LSU Center for Energy Studies

Unconventional Resources and Louisiana's Manufacturing Development Renaissance

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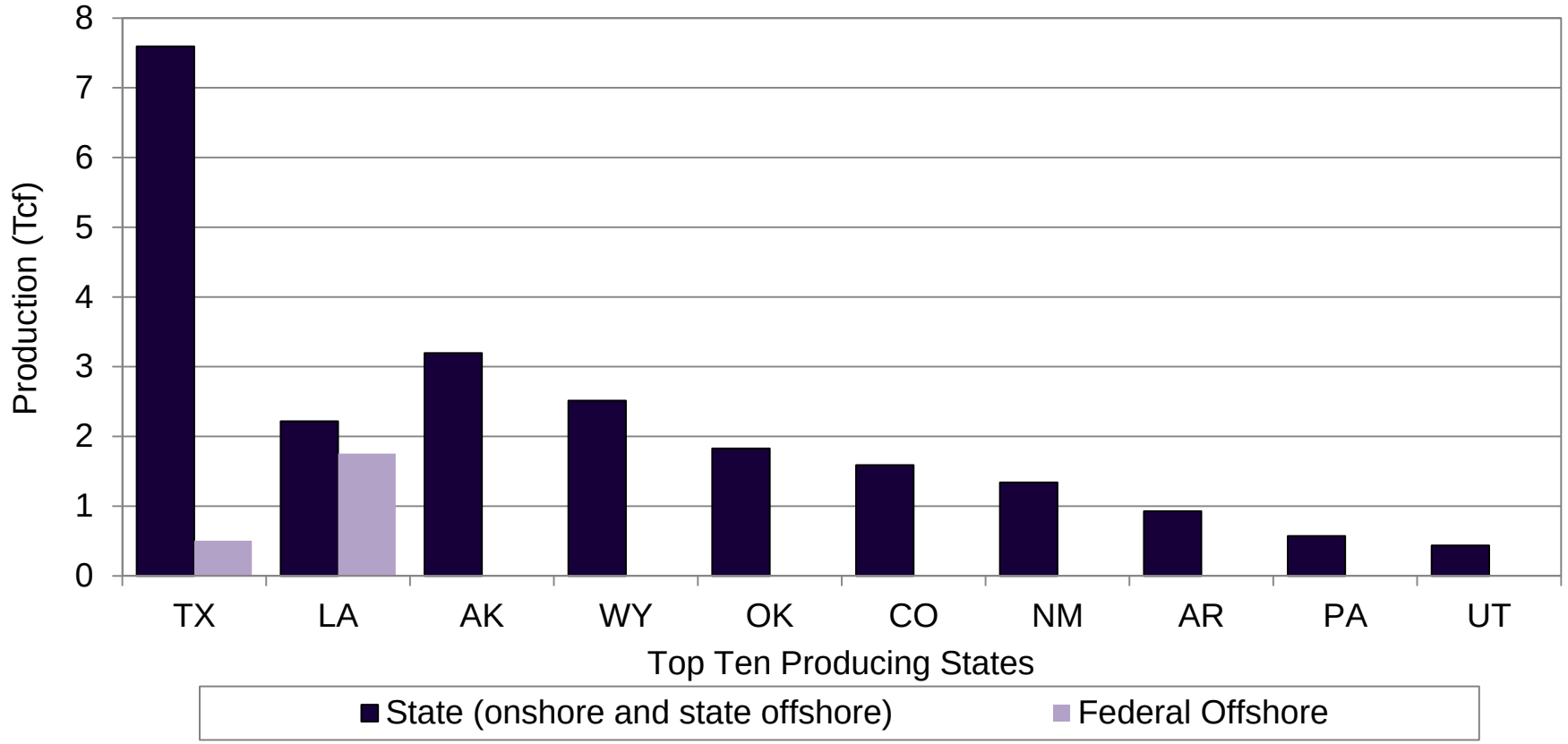
Louisiana Manufacturing & The Importance of Natural Gas

