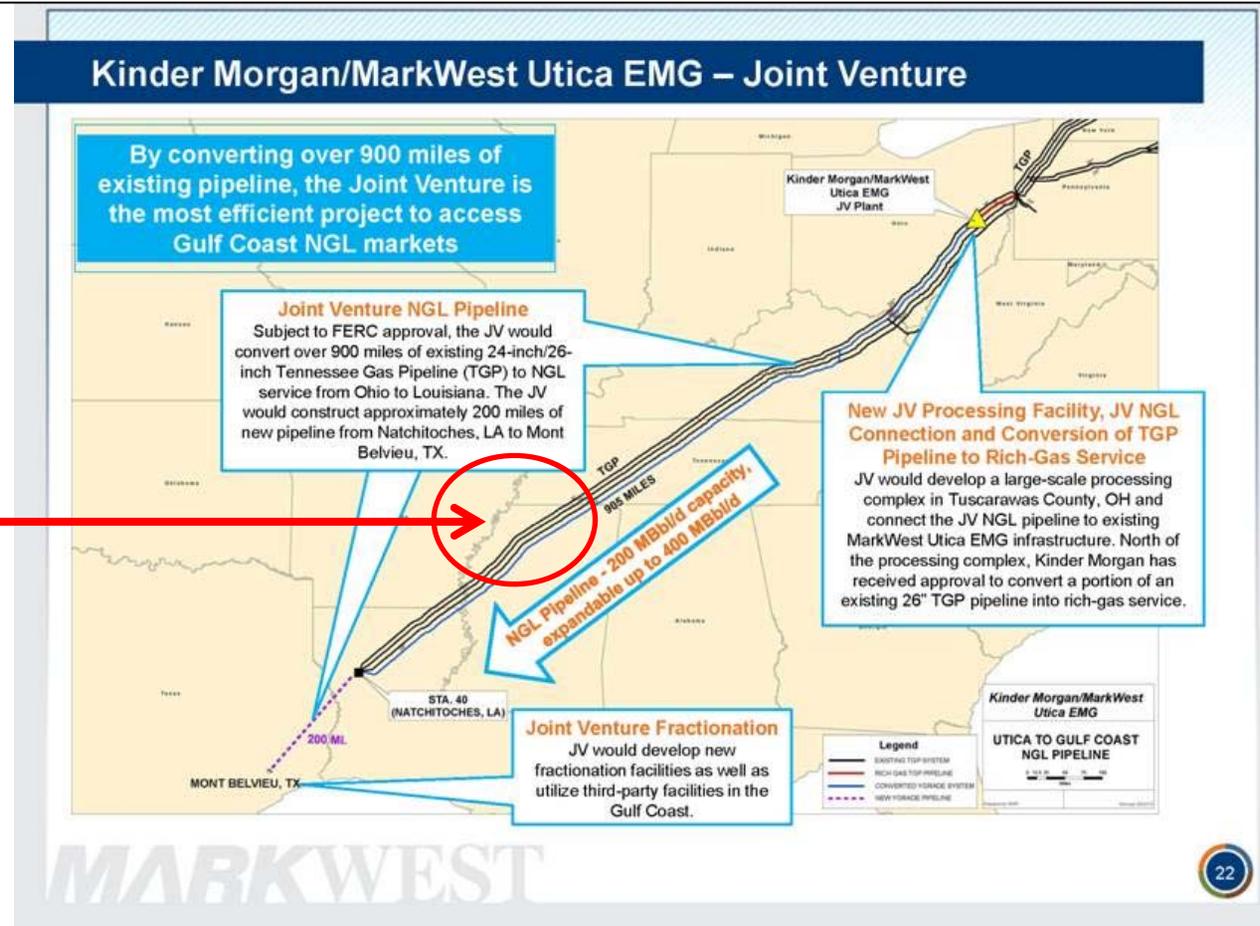
Hattiesburg serves as a point where several NGL pipelines and underground storage facilities are located.





