

Energy and Economic Update for Louisiana and the Gulf Coast Region

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Kinetica Partners, LLC
2018 Shipper's Meeting
Lake Charles, LA.
October 18, 2018

Introduction

Up-Stream Oil and Gas Outlook

Industrial Outlook

Employment Outlook

Mid-Stream Investments

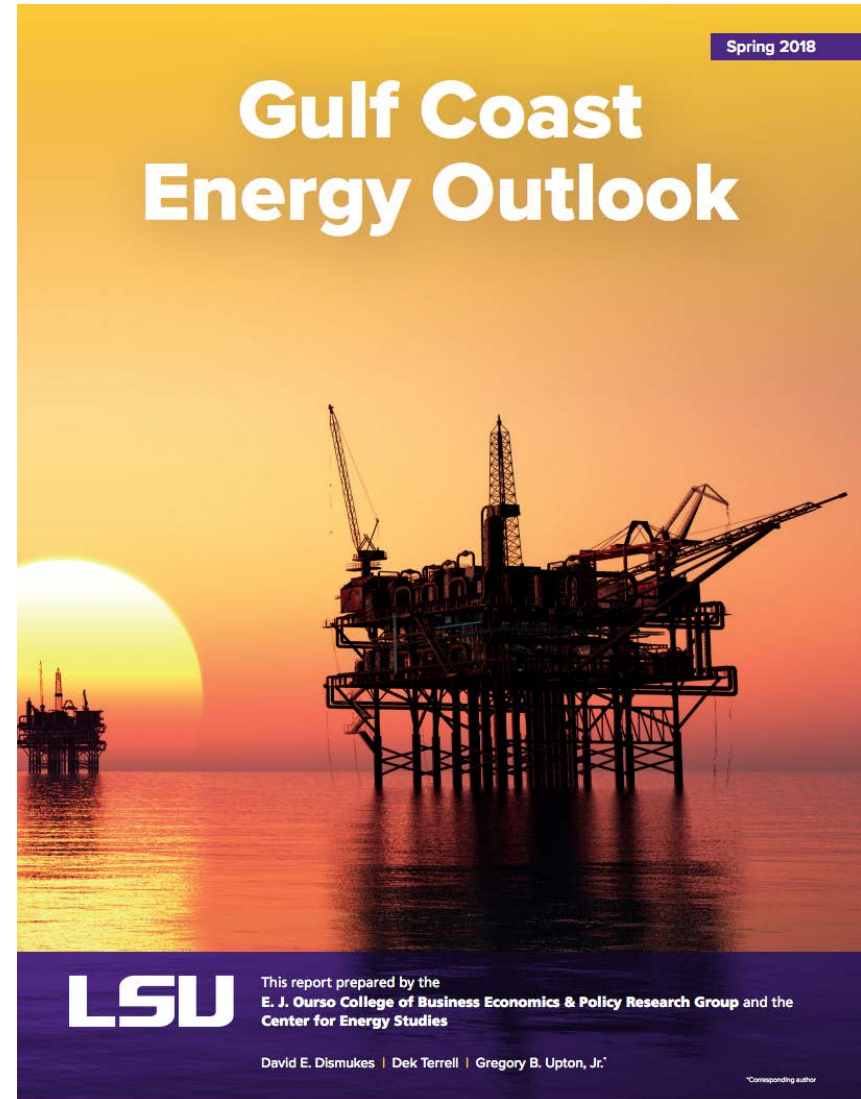
Exports

Conclusions

Introduction

Gulf Coast Energy Outlook

- The inaugural **Gulf Coast Energy Outlook** seeks to provide a broad overview of the current status of trends guiding energy markets with an emphasis on the Gulf Coast Region.
- The research initiative is a collaborative effort of Louisiana State University's **Center for Energy Studies** and **E.J. Ourso College of Business** and focuses on the energy sector of the Gulf Coast Region's economy.



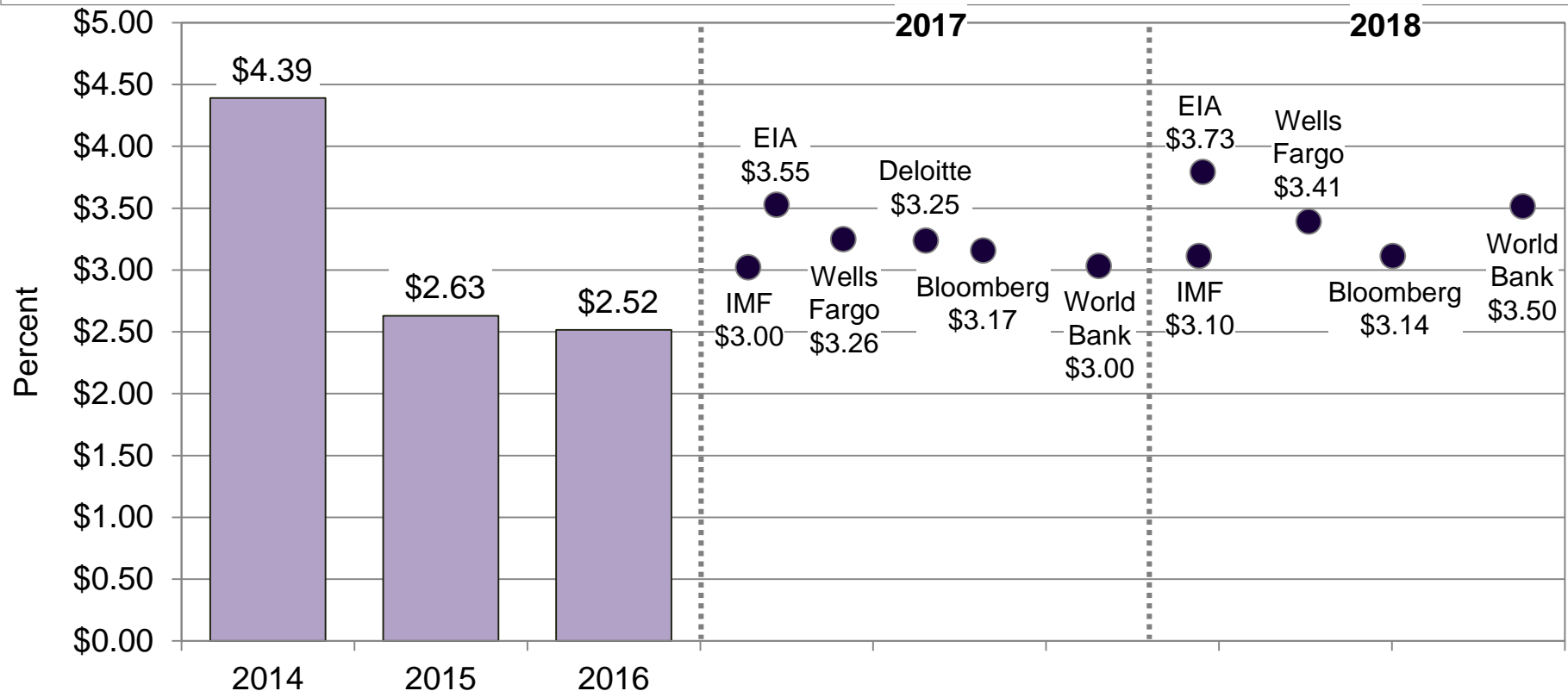
Up-Stream Oil and Gas Outlook

Current Natural Gas Prices and Near-Term Outlook

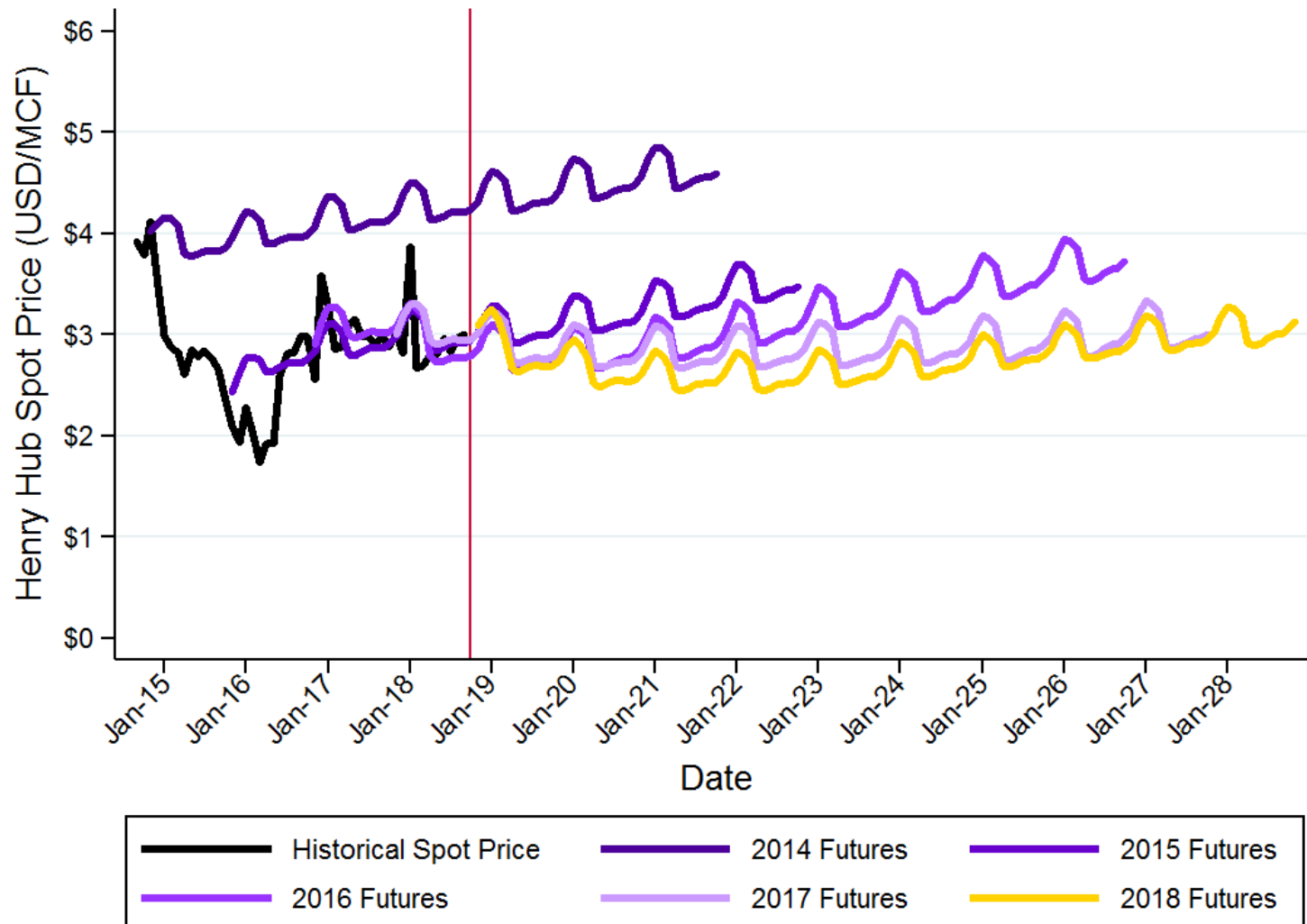
Natural gas prices were forecasted to stay below \$3.55 per MMBtu in 2017 and are projected to stay under \$3.75 in 2018.

Actual 2017 prices ranged from \$2.82 to \$3.30

Actual 2018 prices have ranged from \$2.67 to 3.87



Natural Gas Futures Prices

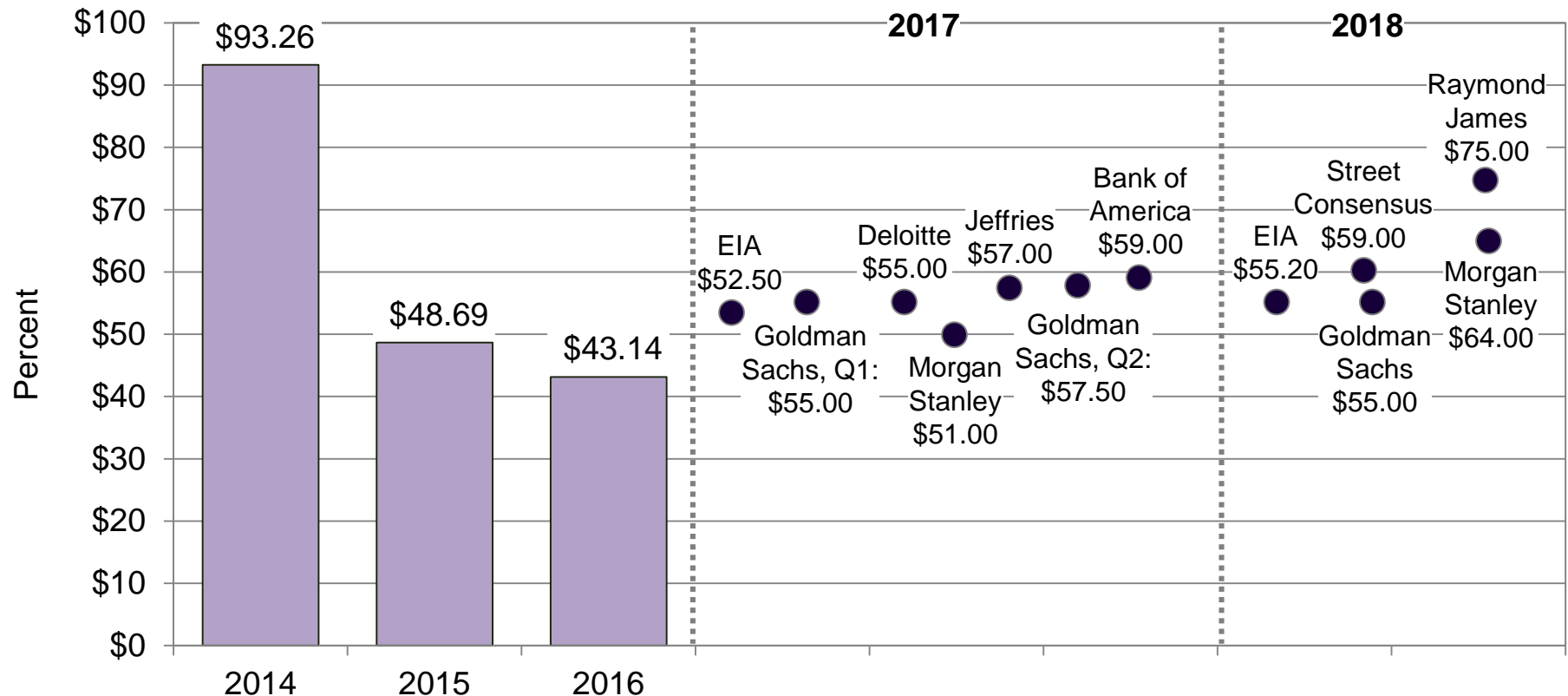


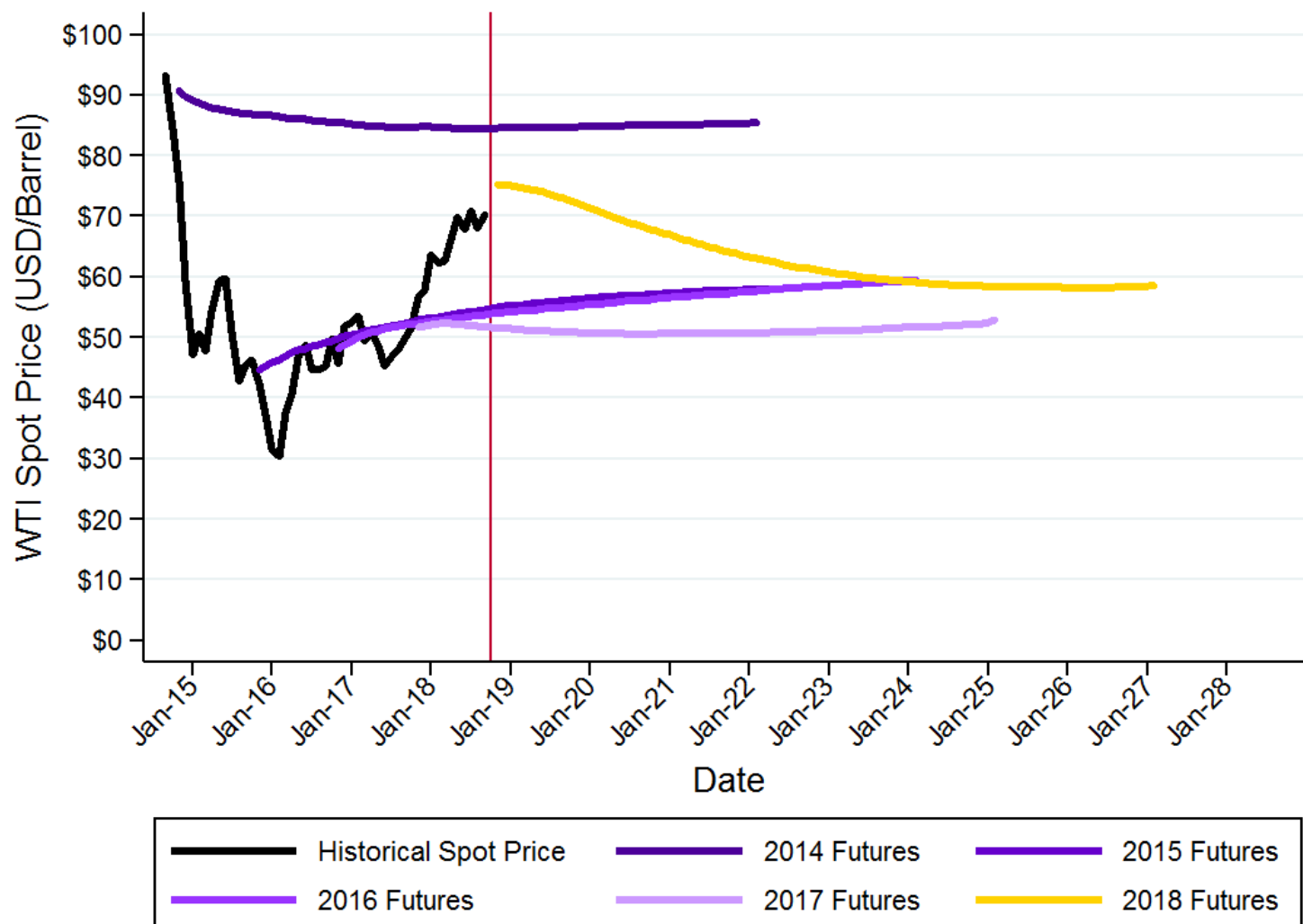
Current Crude Oil Prices and Near-Term Outlook

Most crude oil price projections for 2017 were around \$55 per barrel. Prices are expected to increase in 2018, but remain below \$75 per barrel.