Natural Gas Production in the U.S., 2010

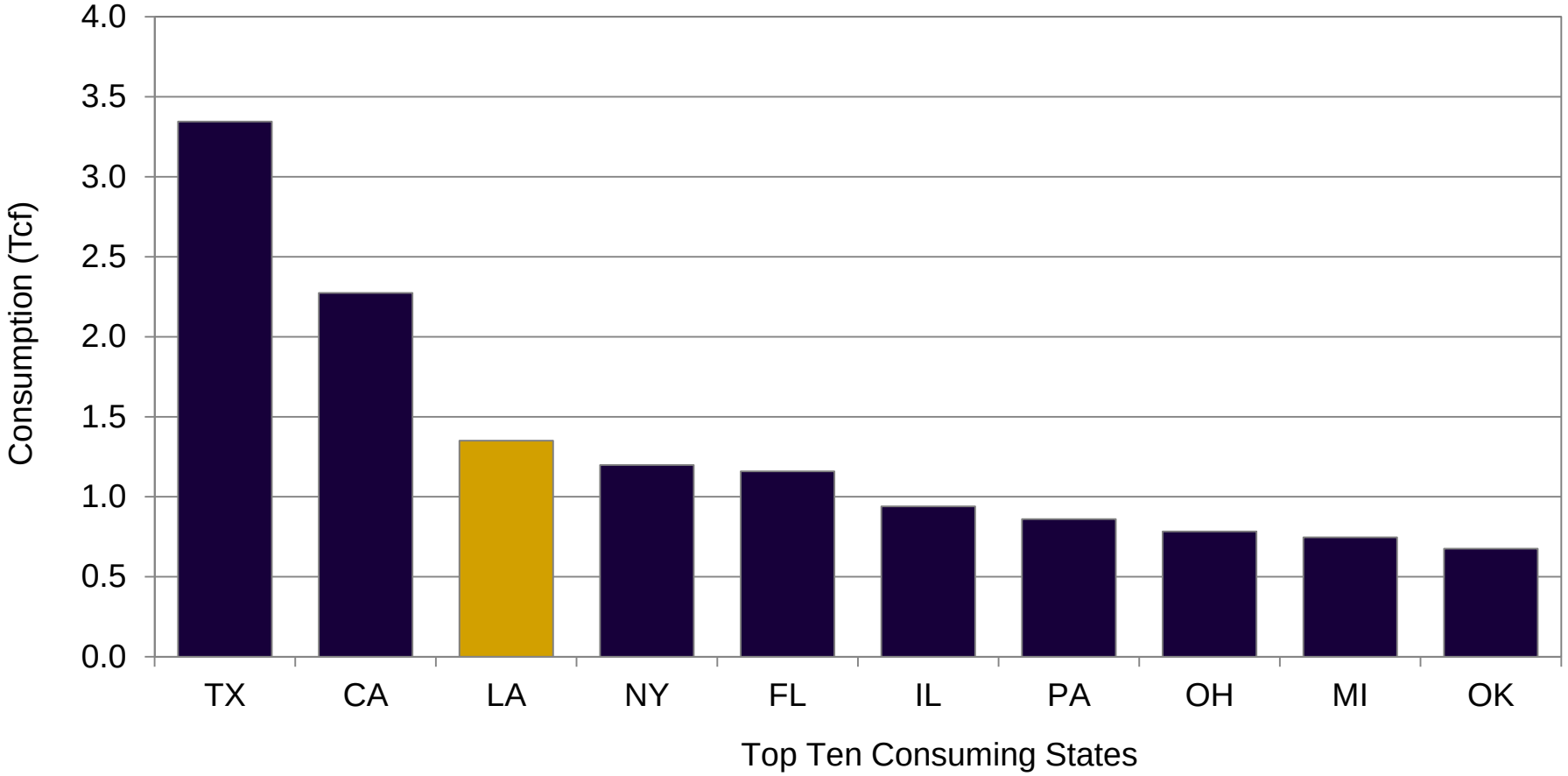
Louisiana is the second largest producer of natural gas in the U.S. and has been historically because of its prolific offshore natural gas reserves. Today, those offshore reserve are supplemented with new on-shore unconventional resources produced primarily in North Louisiana.



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

Natural Gas Consumption in the U.S., 2010

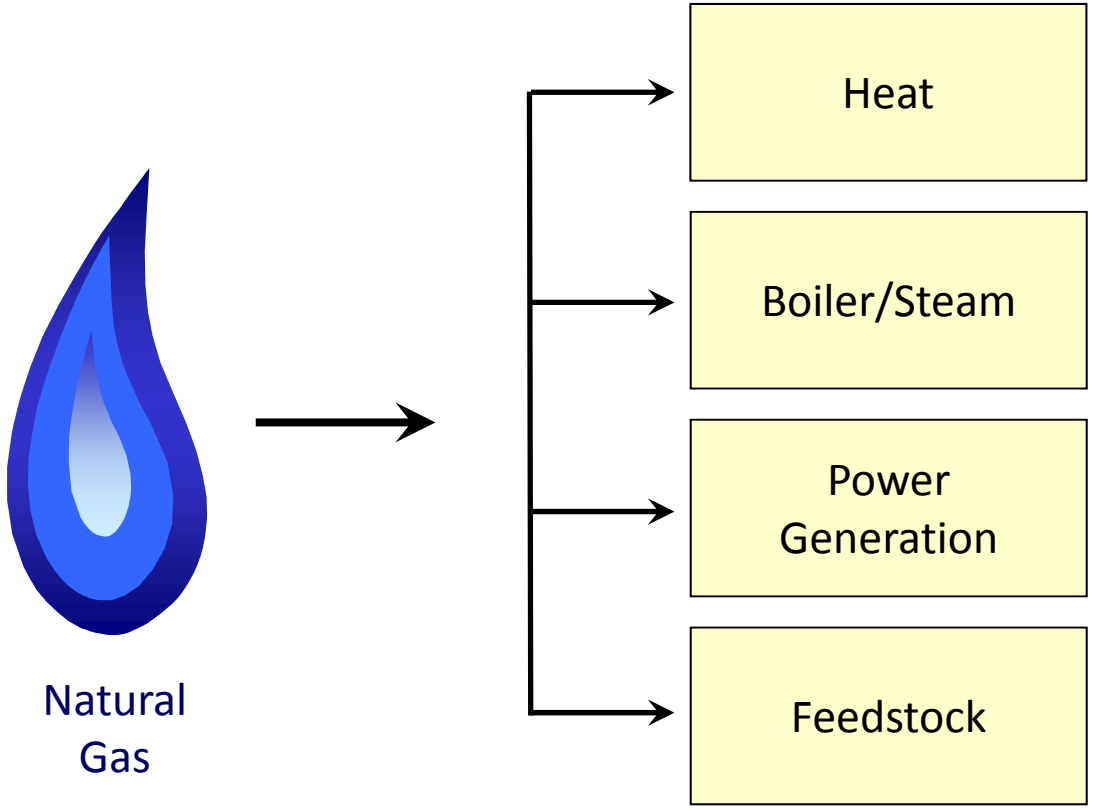
Equally important is the fact that Louisiana is the third largest consumer of natural gas in the U.S. This ranking is entirely a function of the energy-intensive manufacturing located throughout the state.