Recent Announcements Impacting Mississippi NGL Assets

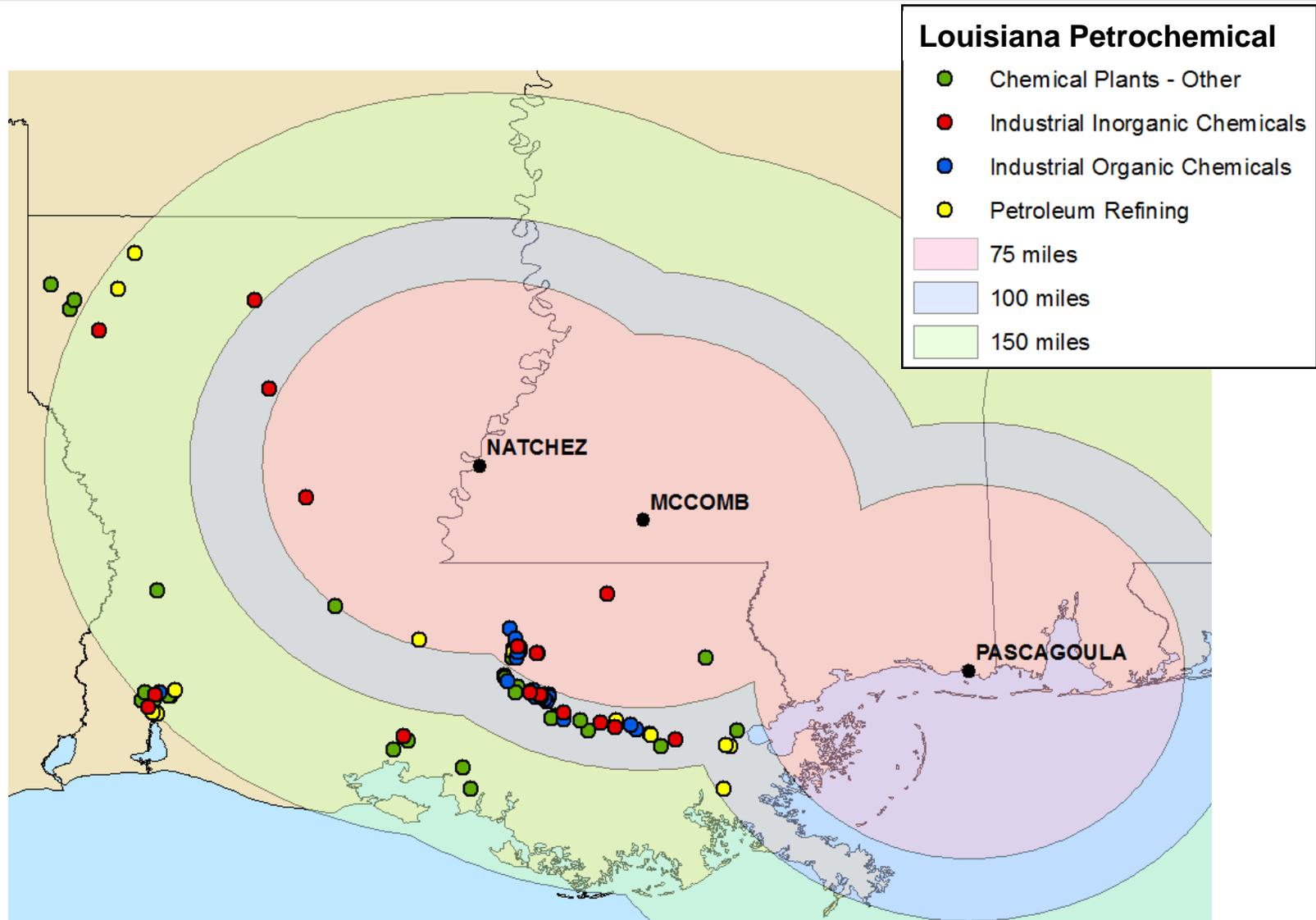
A joint venture between Kinder Morgan Energy Partners, L.P. and MarkWest Utica EMG, has plans to convert over 900 miles of existing Tennessee Gas Pipeline assets to NGL service in order to support a large scale processing complex in Ohio.