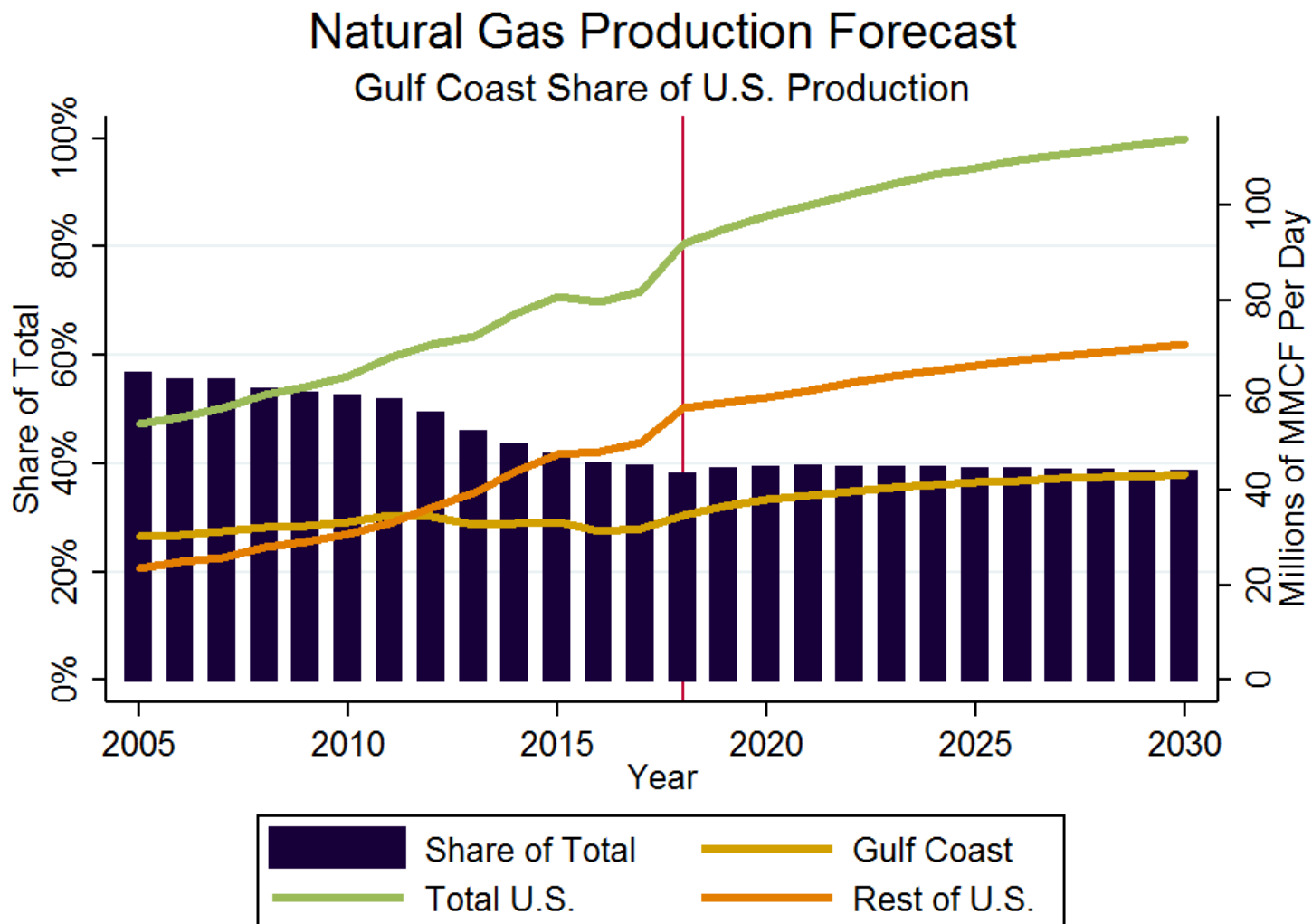
Actual 2017 prices ranged from \$45 to \$58 per barrel.

Actual 2018 prices ranged from \$62 to \$71 per barrel.

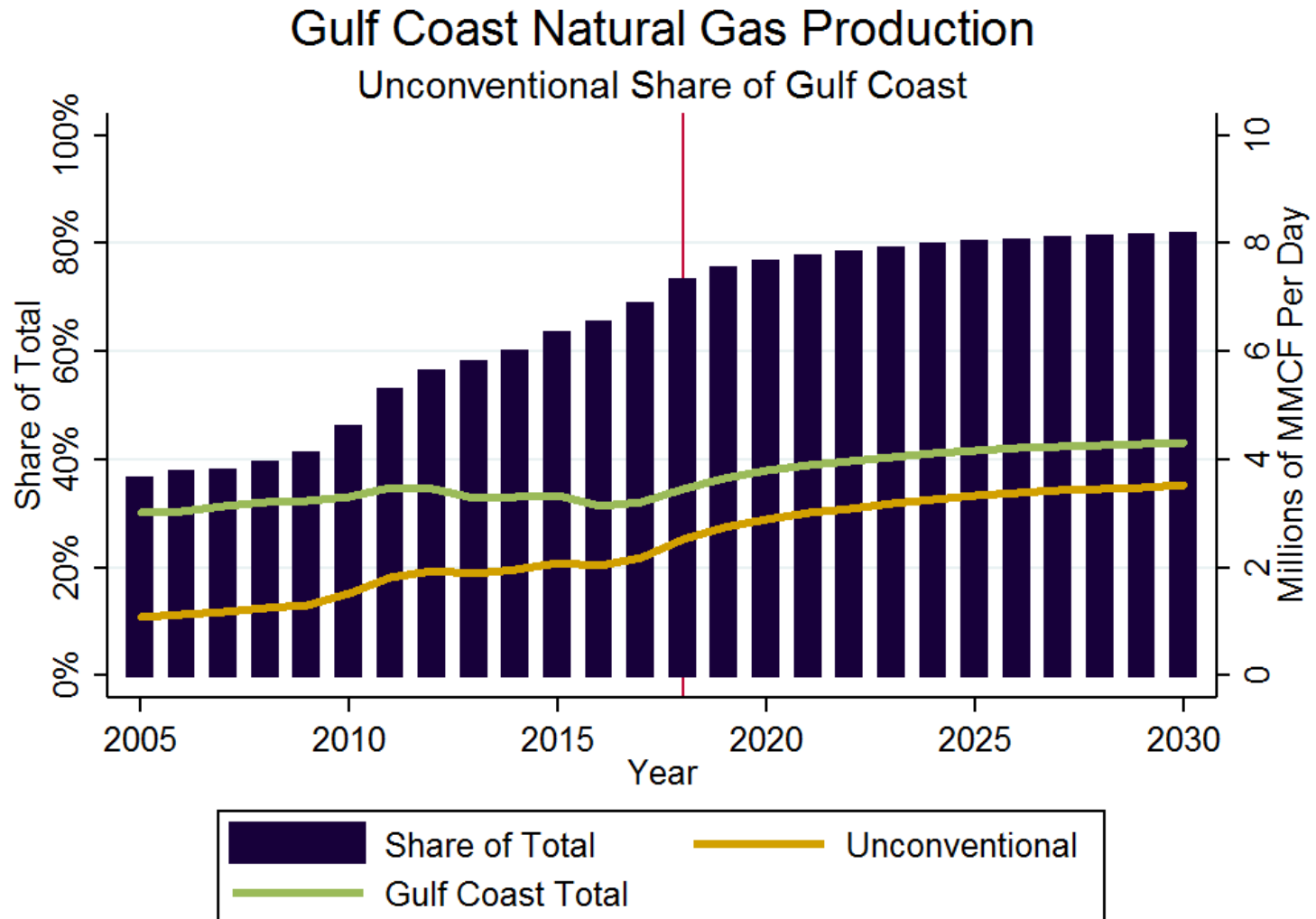


Natural Gas Futures Prices


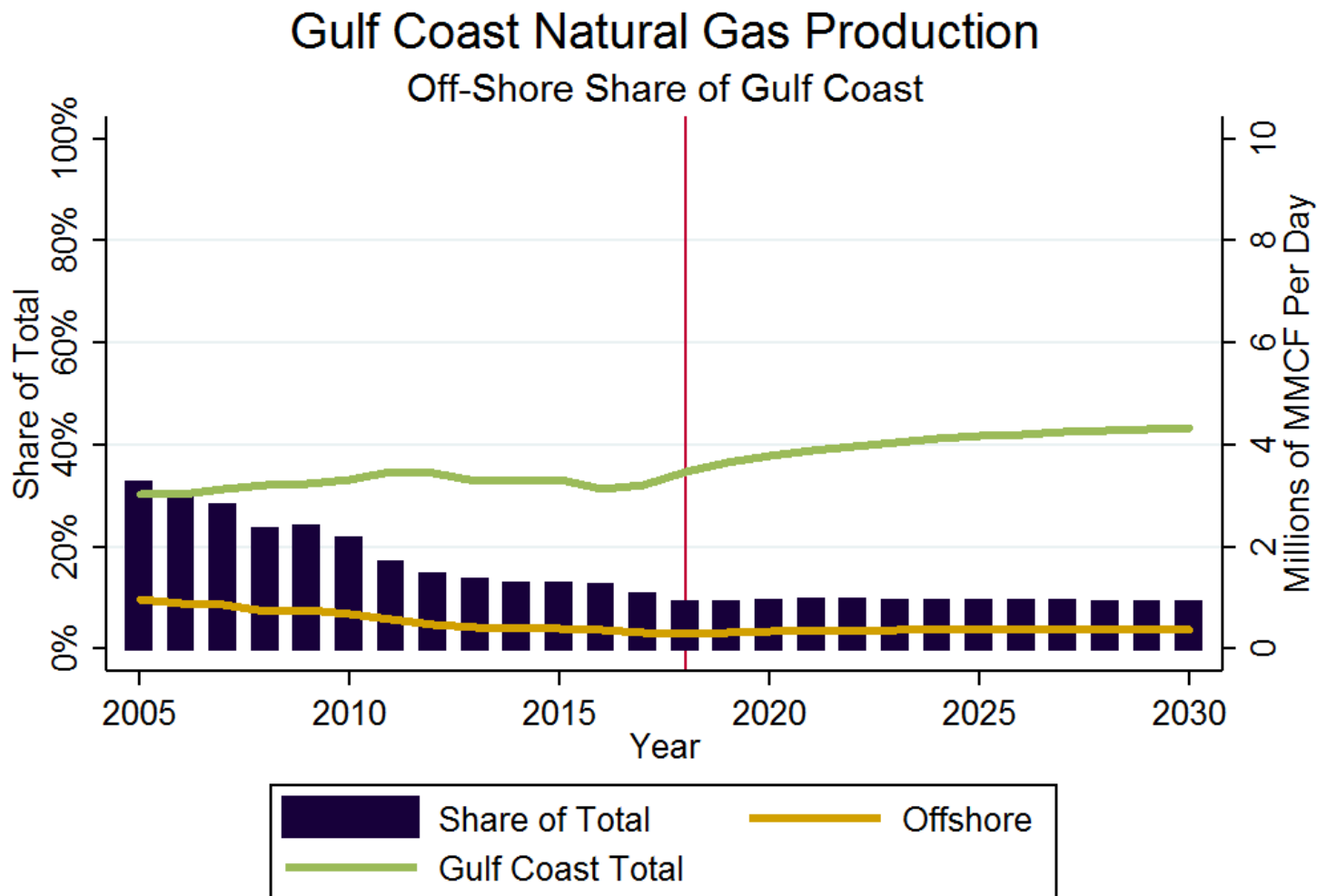
Gulf Coast Natural Gas Production Forecast