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

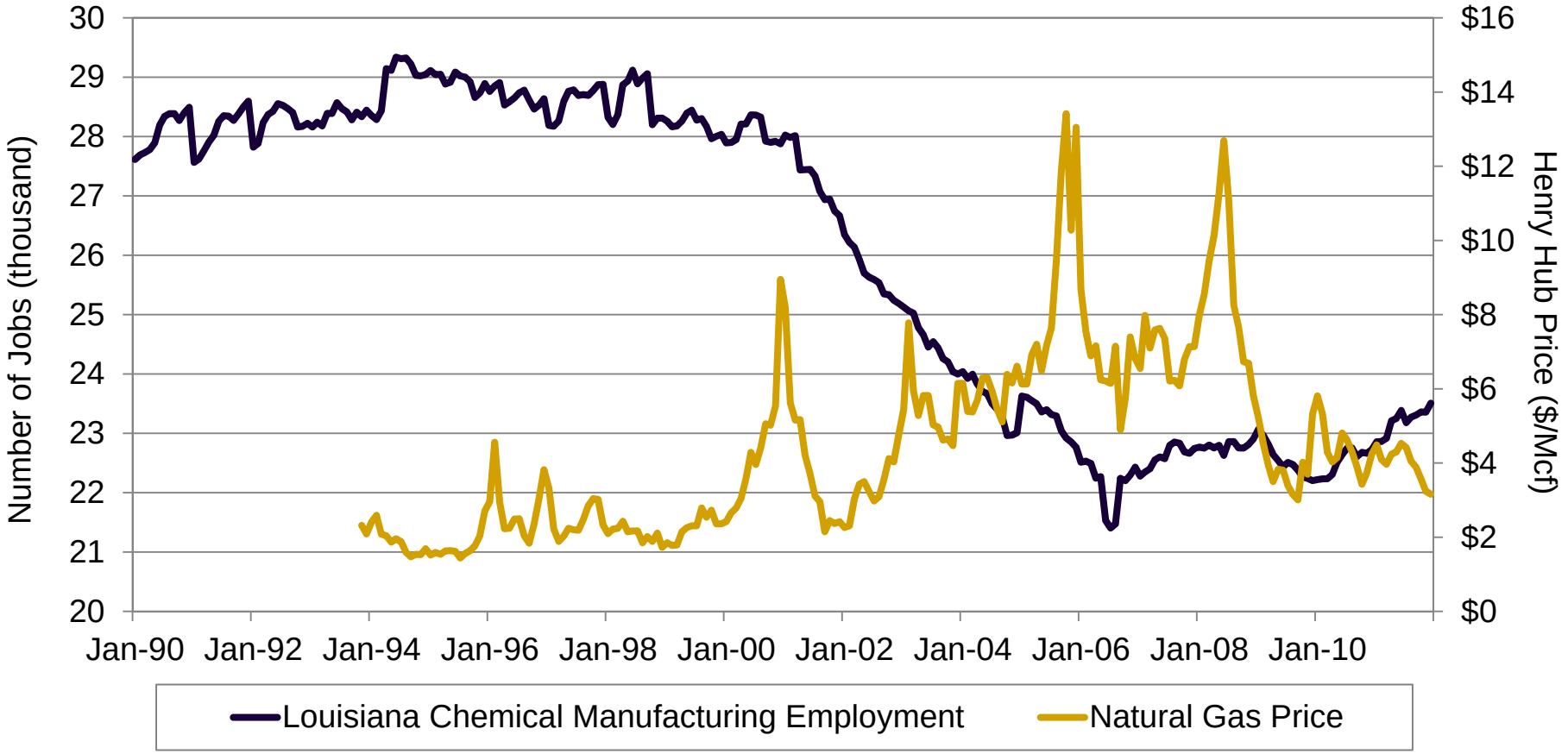
Industrial Natural Gas Usage

Louisiana's chemical industry, in particular, uses natural gas in a range of applications that include the generation of heat, steam, and power. Feedstock uses are equally important and are the building blocks of modern petrochemical manufacturing.



Louisiana Chemical Industry Employment and Henry Hub Spot Price

Louisiana's chemical industry is particularly sensitive to changes in natural gas prices. As natural gas prices increase, chemical industry employment (and output) tends to decrease.