Part of this new liquids pipeline will cross directly through Mississippi



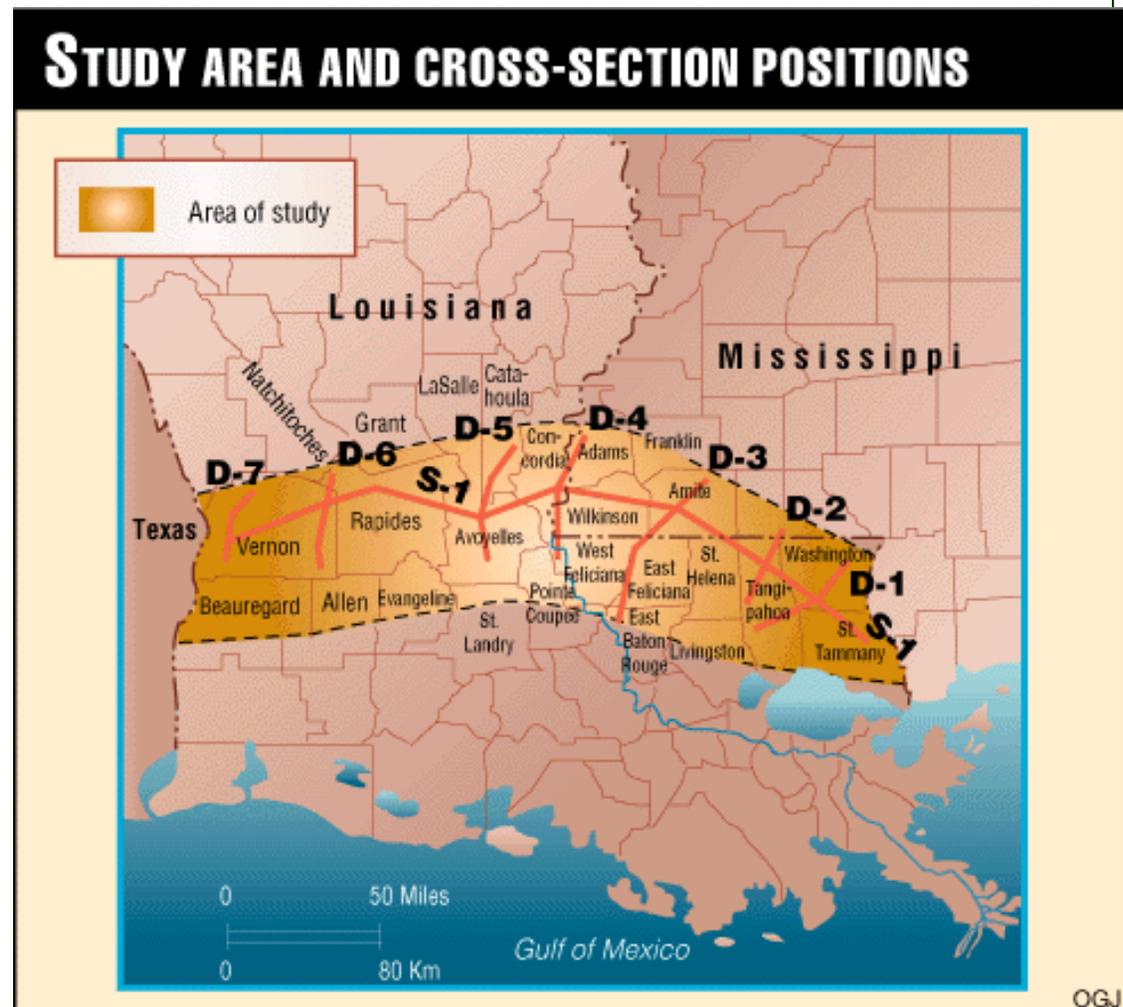
Proximity of Mississippi MSAs to Louisiana Petrochemical Plants





Upstream Opportunities in the Tuscaloosa Marine Shale

- 1998 LGS Study primary publicly-available source of information on the formation.
- Lies between sands of the upper and lower Tuscaloosa.
- Approximately 2.7 MM acres.
- Varies in thickness from 500 feet (MS) to around 800 feet (LA).
- Shallowest opportunity around 10,000 feet – mostly between 11,000 to 12,000 – some areas as deep as 16,000 (EBR).
- Estimated potential resource of 7 BBbls.





Illustrative Economic Impacts from Rapid Unconventional Drilling Activities

If TMS development were to progress in a fashion comparable to the Haynesville shale, the opportunities for overnight economic development are considerable. The value of this drilling activity alone could approach close to \$30 billion over a seven year period.