Unconventional On-Shore Natural Gas Oil Forecast

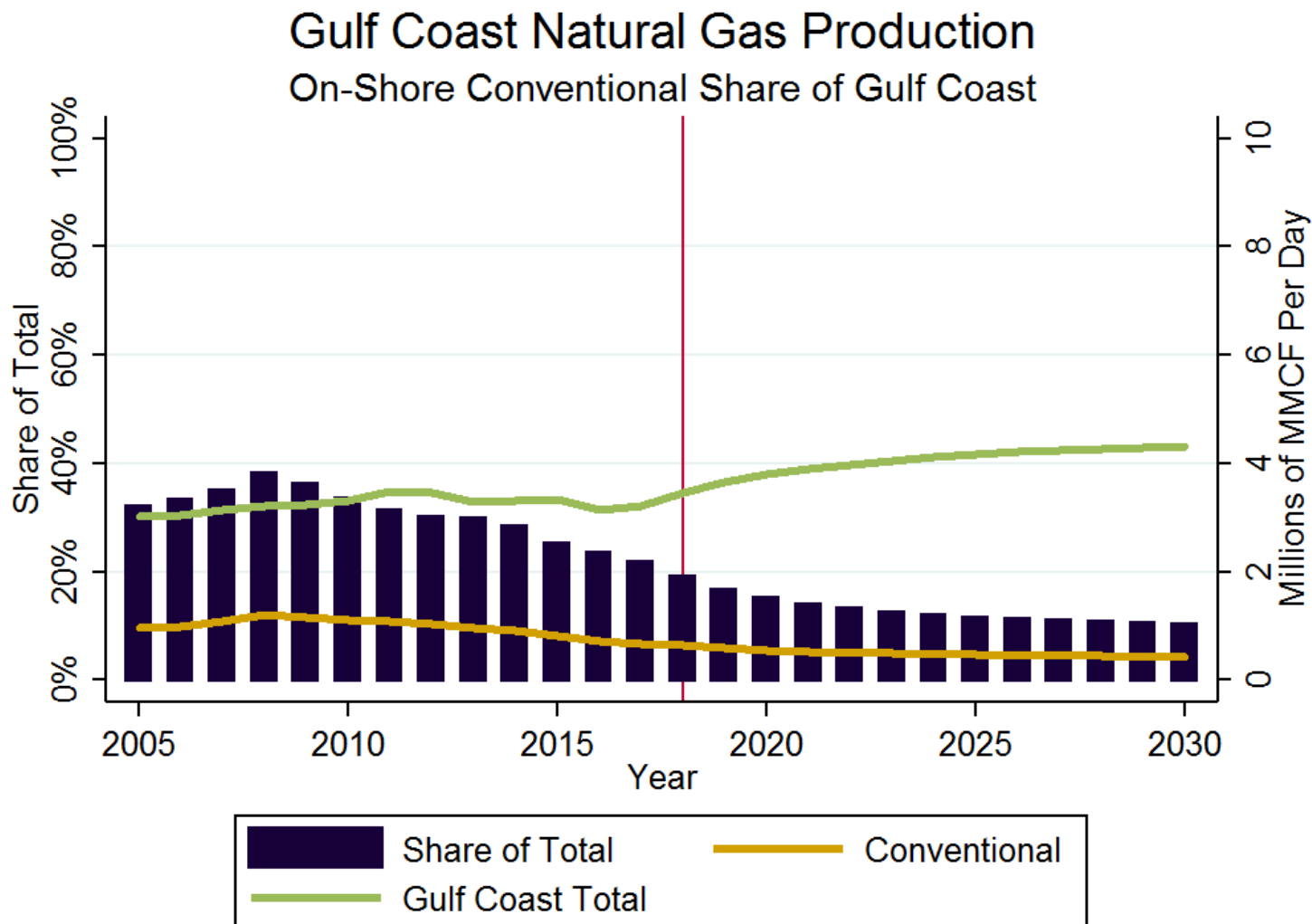


Off-Shore Natural Gas Forecast

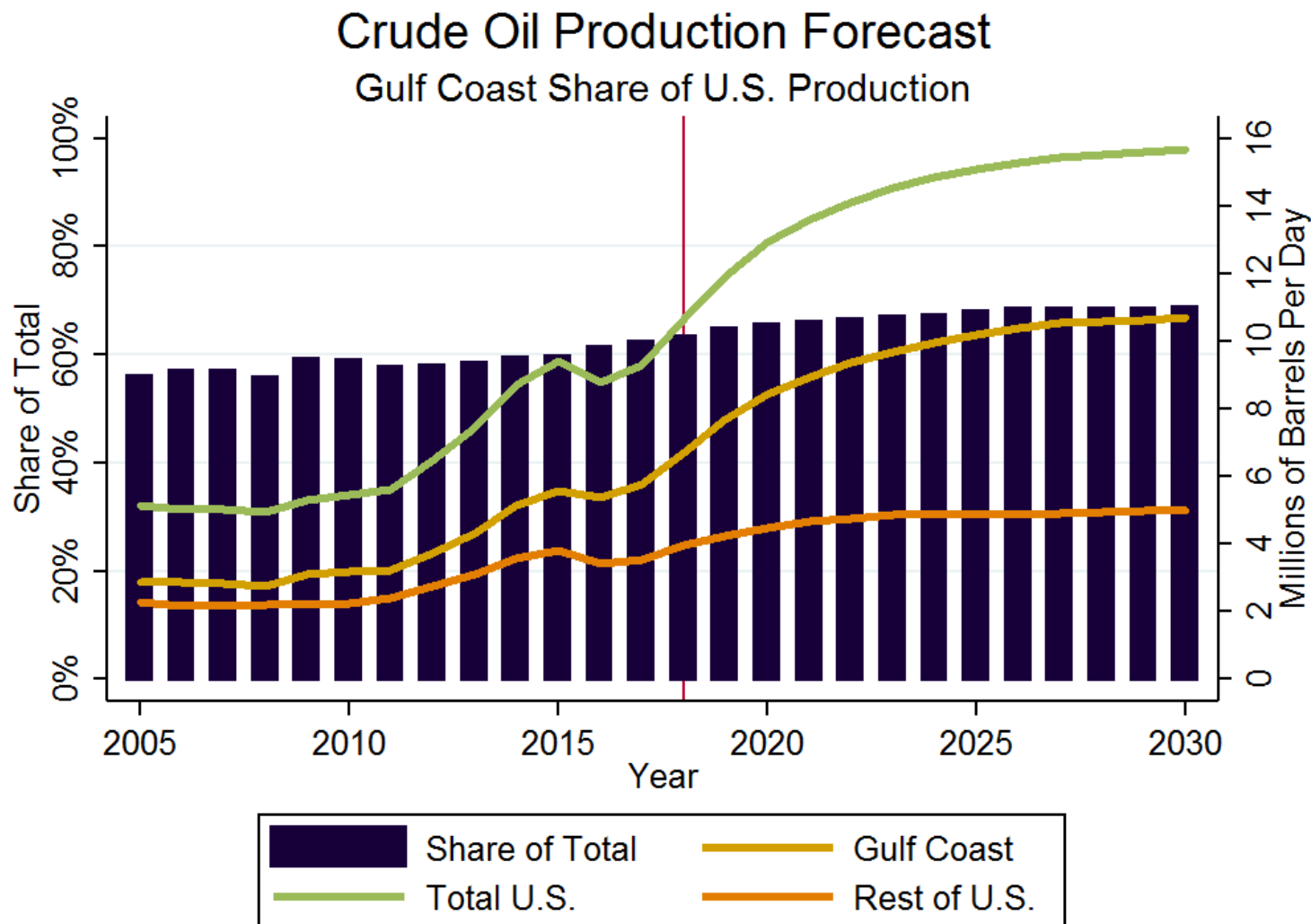


Note: Offshore includes both state and federal waters.

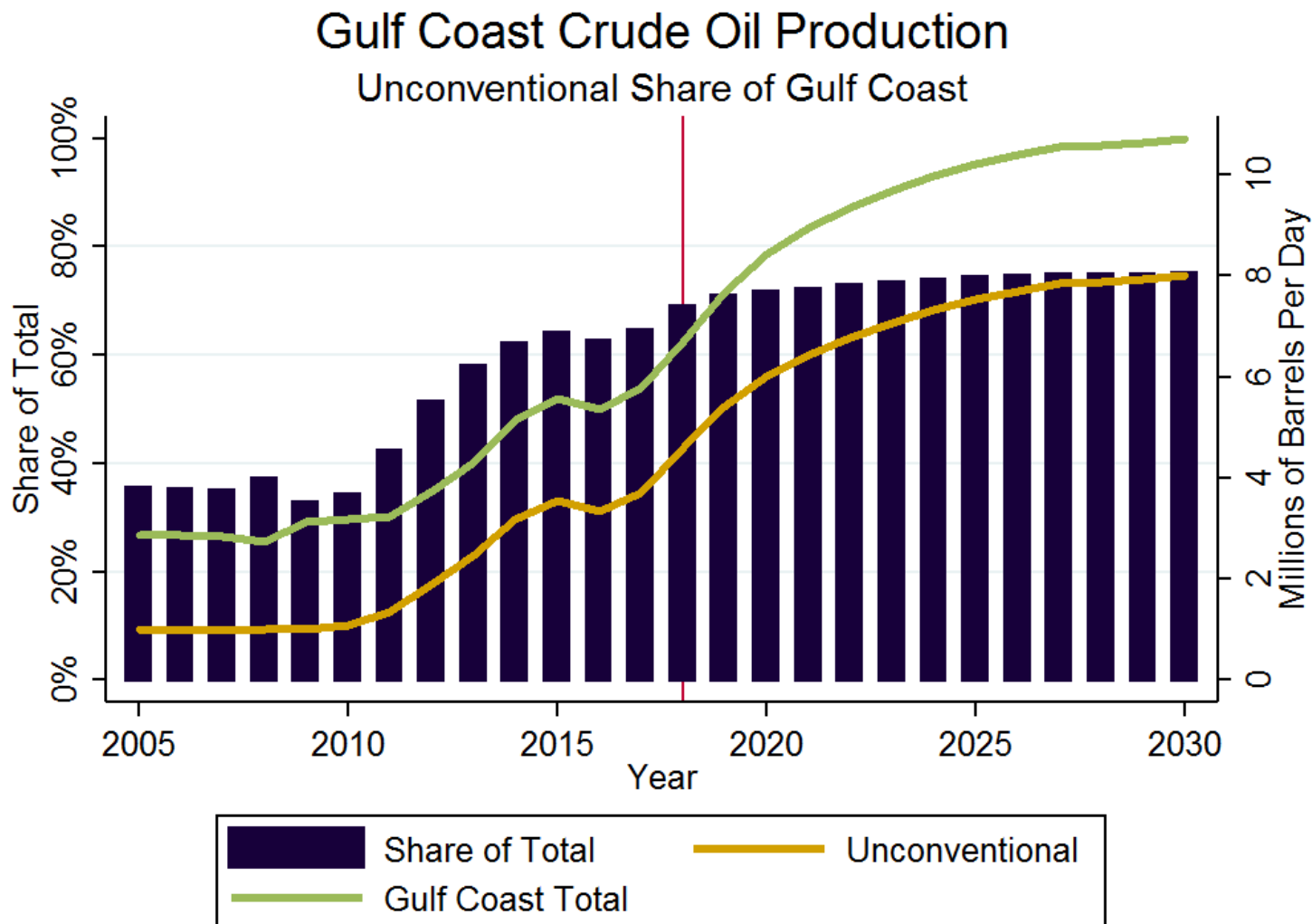
Conventional On-Shore Natural Gas Forecast



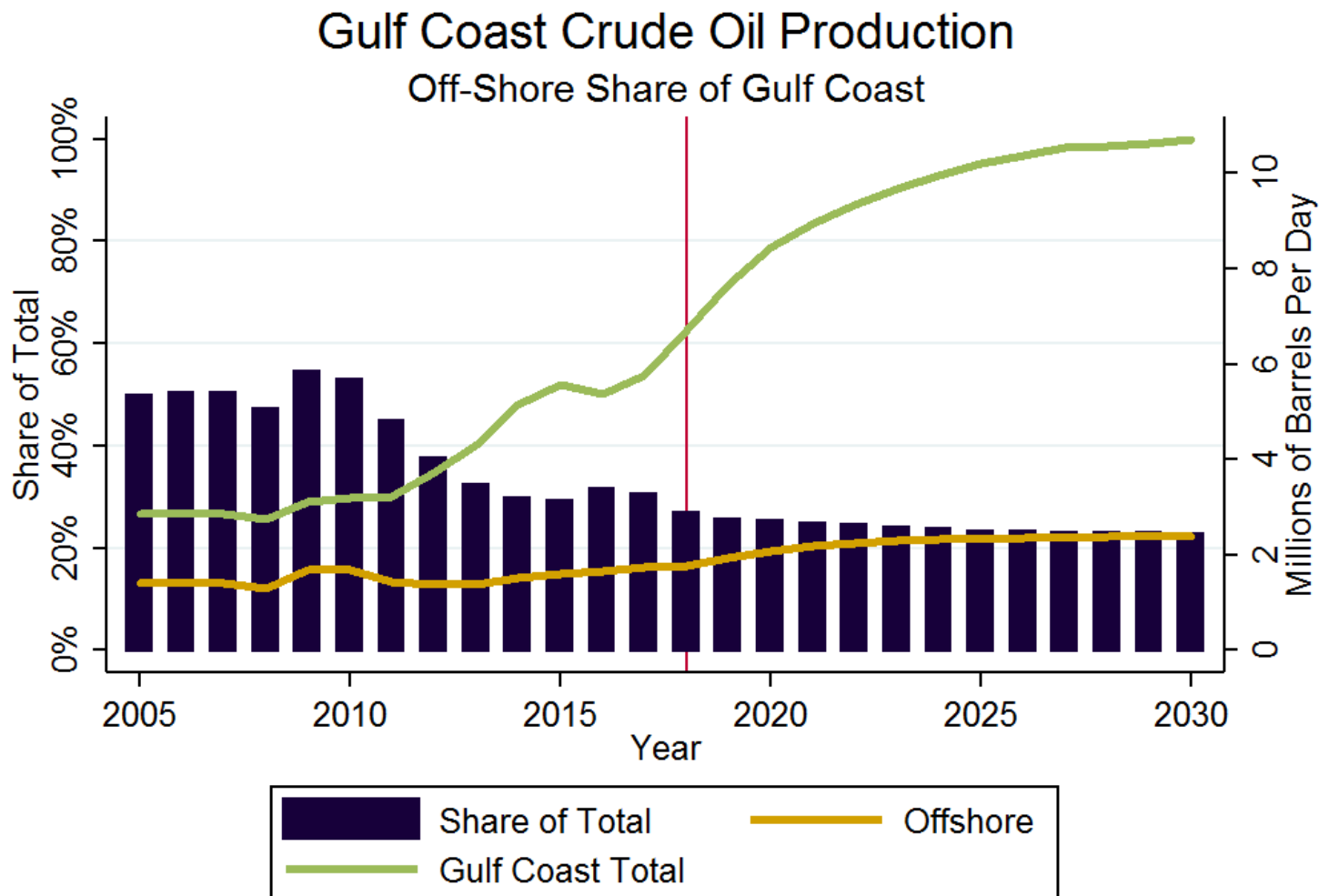
Gulf Coast Crude Oil Production Forecast