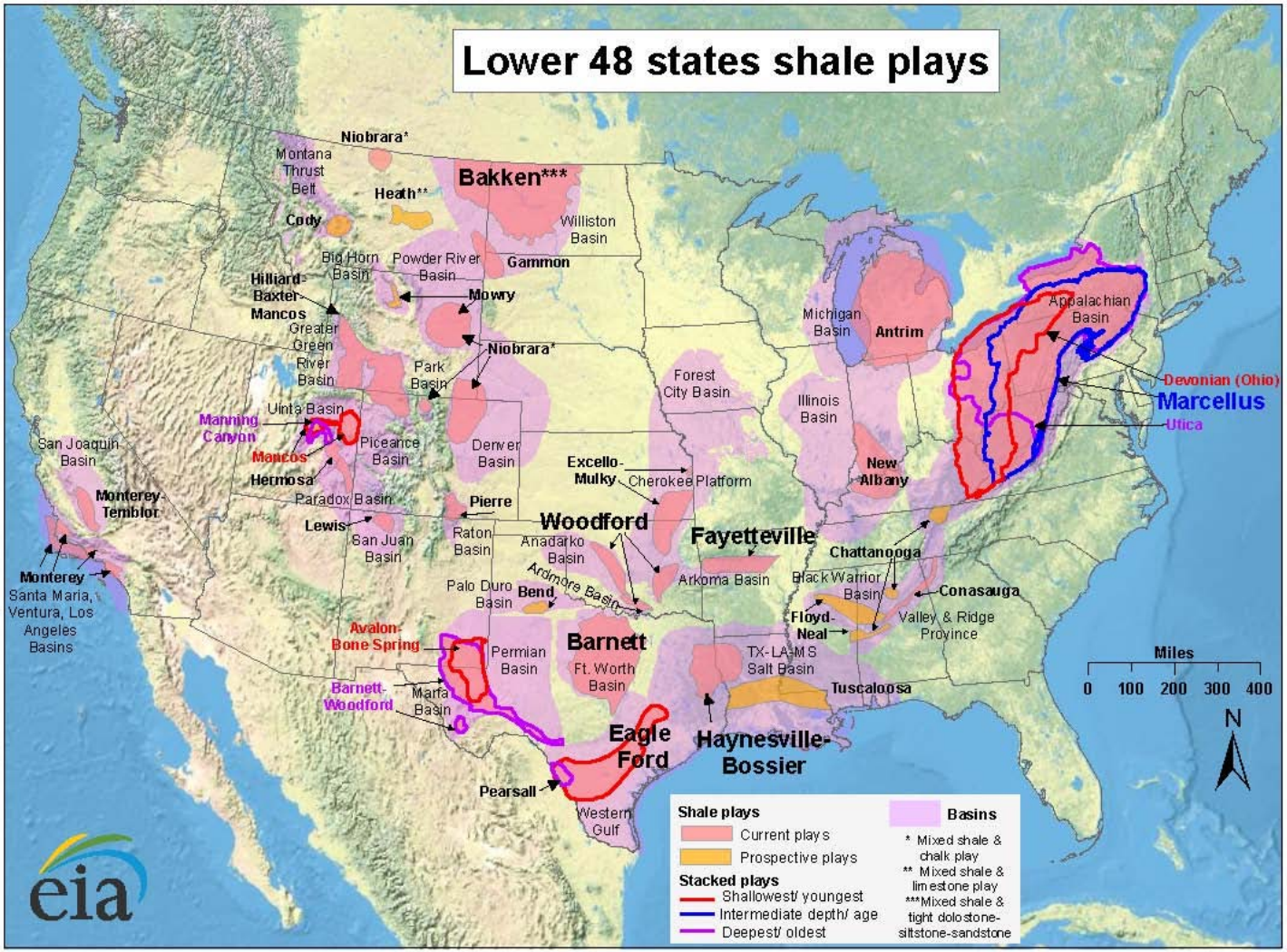


Source: Bureau of Economic Analysis, U.S. Department of Commerce; and Energy Information Administration, U.S. Department of Energy.

Unconventional Resources

Domestic Shale Basins and Plays

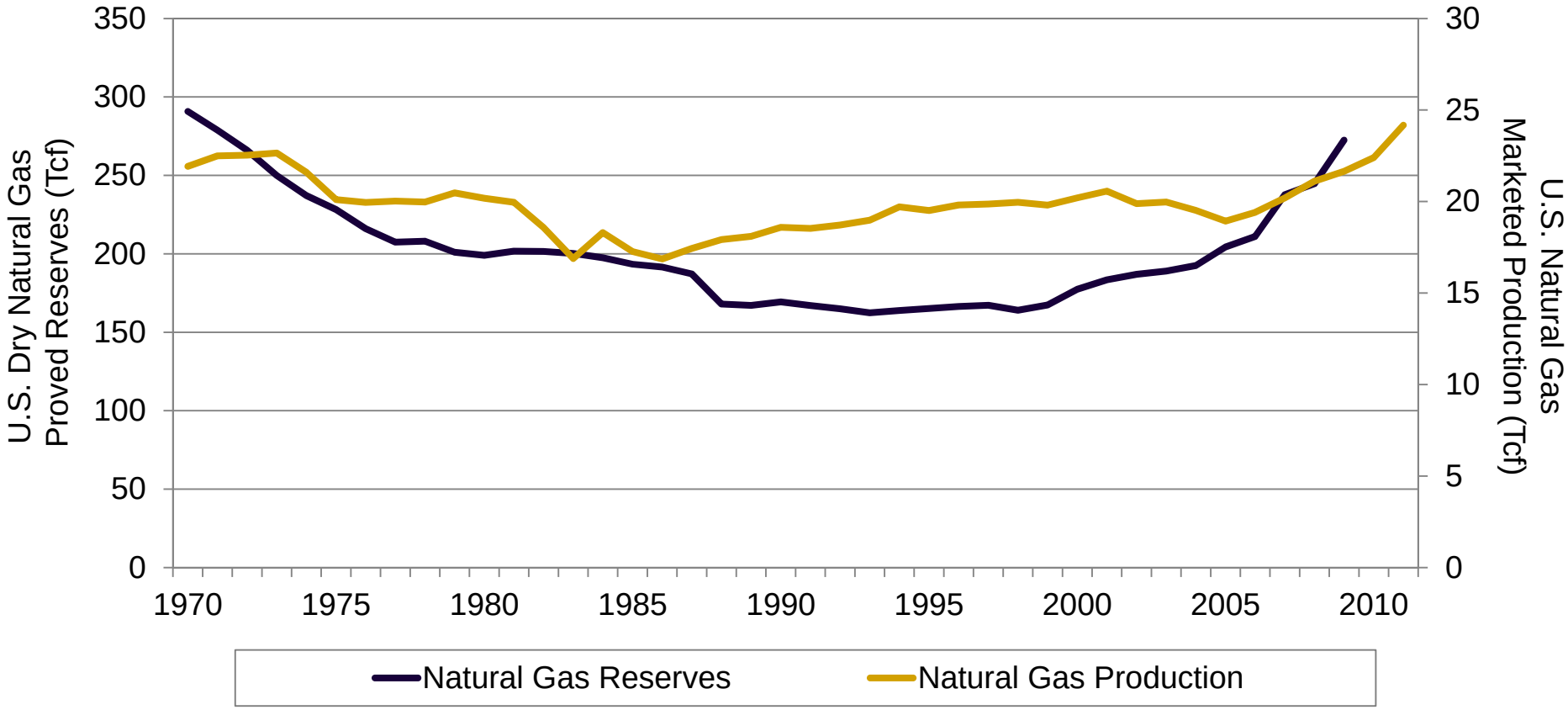
Unlike conventional resources, shale plays (natural gas, liquids, and crudes) are located throughout the U.S. and are the primary reason for the decrease in overall and regional natural gas prices.