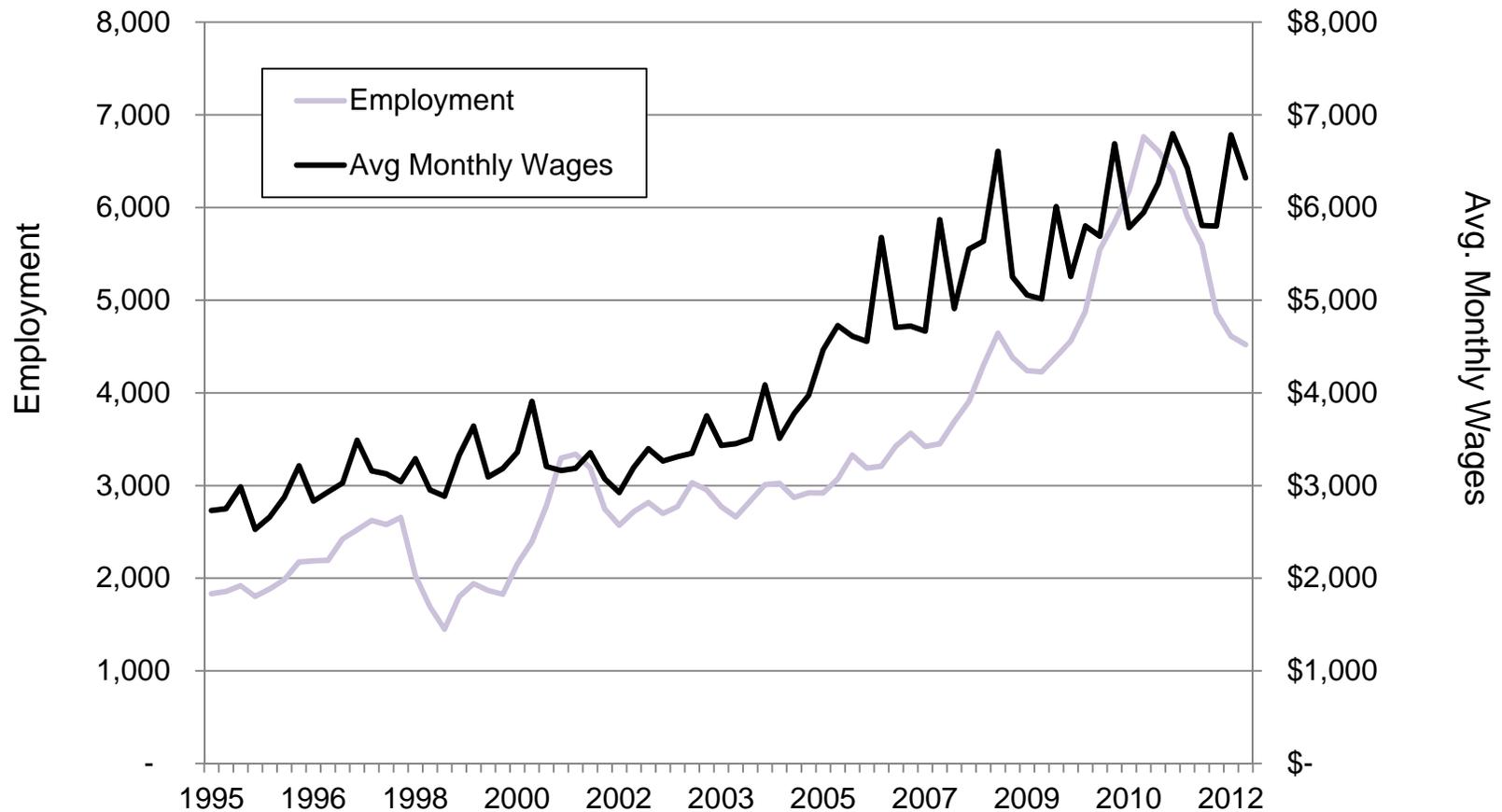
Illustrative Economic Impacts from Unconventional Drilling

	New Wells	Drilling Investment (\$ Millions)	Direct Employment (Job-Yrs)	Indirect Employment (Job-Yrs)	Induced Employment (Job-Yrs)	Total Jobs (Job-Yrs)
2007	1	\$ 13	18	18	11	47
2008	43	\$ 559	769	769	489	2,026
2009	333	\$ 4,329	5,952	5,952	3,788	15,693
2010	697	\$ 9,061	12,459	12,459	7,928	32,846
2011	810	\$ 10,530	14,479	14,479	9,214	38,171
2012	332	\$ 4,316	5,935	5,935	3,777	15,646
2013	90	\$ 1,170	1,609	1,609	1,024	4,241
Total	2,306	\$ 29,978	41,220	41,220	26,231	108,670



Potential Oil and Gas Sector Employment Increases

Shreveport MSA employment and monthly average wages skyrocket post-Haynesville shale drilling boom.





Conclusions



Conclusions

- Region is well-poised for considerable economic development.
- Development here could differ given the additional infrastructure not available in neighboring shale plays.
- Energy-based industries require low cost, stable access to both inputs and outputs – both of which are in abundance.
- TMS is an important emerging play. It's location, and the timing of its development, could leverage regional energy development in ways not seen in other parts of the country.
- The opportunities for employment, wage growth and increased economic activity will be considerable.
- The region needs to facilitate, but more importantly, needs to prepare for the looming growth related challenges that could arise overnight.



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