Unconventional On-Shore Crude Oil Forecast

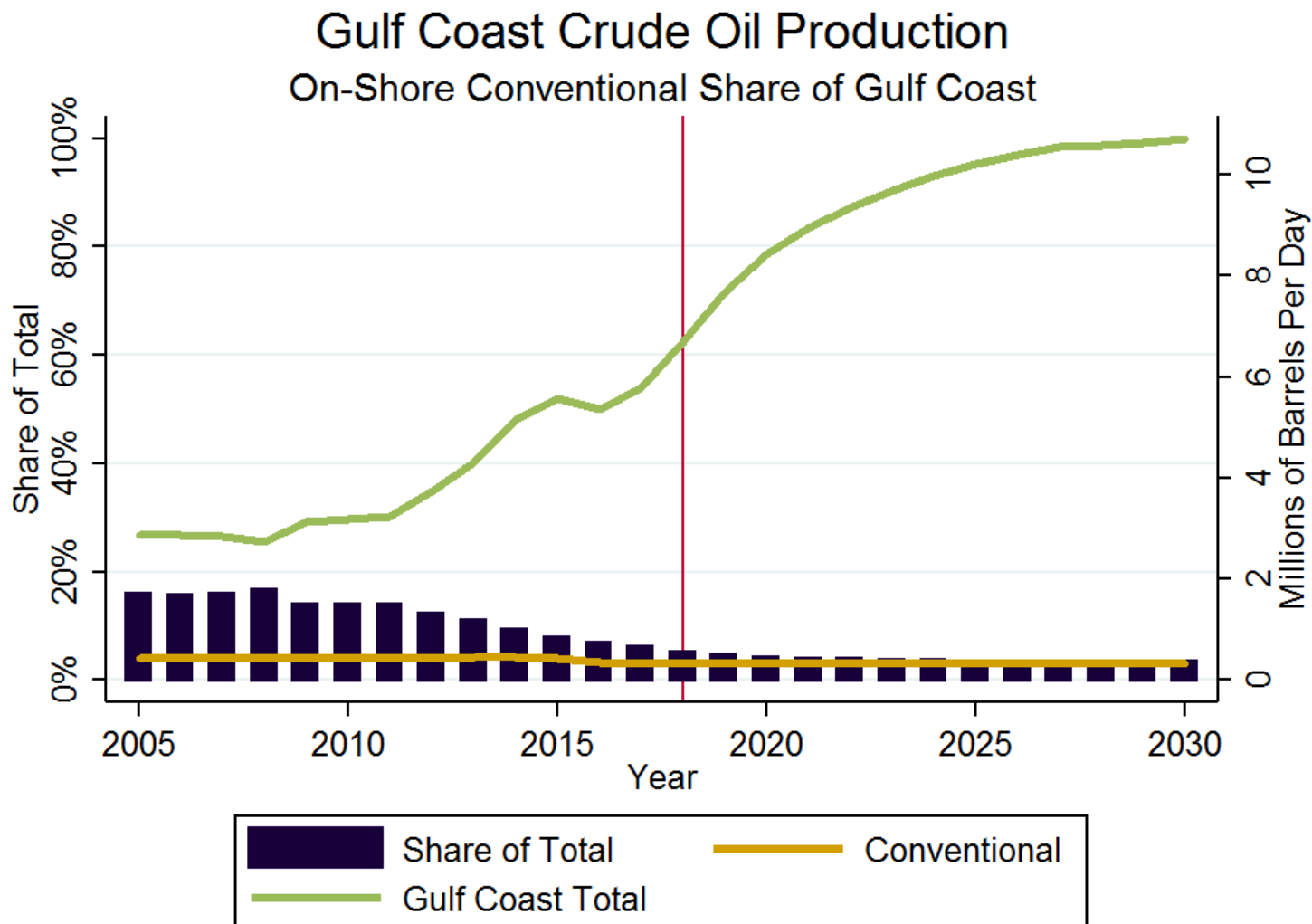


Off-Shore Crude Oil Forecast

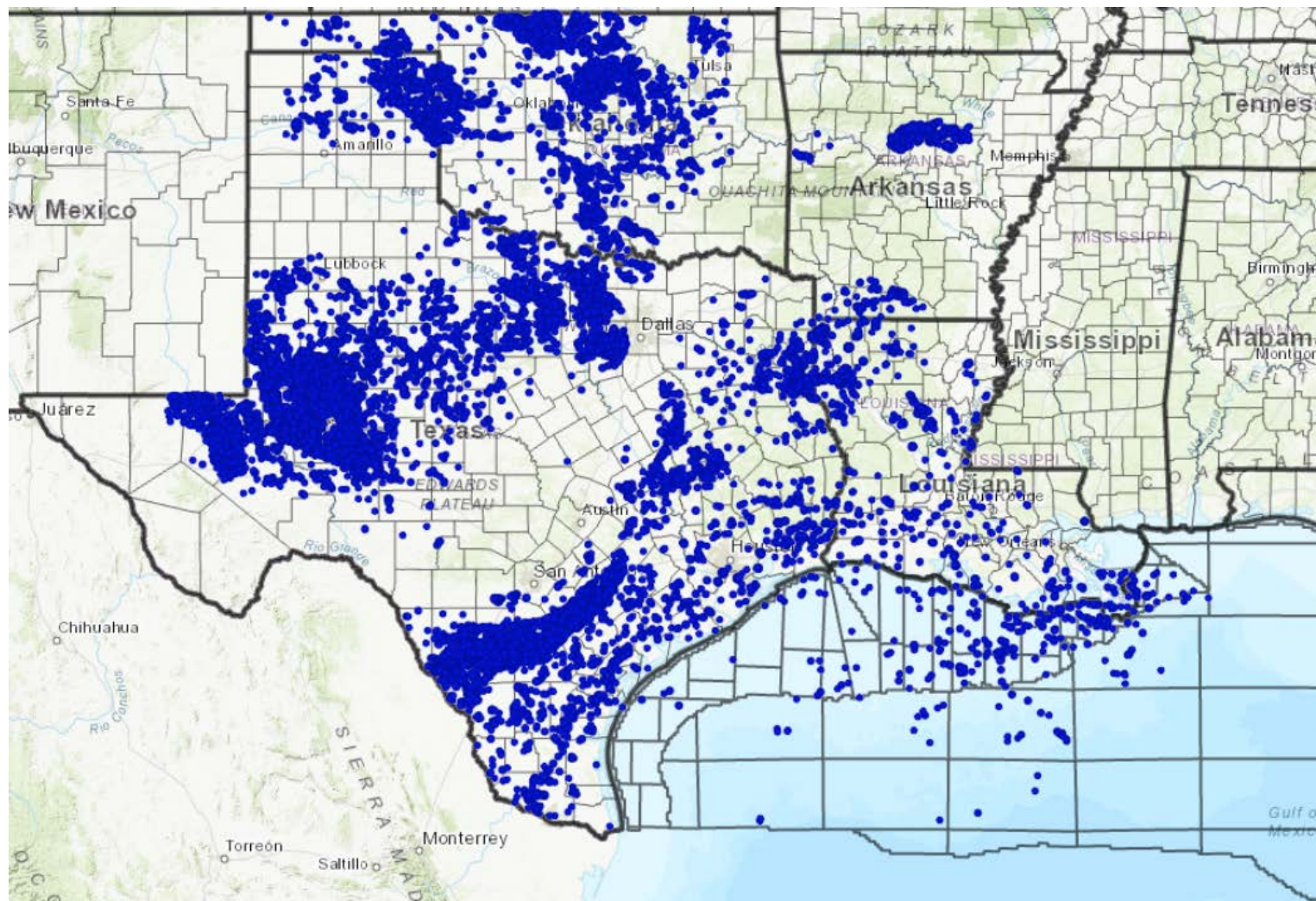


Note: Offshore includes both state and federal waters.

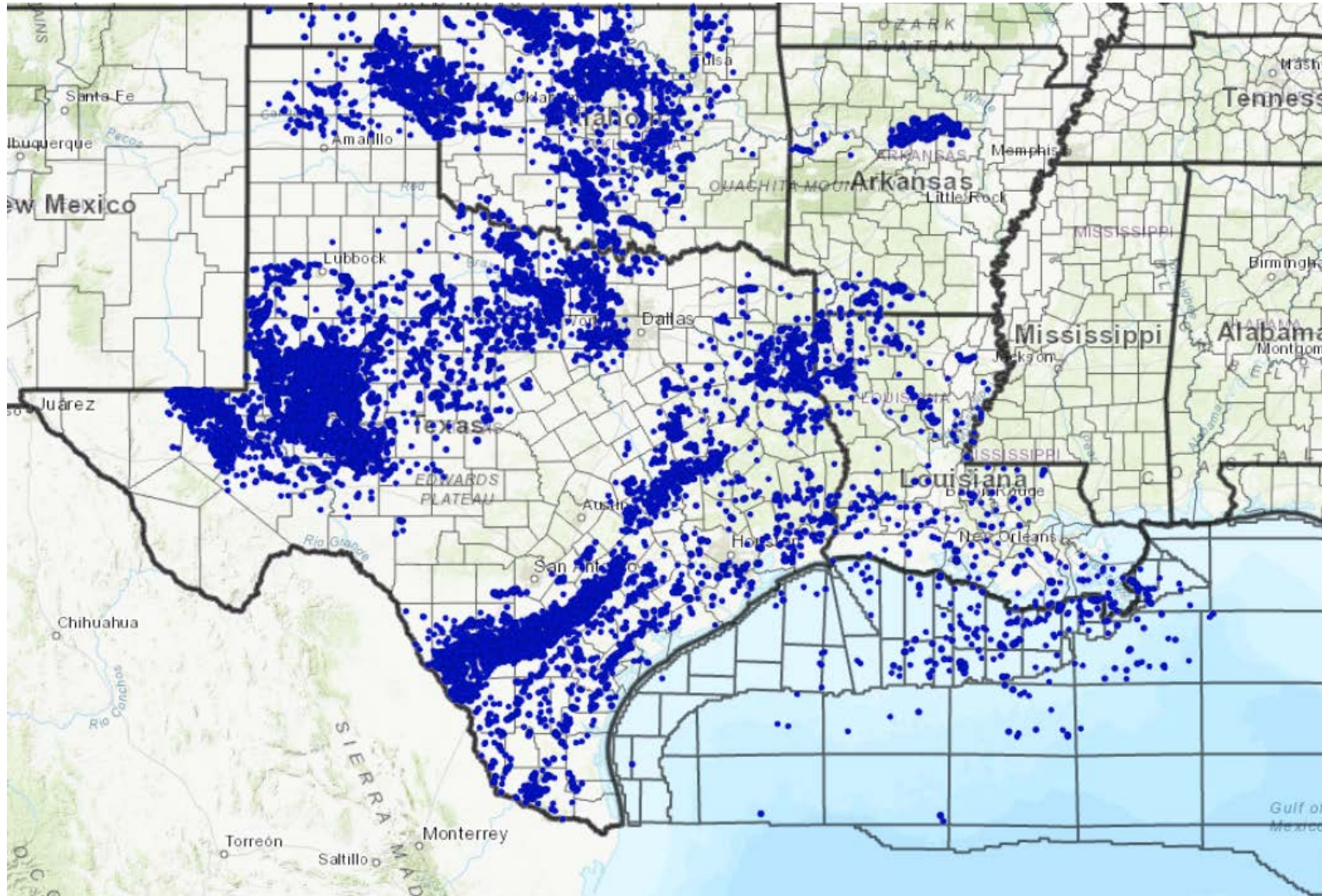
Conventional On-Shore Crude Oil Forecast