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

Changes in Reserves and Production

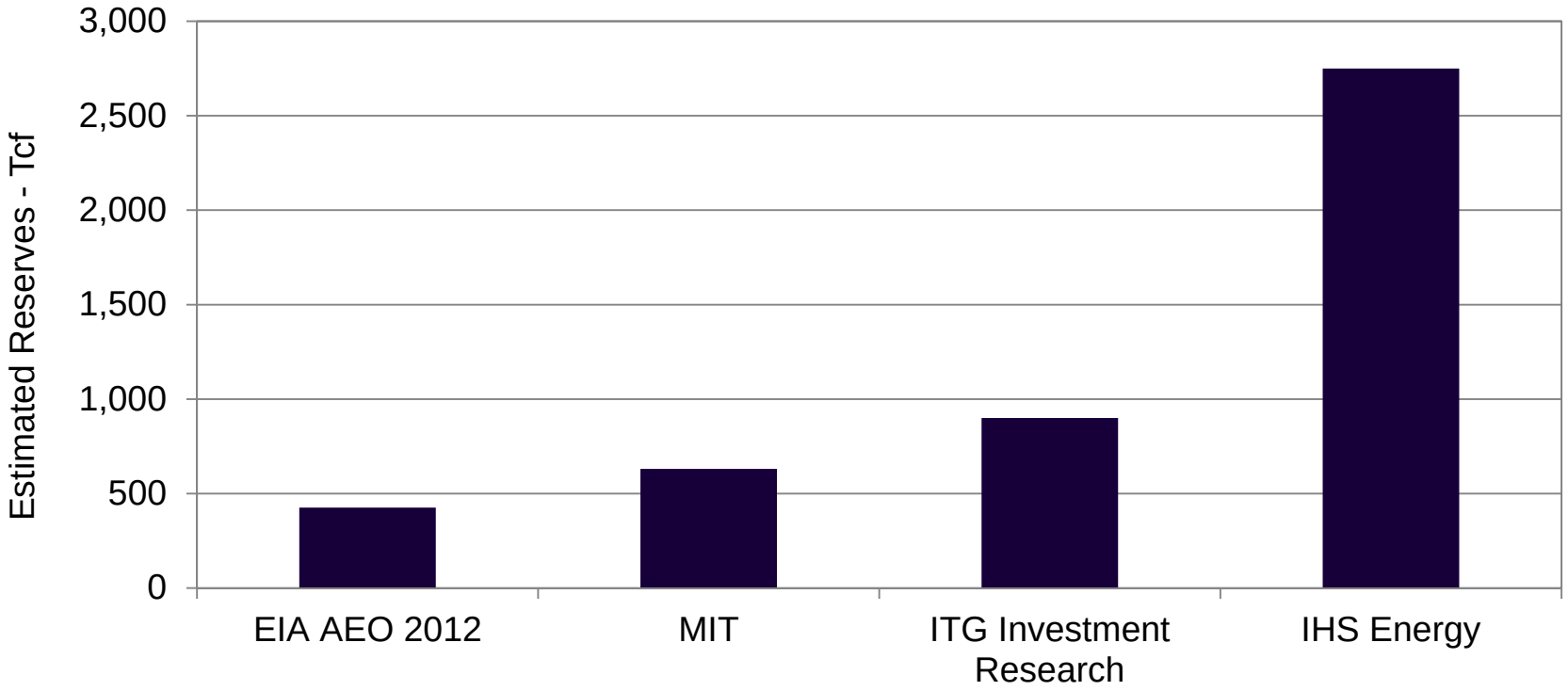
Natural gas production and reserves are at levels not seen since the 1970s. U.S. natural gas production is now at an all time recorded peak. These consistent increases should lead to a steady feedstock supply that does not impinge on other domestic natural gas uses.



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

Alternative Natural Gas Reserves

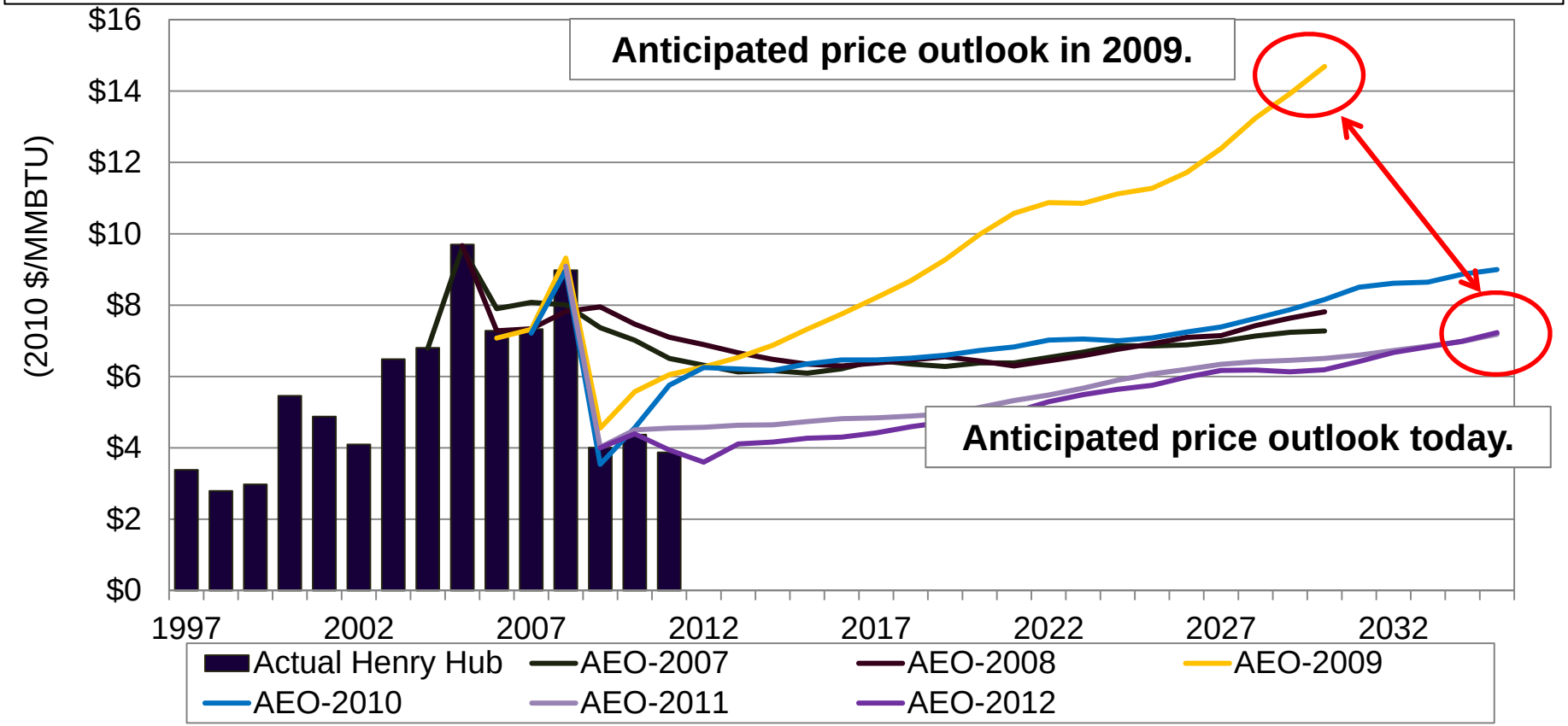
There are a wide range of unconventional shale gas reserve estimates that are as low as 436 Tcf to as high as 2,750 Tcf. This represents a range of between 18 years and over 100 years of available natural gas resources based upon current consumption levels.*



Note: *Assumes 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.

Natural Gas Price Outlook – Annual Energy Outlook ("AEO")

Shale reserves have a significant impact on future price outlook. Abundant supplies should keep prices from increasing back to levels seen as recently as 2009. The current AEO forecasts natural gas prices in 2030 at $6.29/Mcf (40 percent less than the 2009 AEO forecast).

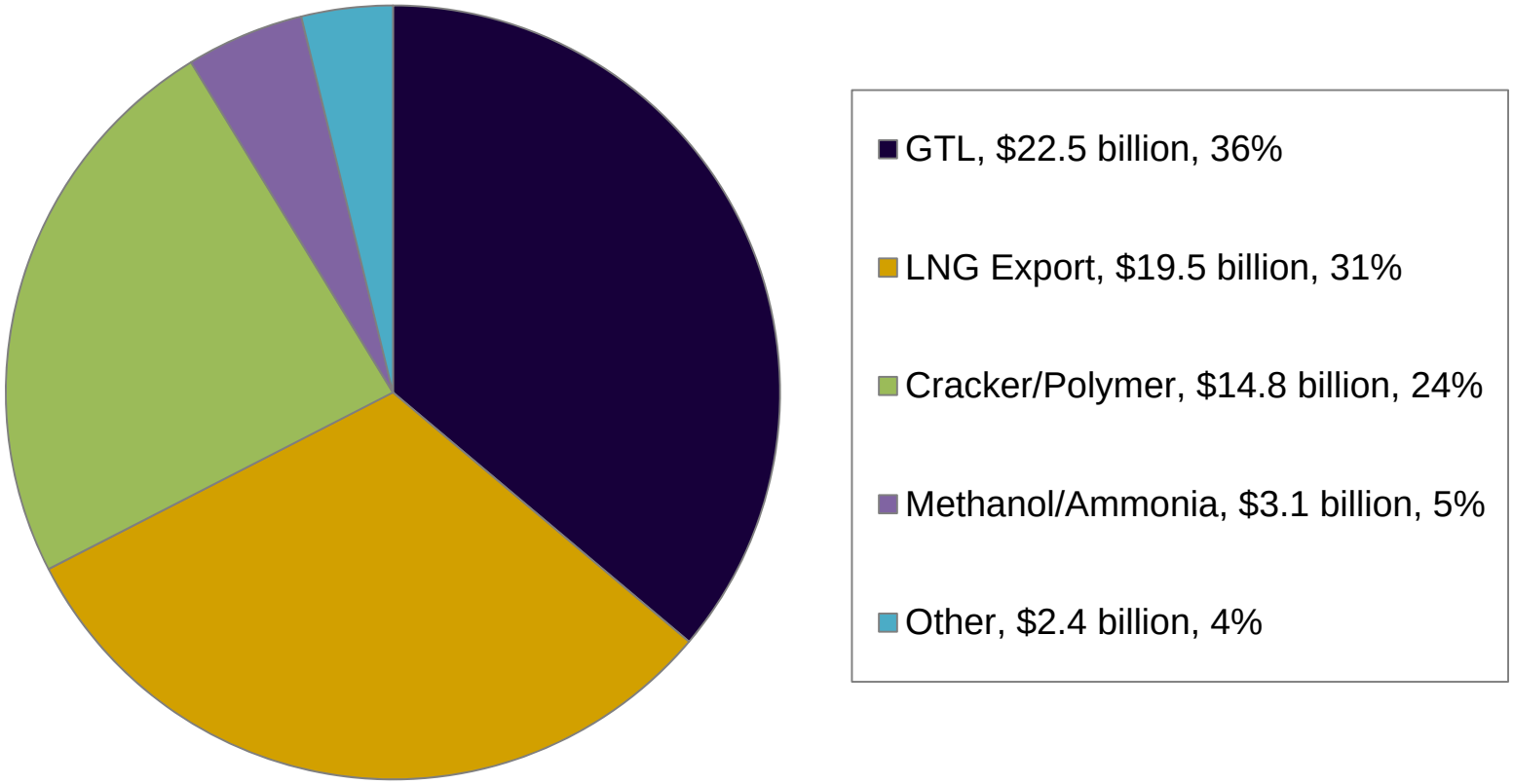


Source: Energy Information Administration, U.S. Department of Energy.