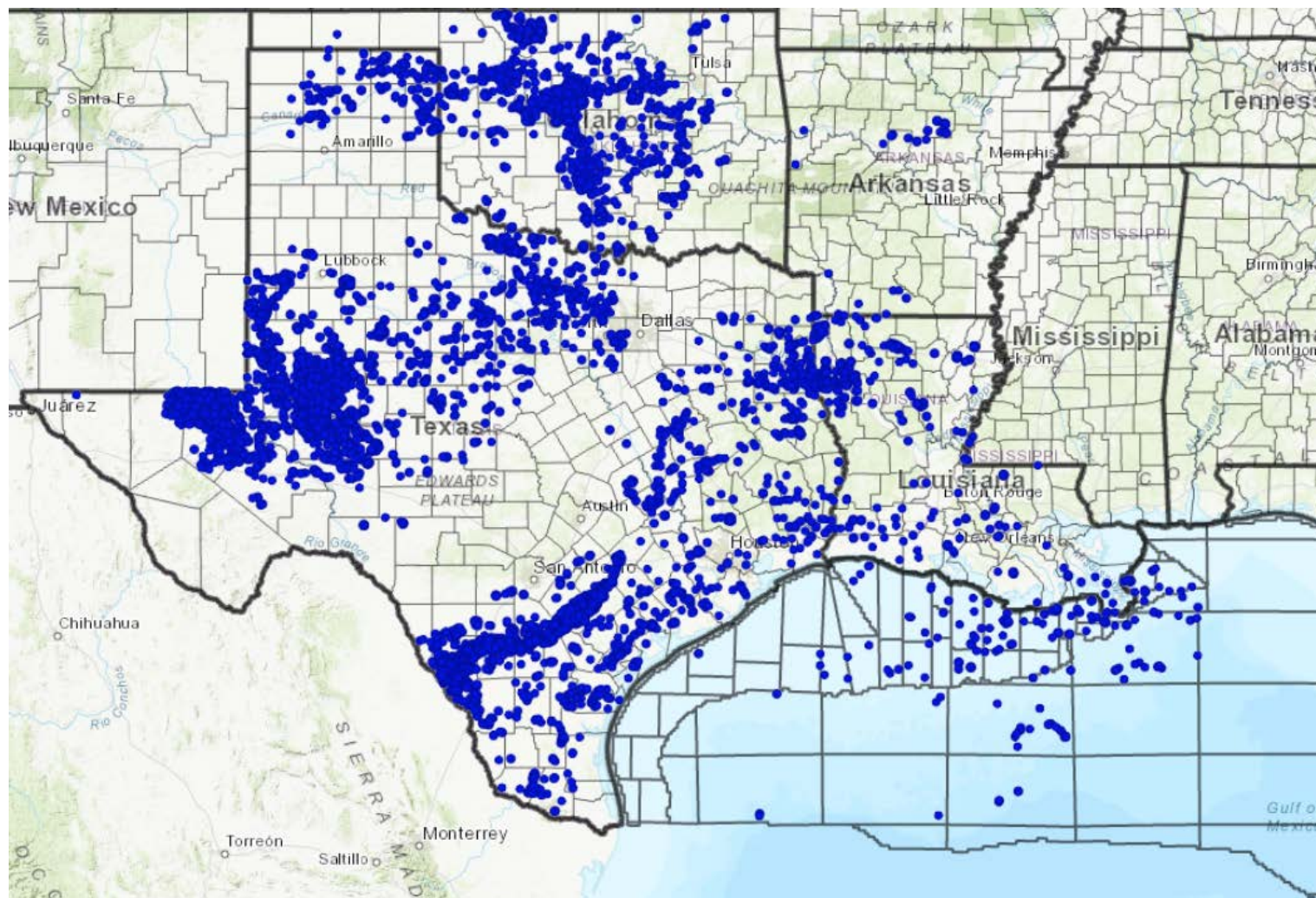
Wells Completed - 2013



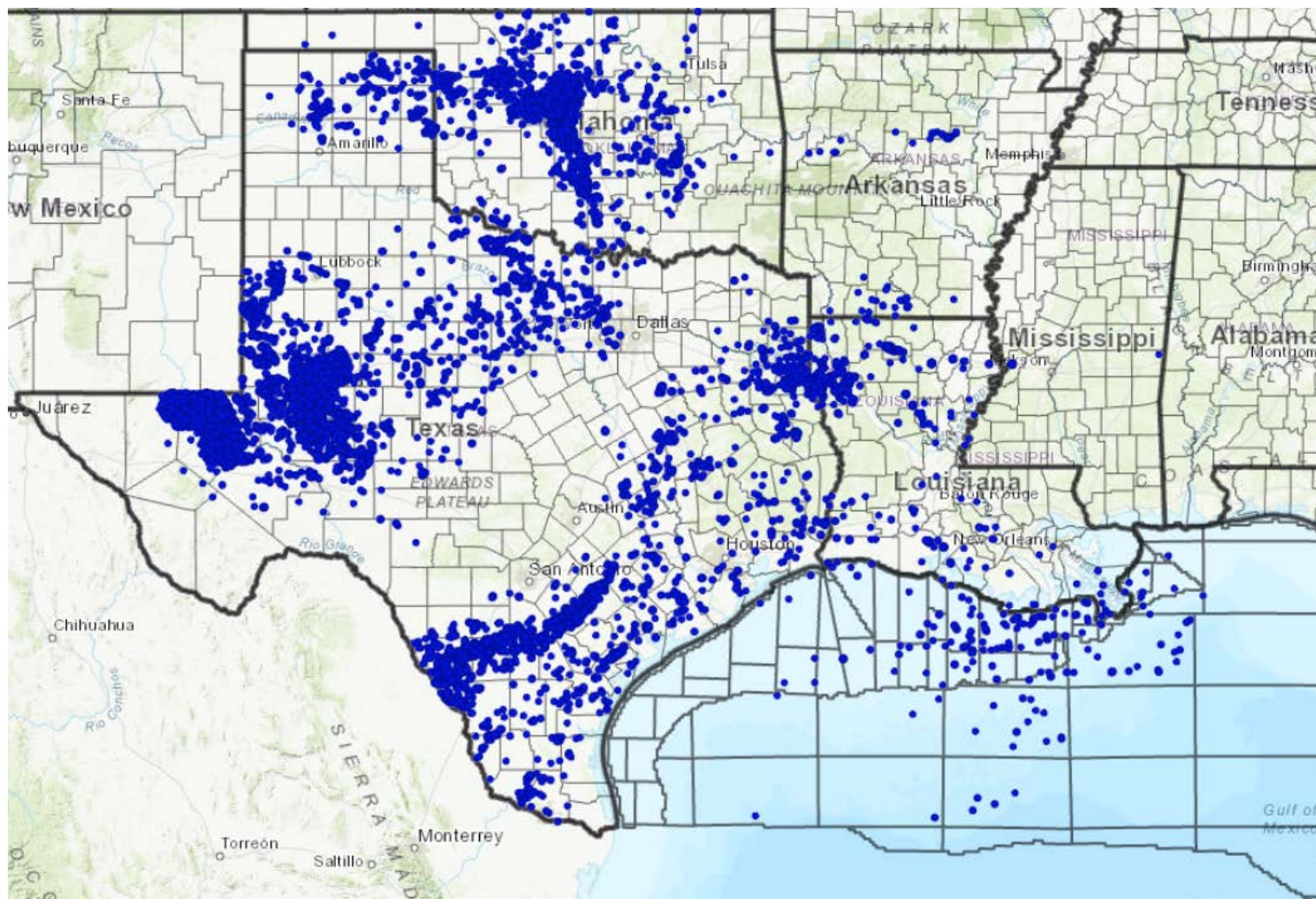
Wells Completed - 2014



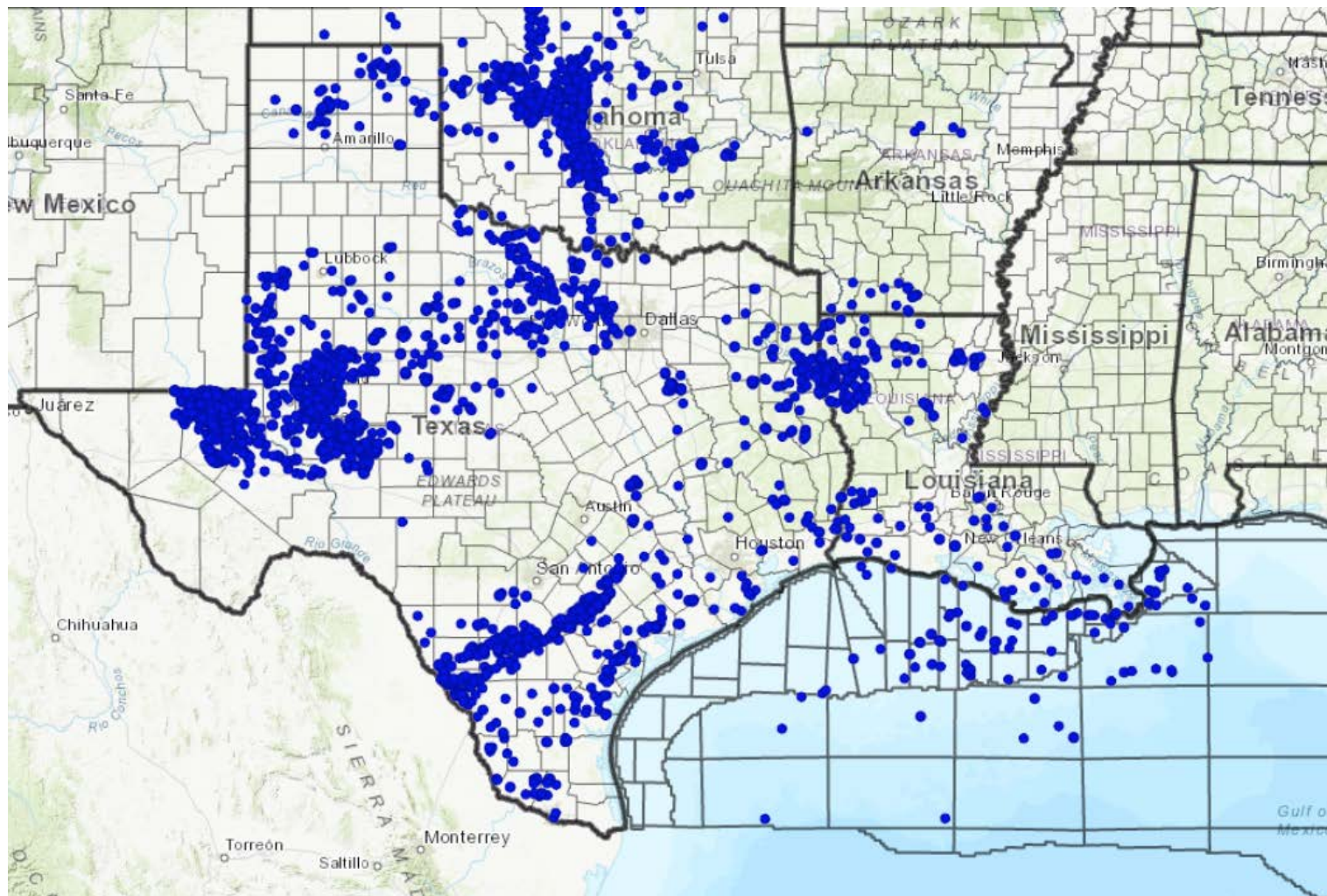
Wells Completed - 2016



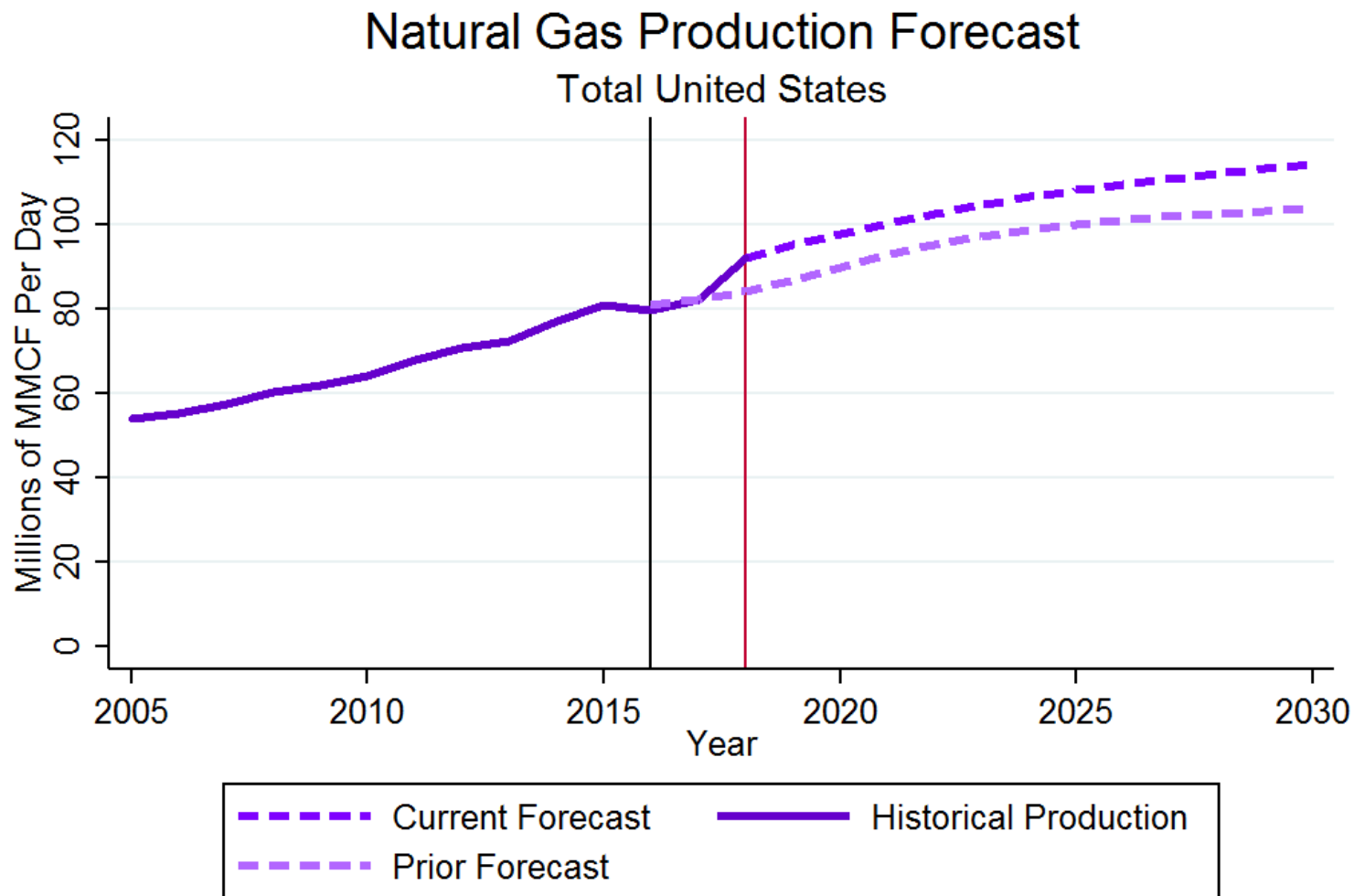
Wells Completed - 2017



Wells Completed – To date: 2018

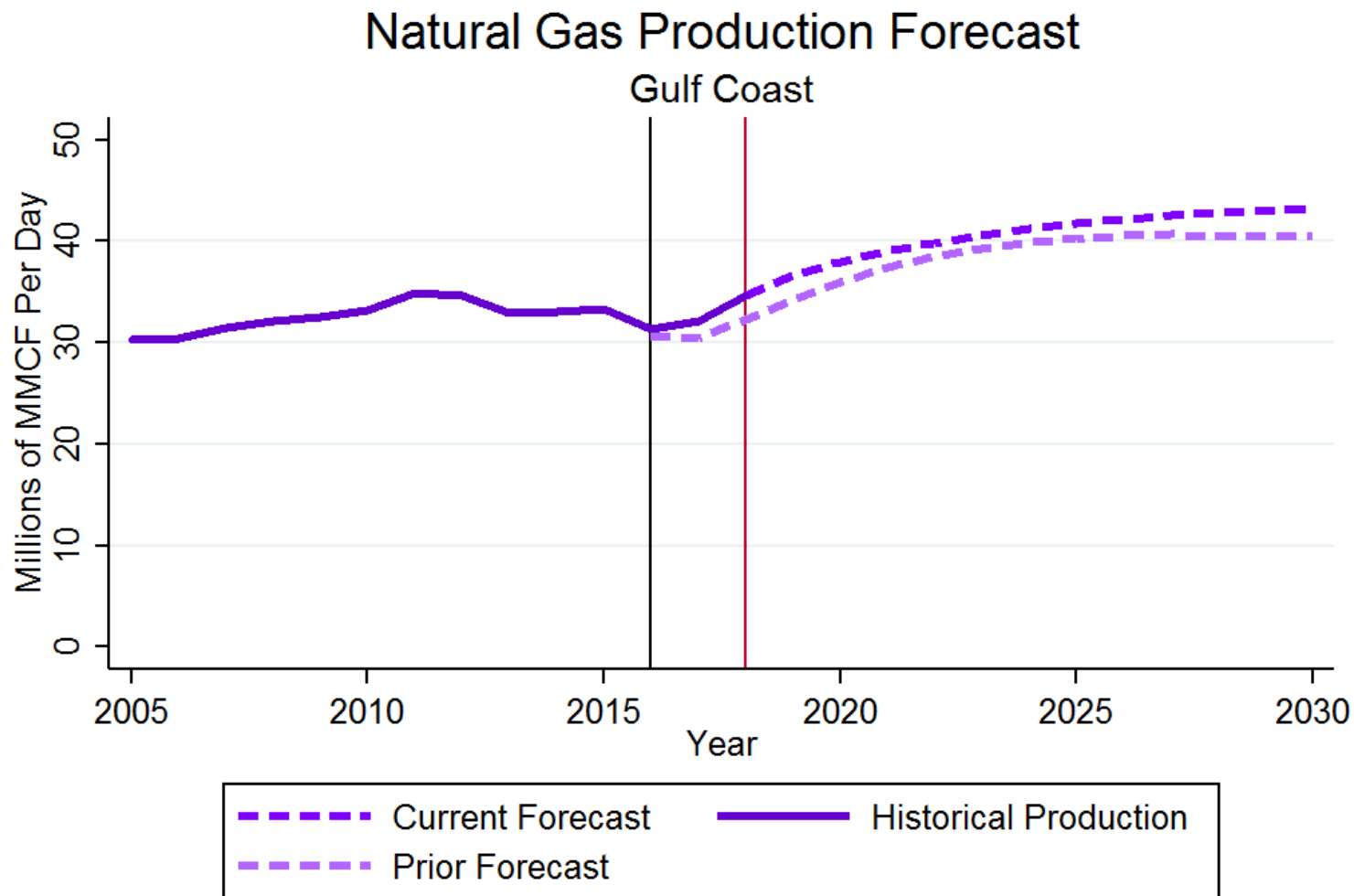


Forecast Performance



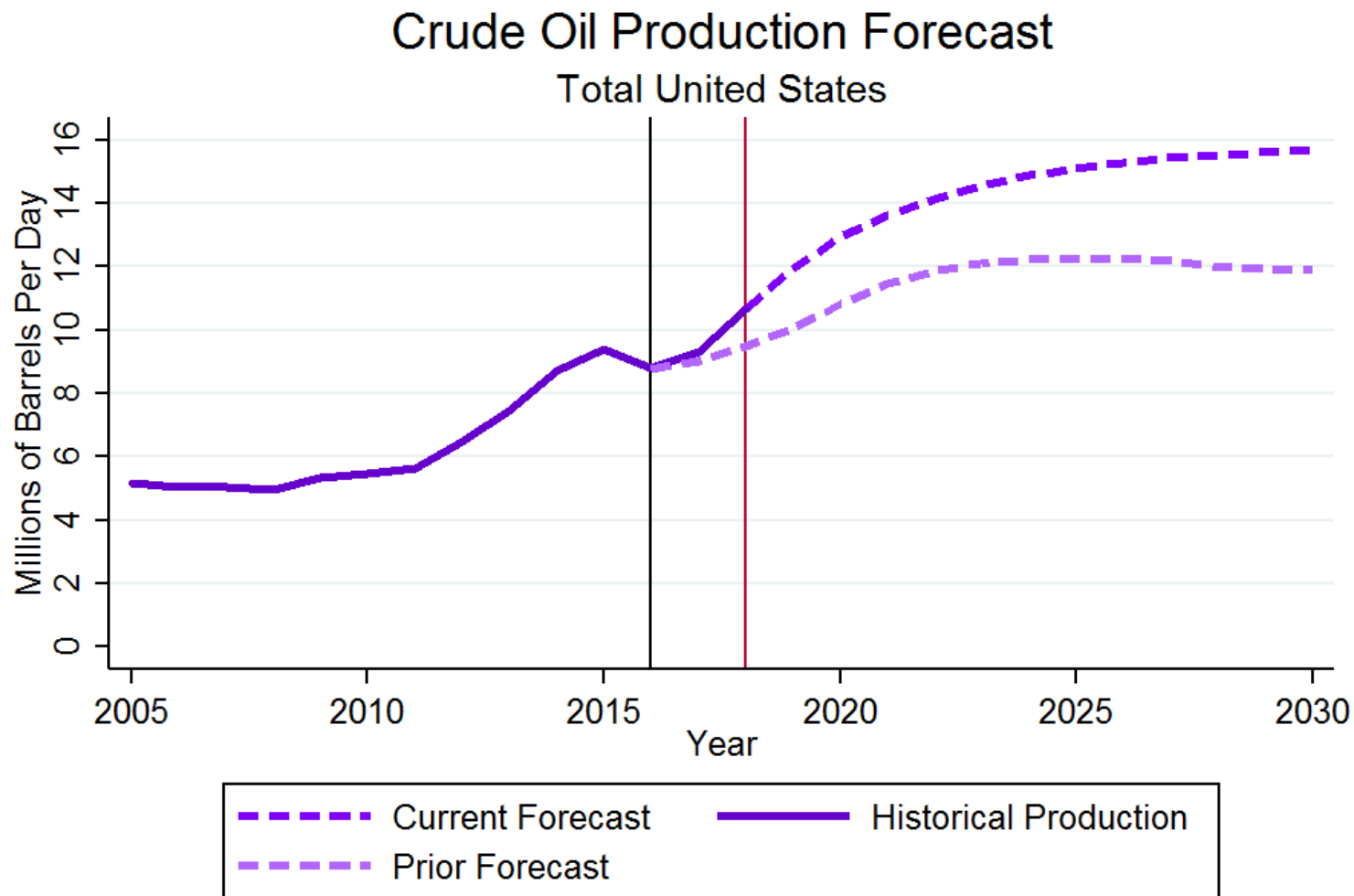
Forecasts based on DrillingInfo Prodcast.

Forecast Performance



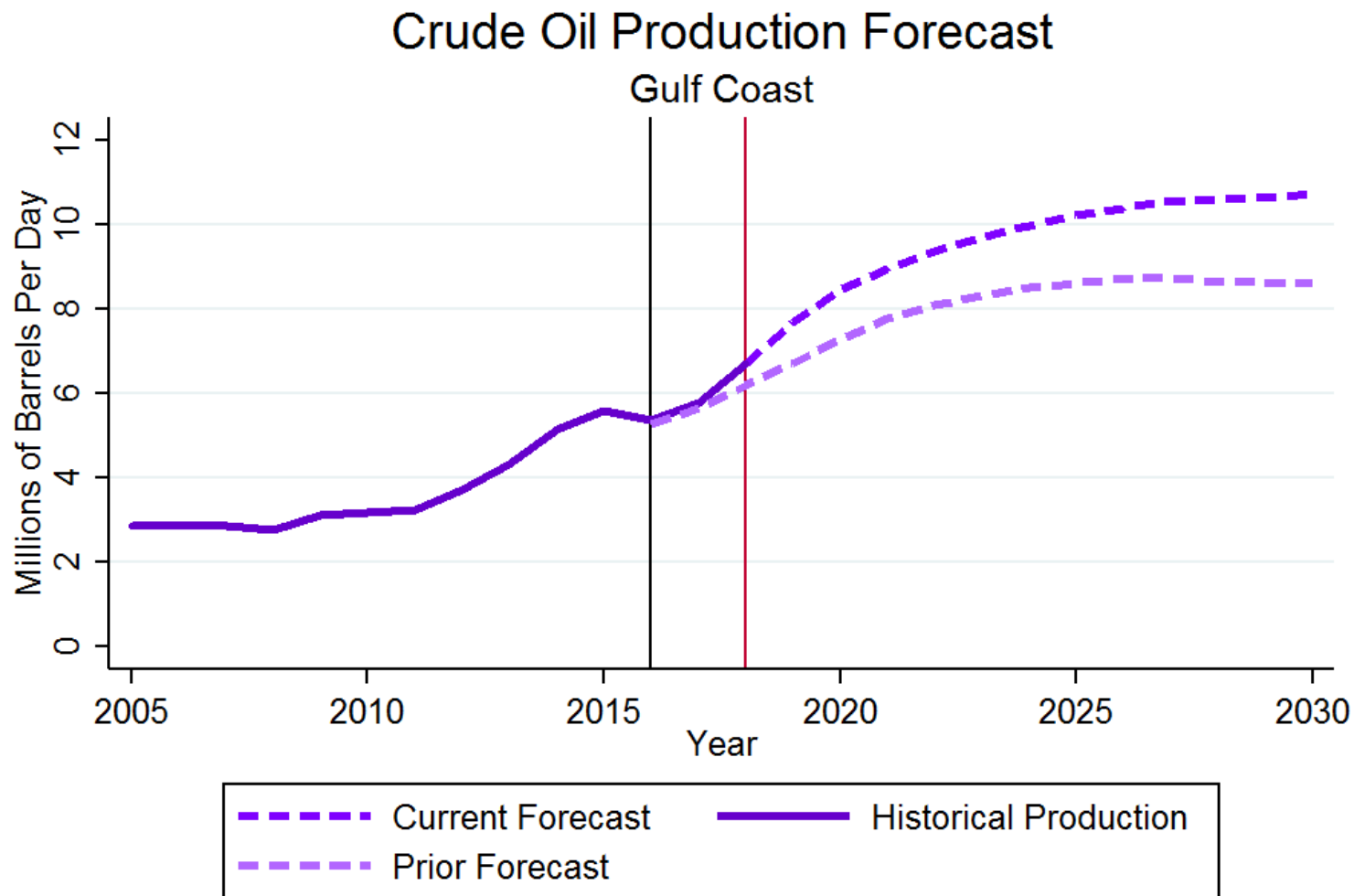
Forecasts based on DrillingInfo Prodcast.

Forecast Performance



Forecasts based on DrillingInfo Prodcast.

Forecast Performance



Forecasts based on DrillingInfo Prodcast.

Industrial Outlook

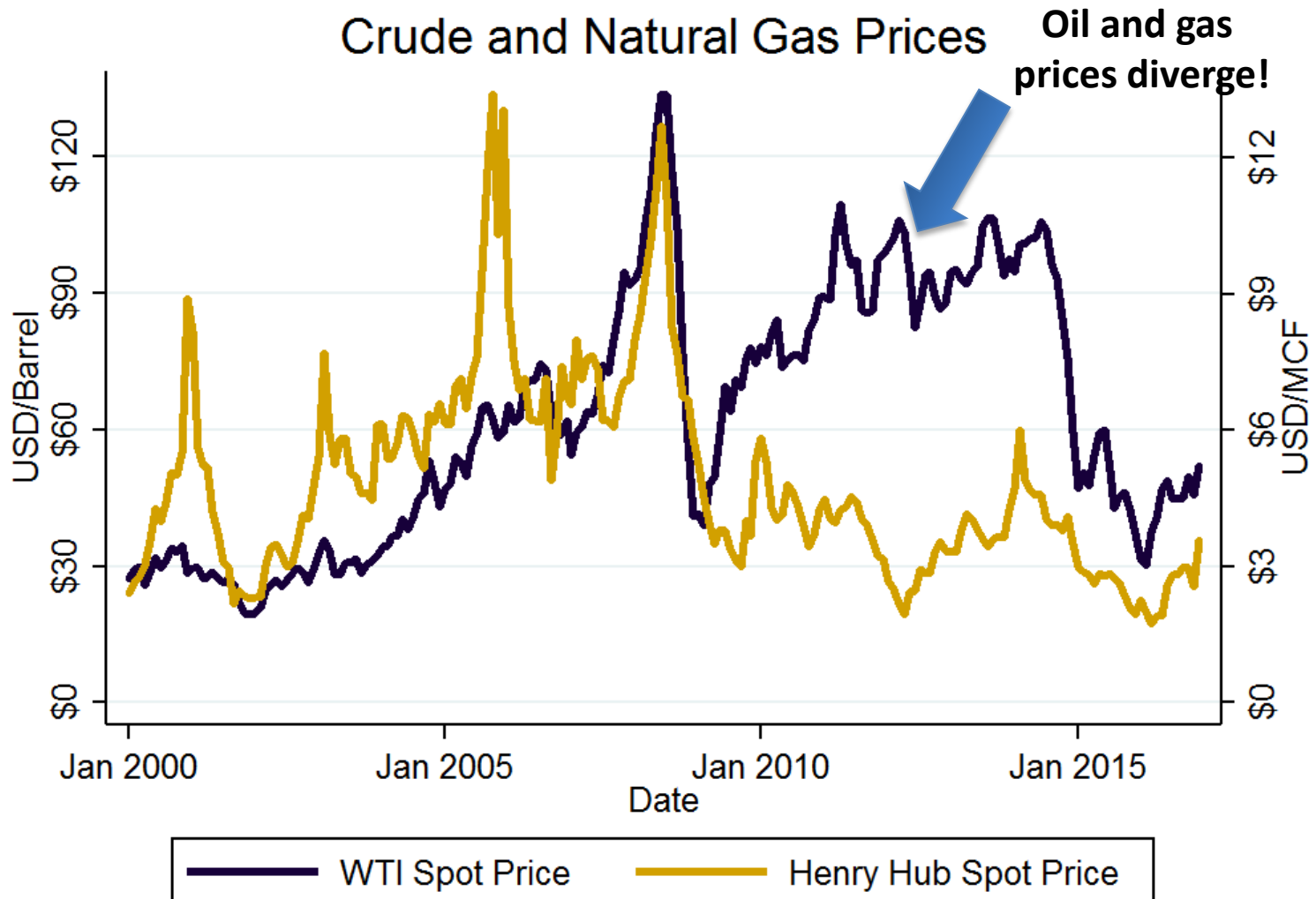
Industrial Outlook

- There is a symbiotic relationship between natural gas prices and Louisiana's energy-intensive manufacturing base. Louisiana manufacturing relies heavily on natural gas for heat, steam, power generation and most importantly, feedstock purposes. Louisiana's chemical industry is particularly reliant upon natural gas and natural gas liquids since both are used to produce a wide range of goods.¹
- Abundant and inexpensive natural gas along side the U.S. increase in oil production has led to significant industrial investments.
- Significant investments in crude oil transport, including pipeline reversals, expansions, and additions, alongside the lifting of the crude oil export ban can create an environment that allows for the Gulf Coast to become the epicenter for hydrocarbon trading.²

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

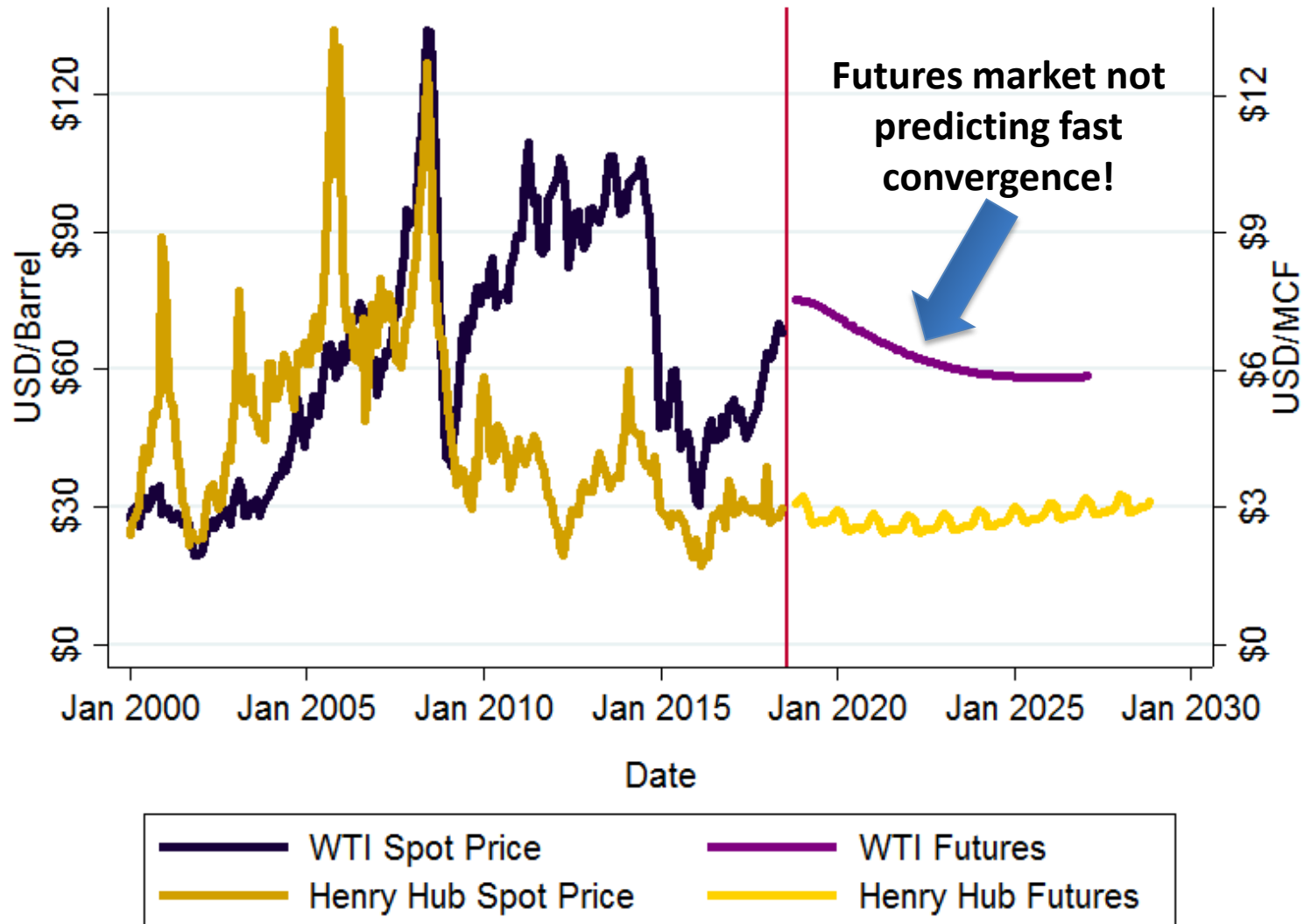
2. Upton (2016). *Crude Oil Exports and the Louisiana Economy. A discussion of the U.S. policy of restricting crude oil exports and its implications for Louisiana*. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.

WTI and Brent Spot Prices



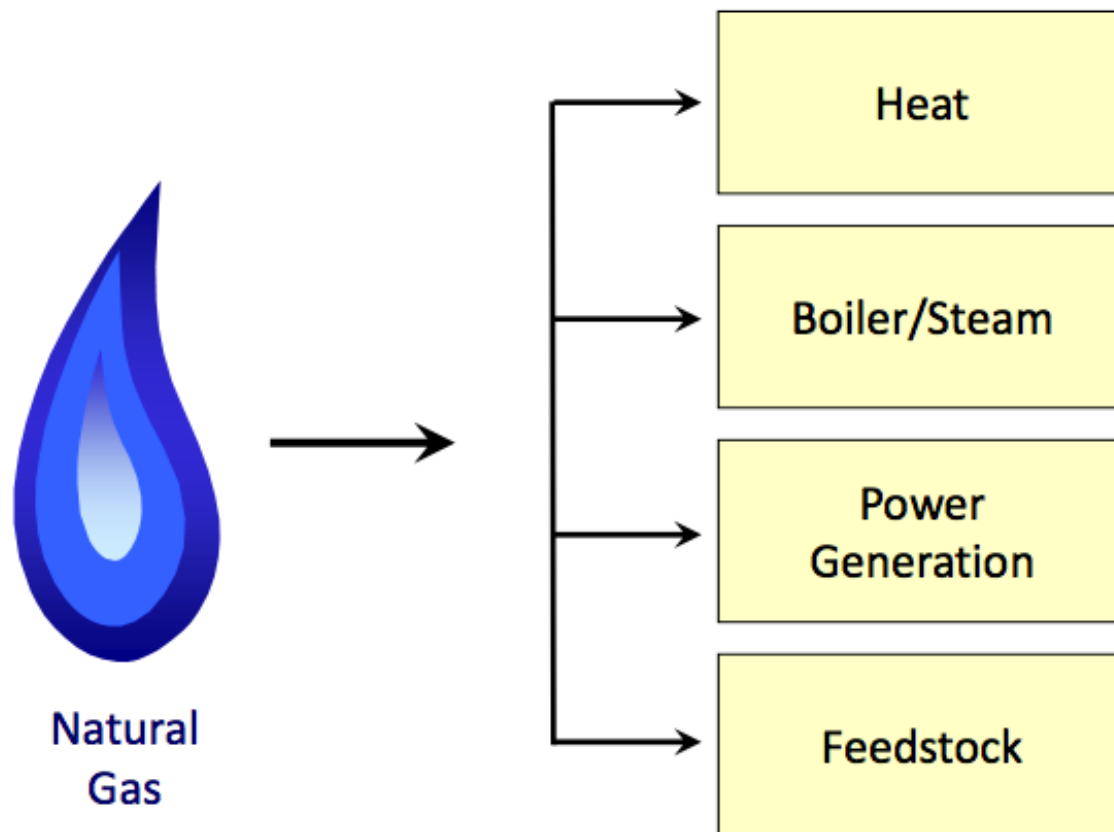
Source: EIA.

WTI and Brent Spot Prices



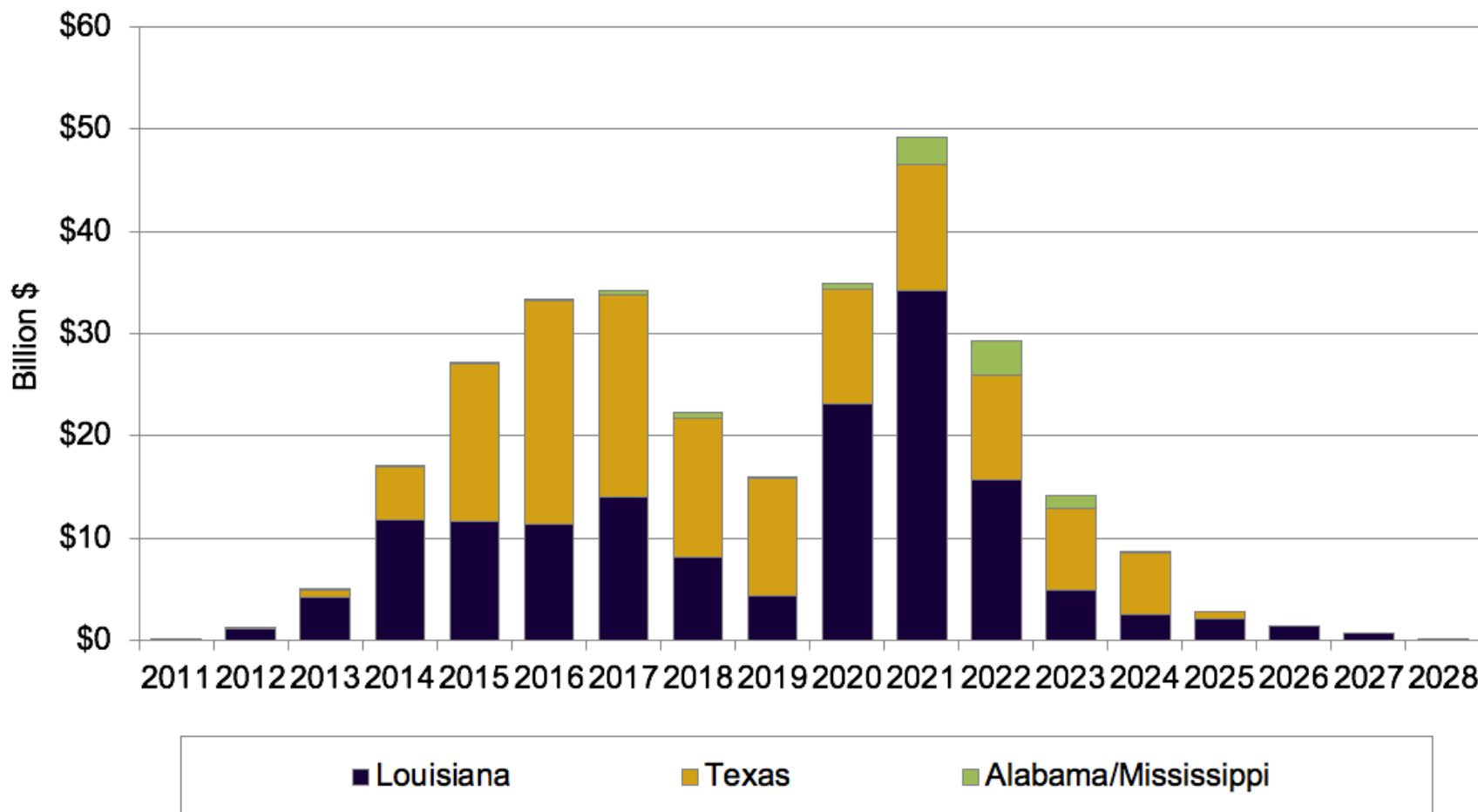
Natural Gas In Manufacturing

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.