Unconventional Resources and Louisiana's Manufacturing Renaissance

Total Capital Expenditures by Sector

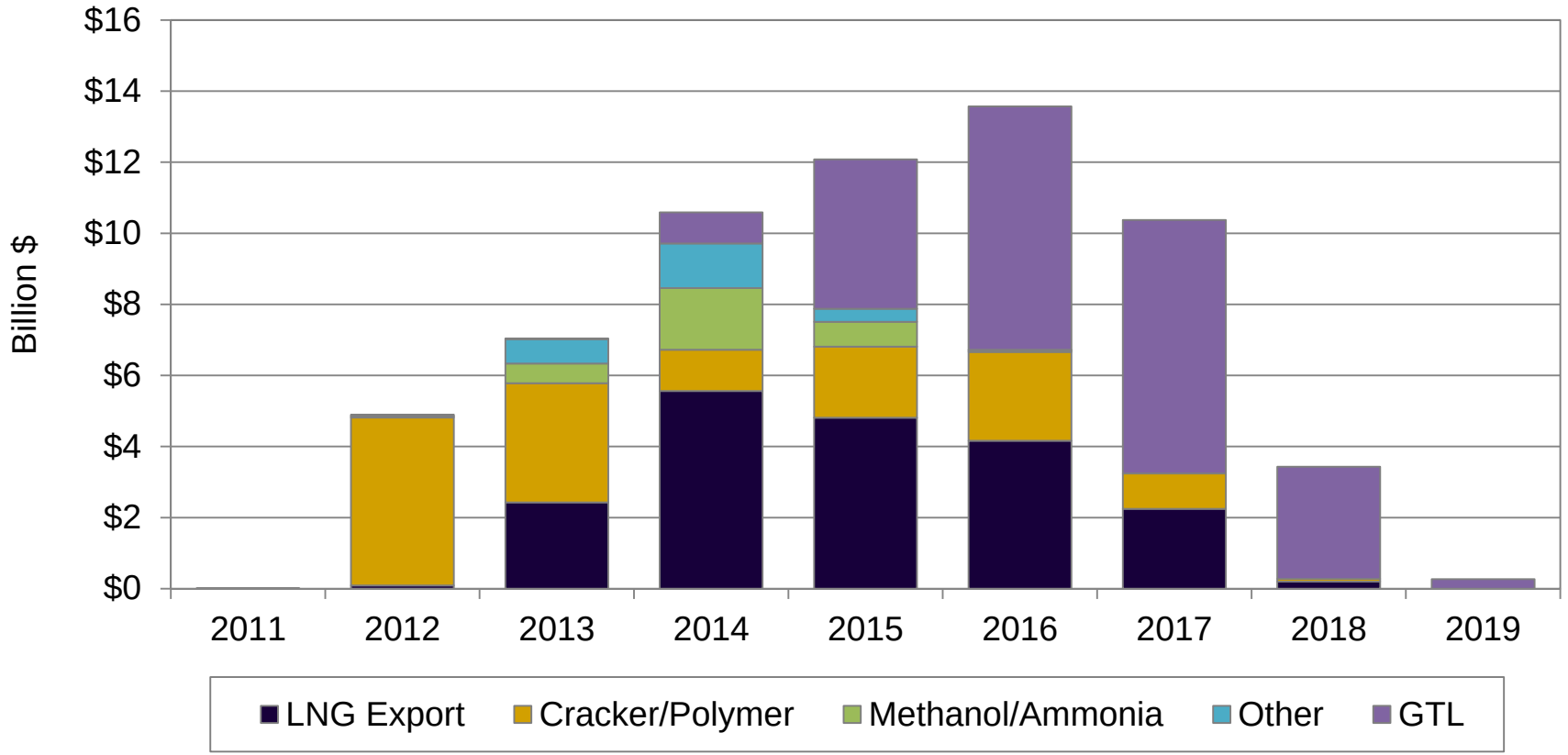
Of the proposed facility expansions in Louisiana, gas-to-liquids and LNG export comprise the majority of proposed capital spending.