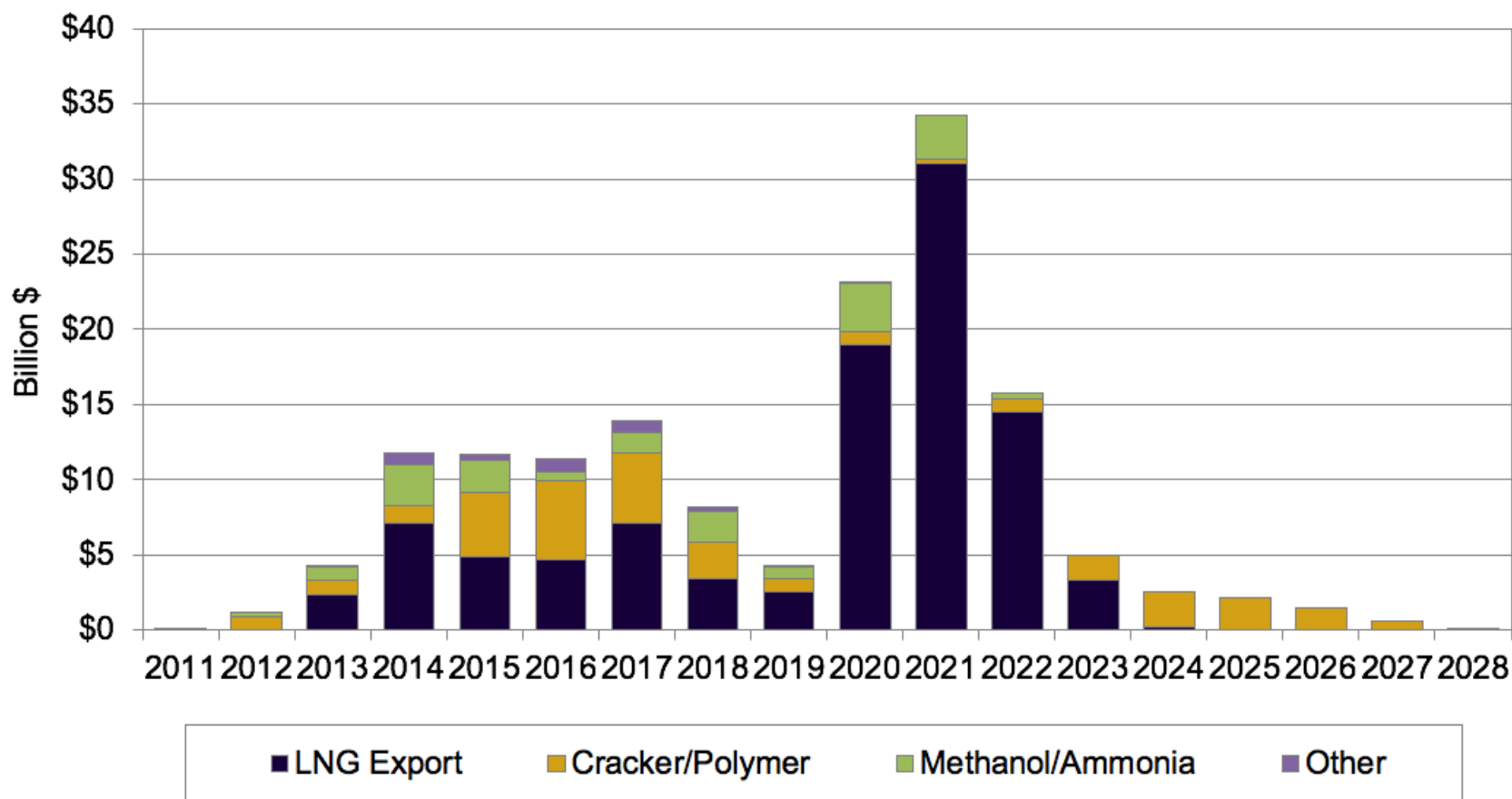
Gulf of Mexico region: energy manufacturing capital expenditures (by state).

To date, Louisiana has seen approximately \$151.7 billion in actual and projected capital investment, whereas Texas captures \$136.1 billion in actual and projected Gulf Cost chemical industry capital investment.



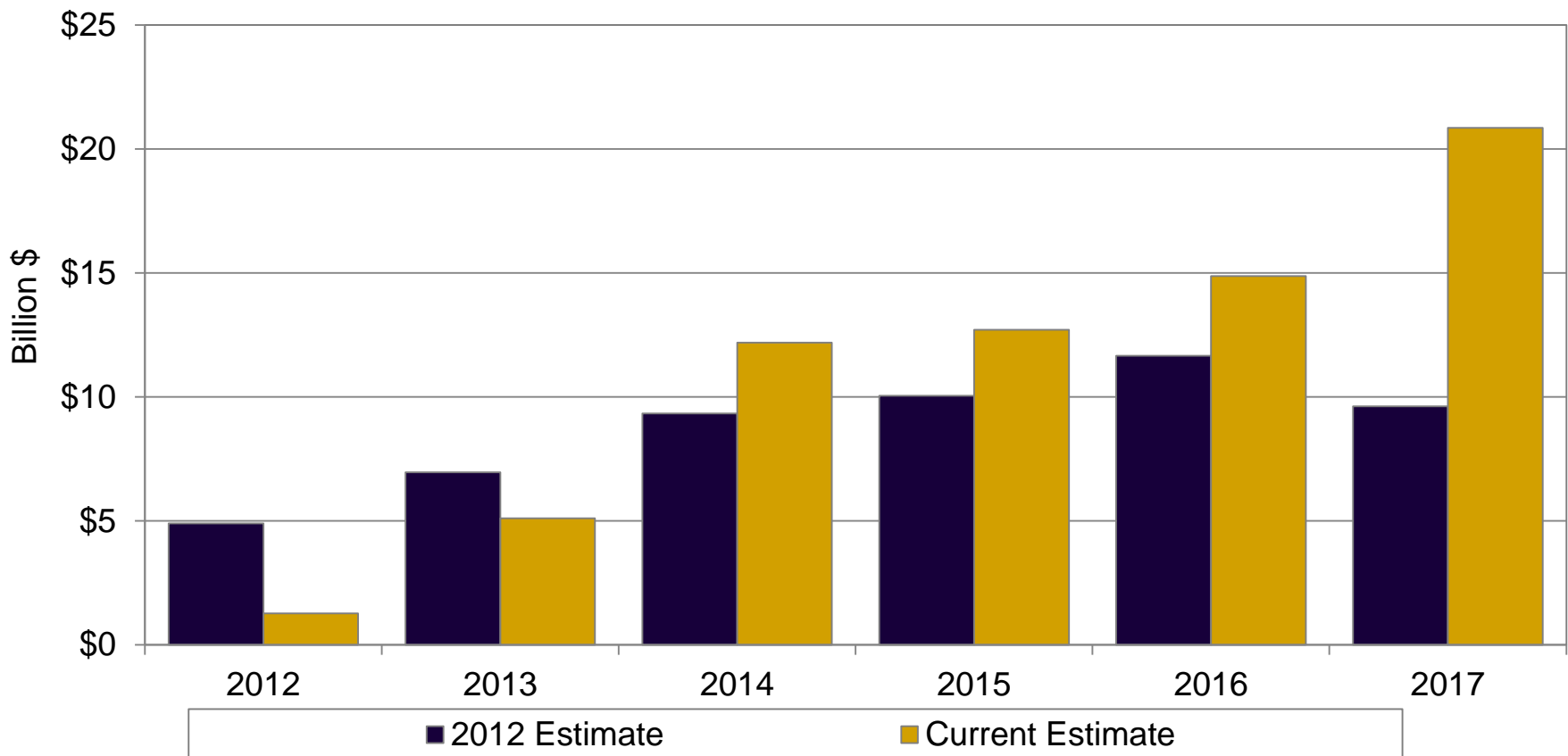
Louisiana energy manufacturing total capital expenditures by sector.

In Louisiana, project announcements are heavily concentrated in LNG Export.



Louisiana projected capital expenditures, then and now

Capital expenditures to date have exceeded early estimates. Projected expenditures for Louisiana 2012 were estimated to be \$53 billion (through 2017); however actual expenditures are closer to \$67 billion, a difference of almost 30 percent.

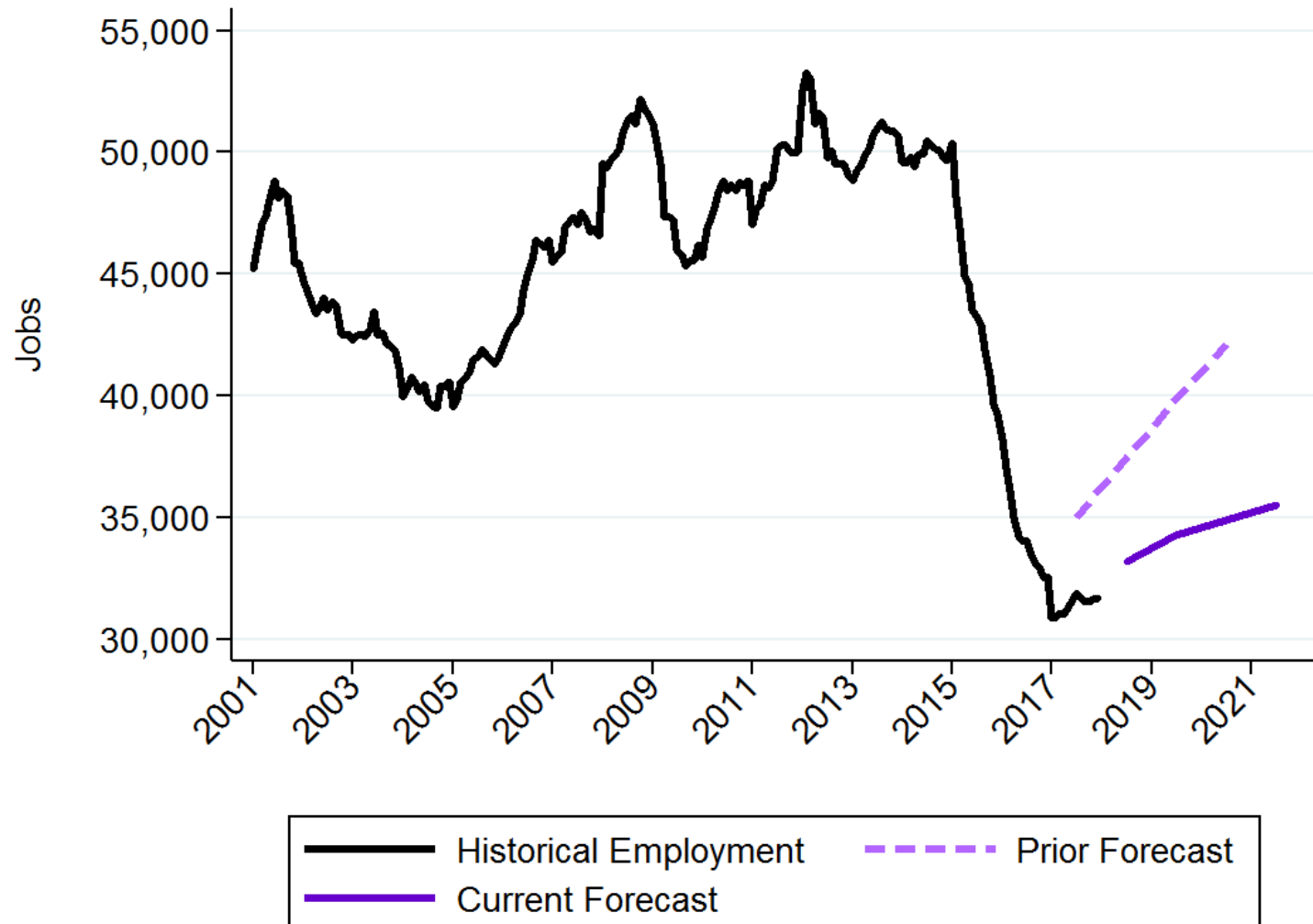


Employment Outlook

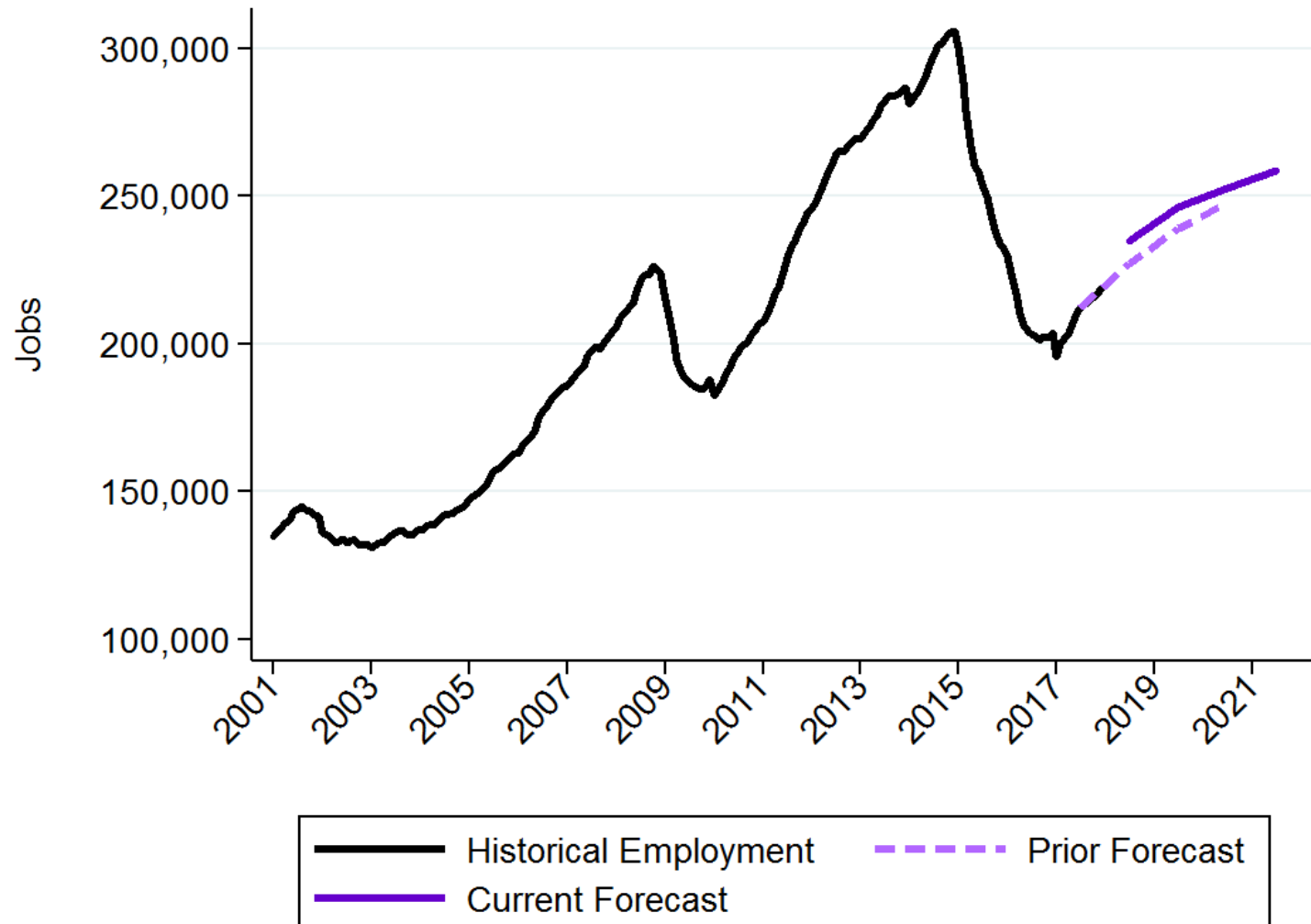
Key Industries

- Oil and Gas
 - NAICS 211: Oil and Gas Extraction
 - NAICS 213: Support Activities for Mining
- Refinery and Chemical Manufacturing
 - NAICS 324: Petroleum and Coal Products Manufacturing (refineries)
 - NAICS 325: Chemical Manufacturing

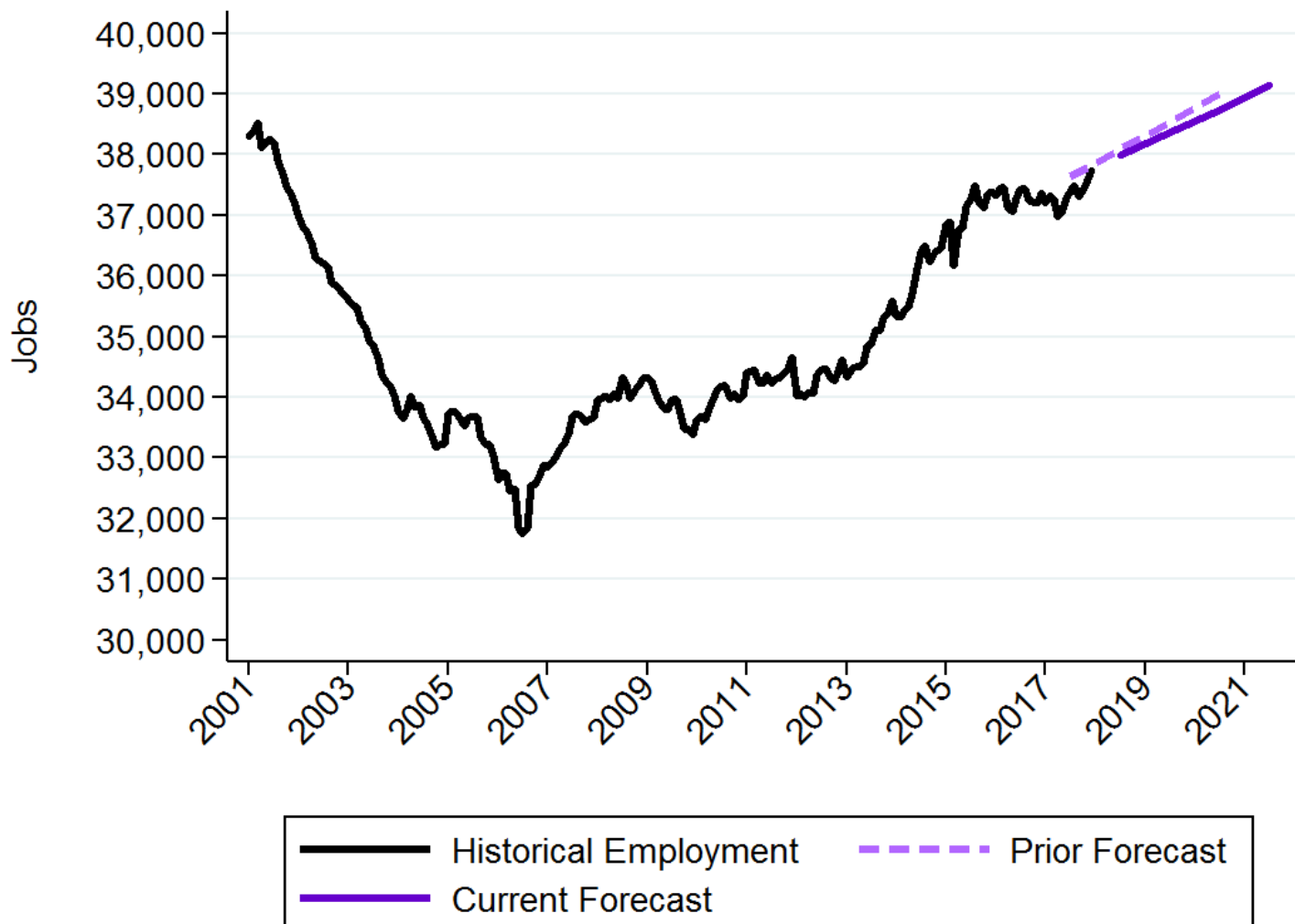
Louisiana oil and gas employment forecast