Total anticipated capital expenditures = $62.2 Billion

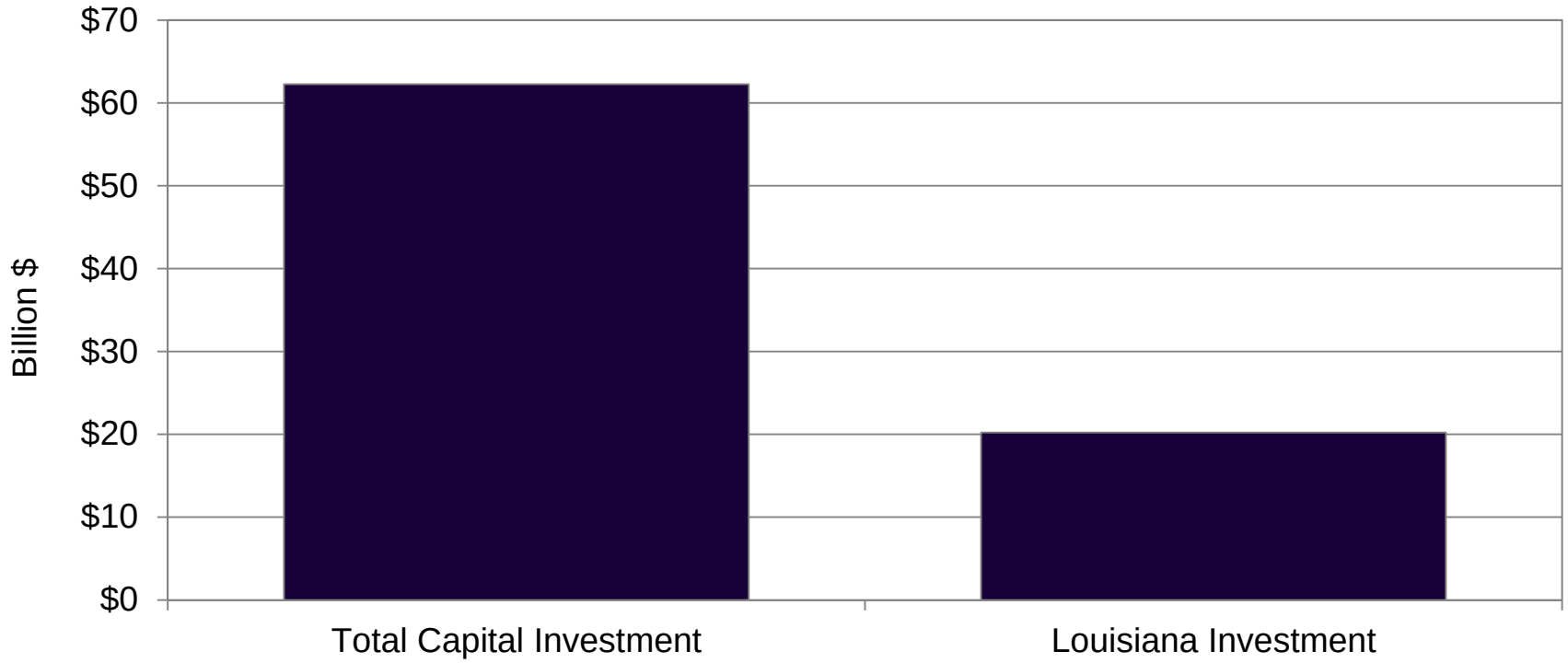
Total Capital Expenditures by Sector

The total capital investment associated with all announced natural gas-driven manufacturing investments in Louisiana totals over $62 billion. Most of the investment is anticipated to occur between 2014 and 2017.



In-State Expenditures

Not all of the total capital investment associated with the natural gas driven manufacturing expansions will occur in Louisiana since a large amount of materials and equipment will be purchased out of state. However, despite this "leakage" there is still an anticipated $20.2 billion that will be spent in Louisiana over the several years representing one of the largest, most concentrated levels of capital expenditures in the state's history.



Potential Economic Impacts/Benefit: Construction, State

If developed, all Louisiana natural gas driven project investments will result in a total state-wide economic impact of some $29.7 billion, the creation of over to 214,000 employment opportunities, and $9.3 billion in new wages.

	Construction Impacts									
	Total	2011	2012	2013	2014	2015	2016	2017	2018	2019
Output (million $)										
Direct	$ 20,205.2	$ 4.4	$ 1,715.4	$ 2,461.9	$ 3,630.9	$ 3,907.5	$ 4,255.9	$ 3,150.0	$ 1,002.5	$ 76.8
Indirect	$ 3,243.9	$ 0.7	$ 275.4	$ 395.2	$ 582.9	$ 627.3	$ 683.3	$ 505.7	$ 160.9	$ 12.3
Induced	$ 6,287.8	$ 1.4	$ 533.8	$ 766.1	$ 1,129.9	$ 1,216.0	$ 1,324.4	$ 980.3	$ 312.0	$ 23.9
Total	**$ 29,736.8**	**$ 6.4**	**$ 2,524.6**	**$ 3,623.2**	**$ 5,343.7**	**$ 5,750.8**	**$ 6,263.6**	**$ 4,636.0**	**$ 1,475.4**	**$ 113.0**
Employment (jobs)										
Direct	136,900	30	11,623	16,680	24,601	26,475	28,836	21,343	6,792	520
Indirect	21,885	5	1,858	2,667	3,933	4,232	4,610	3,412	1,086	83
Induced	55,885	12	4,745	6,809	10,043	10,807	11,771	8,712	2,773	212
Total	**214,670**	**47**	**18,225**	**26,156**	**38,576**	**41,515**	**45,217**	**33,467**	**10,651**	**816**
Wages (million $)										
Direct	$ 6,585.1	$ 1.4	$ 559.1	$ 802.3	$ 1,183.3	$ 1,273.5	$ 1,387.1	$ 1,026.6	$ 326.7	$ 25.0
Indirect	$ 952.0	$ 0.2	$ 80.8	$ 116.0	$ 171.1	$ 184.1	$ 200.5	$ 148.4	$ 47.2	$ 3.6
Induced	$ 1,766.3	$ 0.4	$ 150.0	$ 215.2	$ 317.4	$ 341.6	$ 372.0	$ 275.4	$ 87.6	$ 6.7
Total	**$ 9,303.4**	**$ 2.0**	**$ 789.8**	**$ 1,133.5**	**$ 1,671.8**	**$ 1,799.2**	**$ 1,959.6**	**$ 1,450.4**	**$ 461.6**	**$ 35.4**

Conclusions

Conclusions

- The natural gas (and crude oil) revolution are having, and are likely to have, **considerable positive economic impacts** on U.S. manufacturing/industrial development.
- All of this development is **resource-specific** and **policy dependent**.
- Louisiana, and the Gulf Coast generally, will be **the prime beneficiaries** of this early part of this broader U.S. manufacturing renaissance.
- Natural gas, however, is a **nationally-traded commodity**, and while Louisiana has considerable inherent advantages, **we still have to compete for new greenfield investments**. These investments are **not guaranteed** simply because the natural gas is here alone.

Questions, Comments and Discussion

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