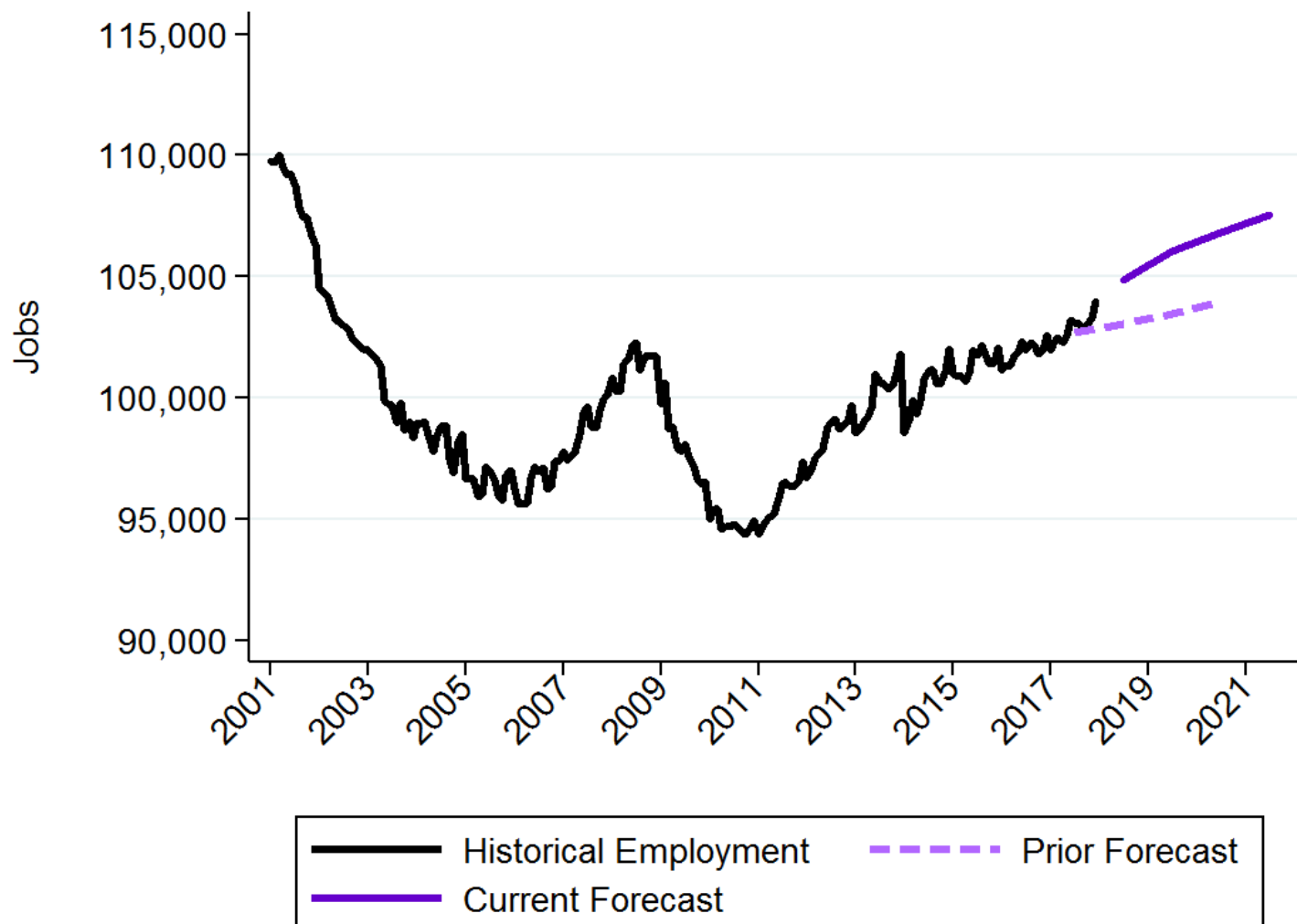


Texas oil and gas employment forecast



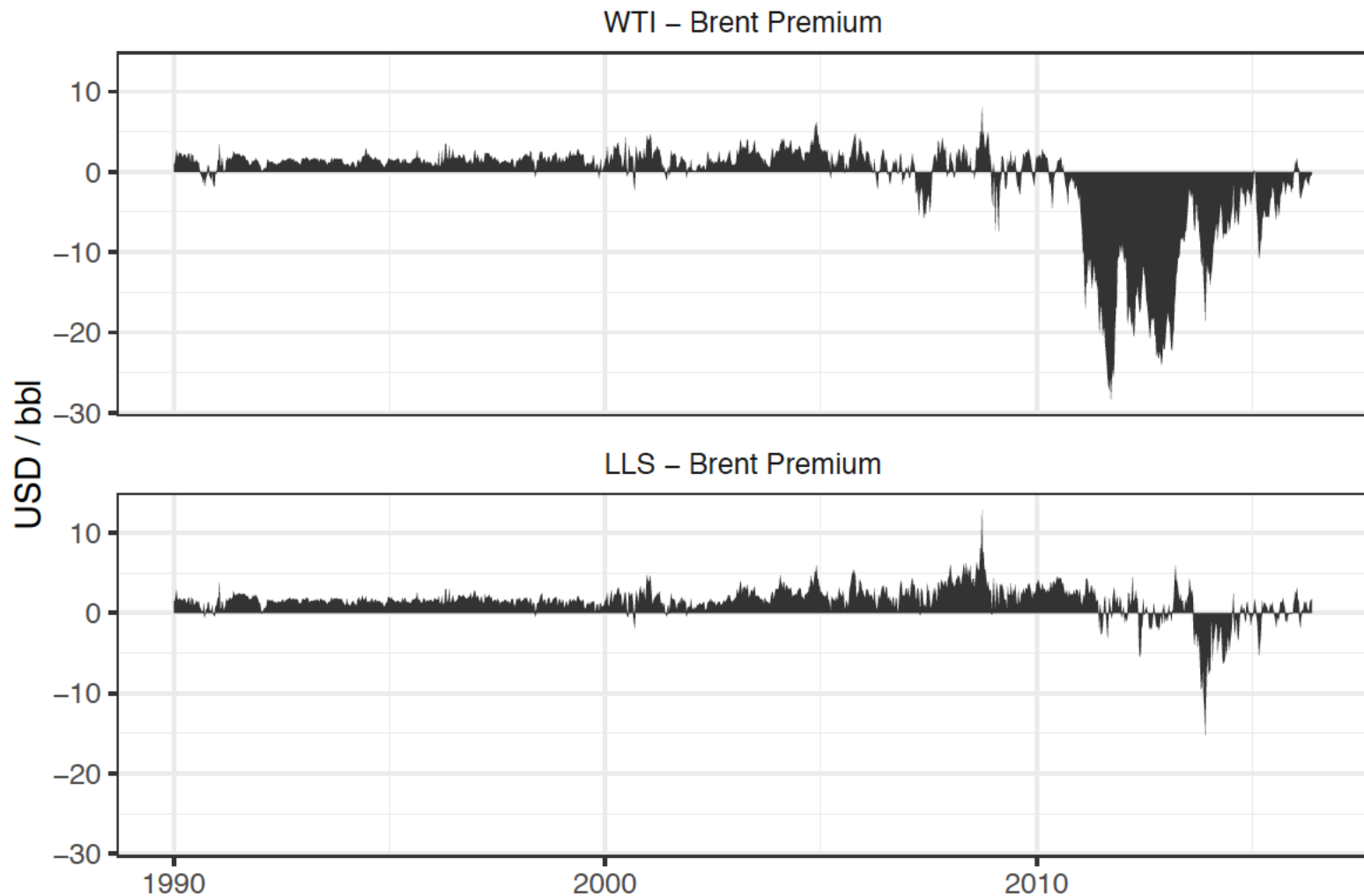
Louisiana refinery and chemical sector employment forecast



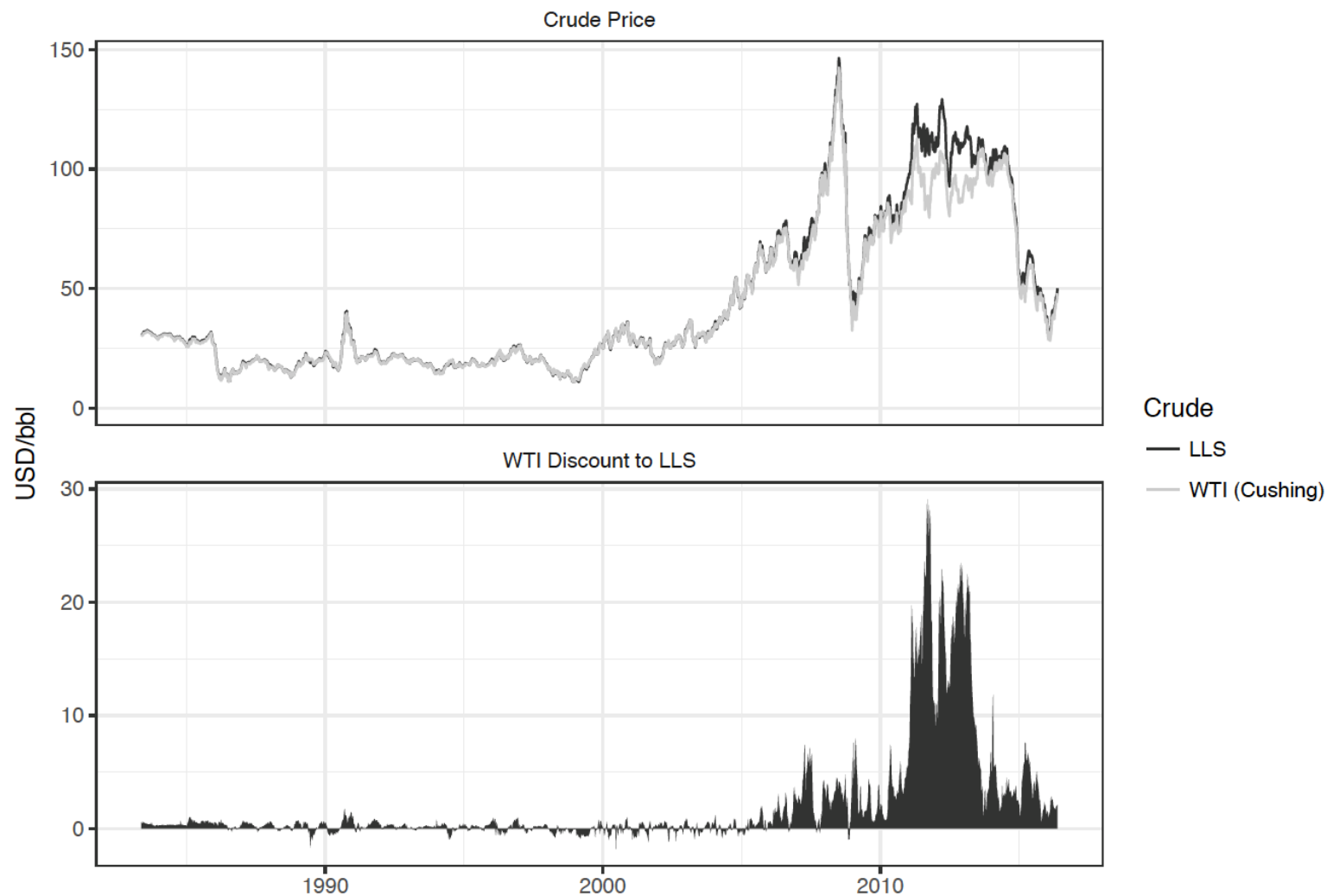
Texas refinery and chemical sector employment forecast


Mid-Stream Infrastructure

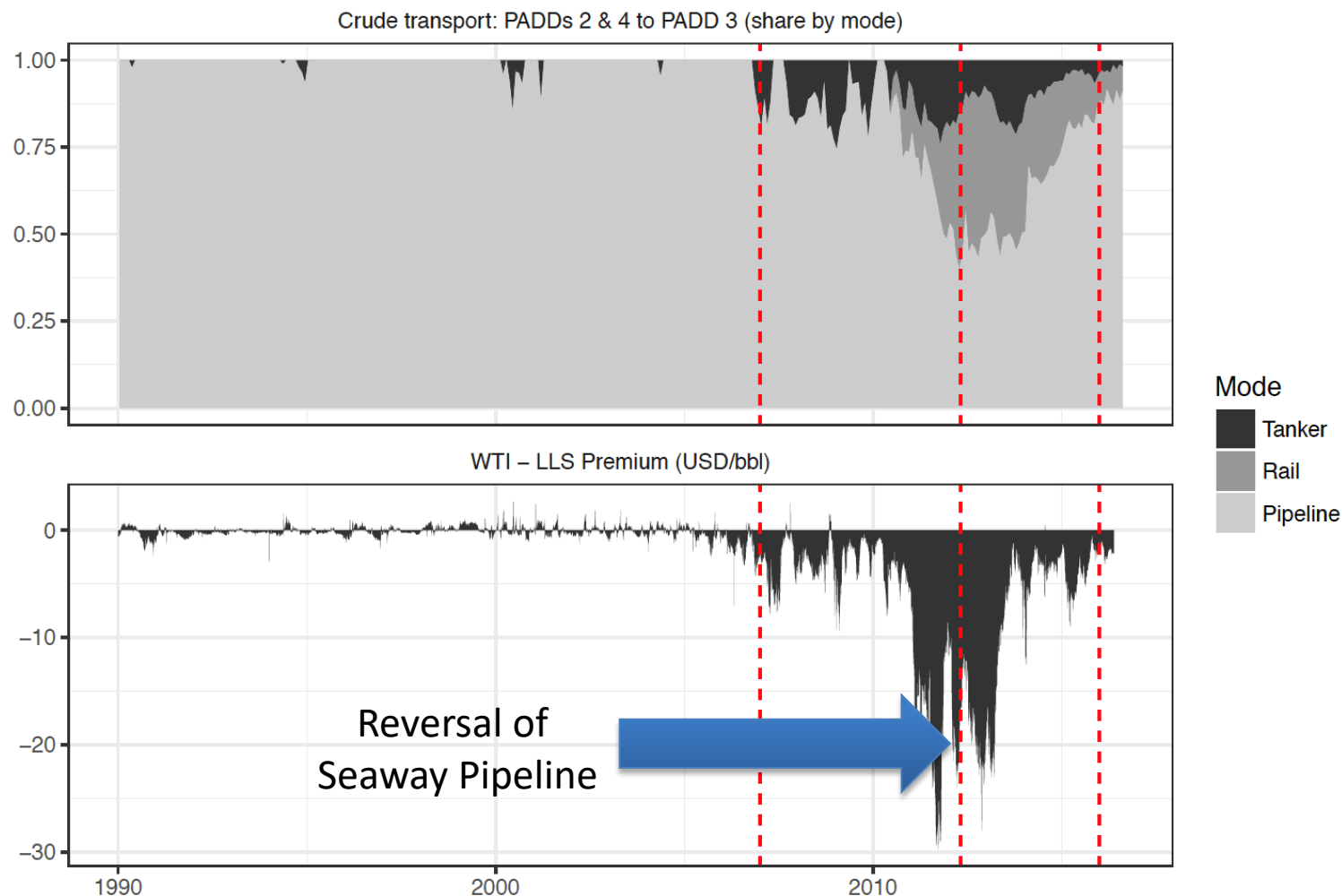
Foreign/Domestic Price Differentials



Price Differentials Within the U.S.

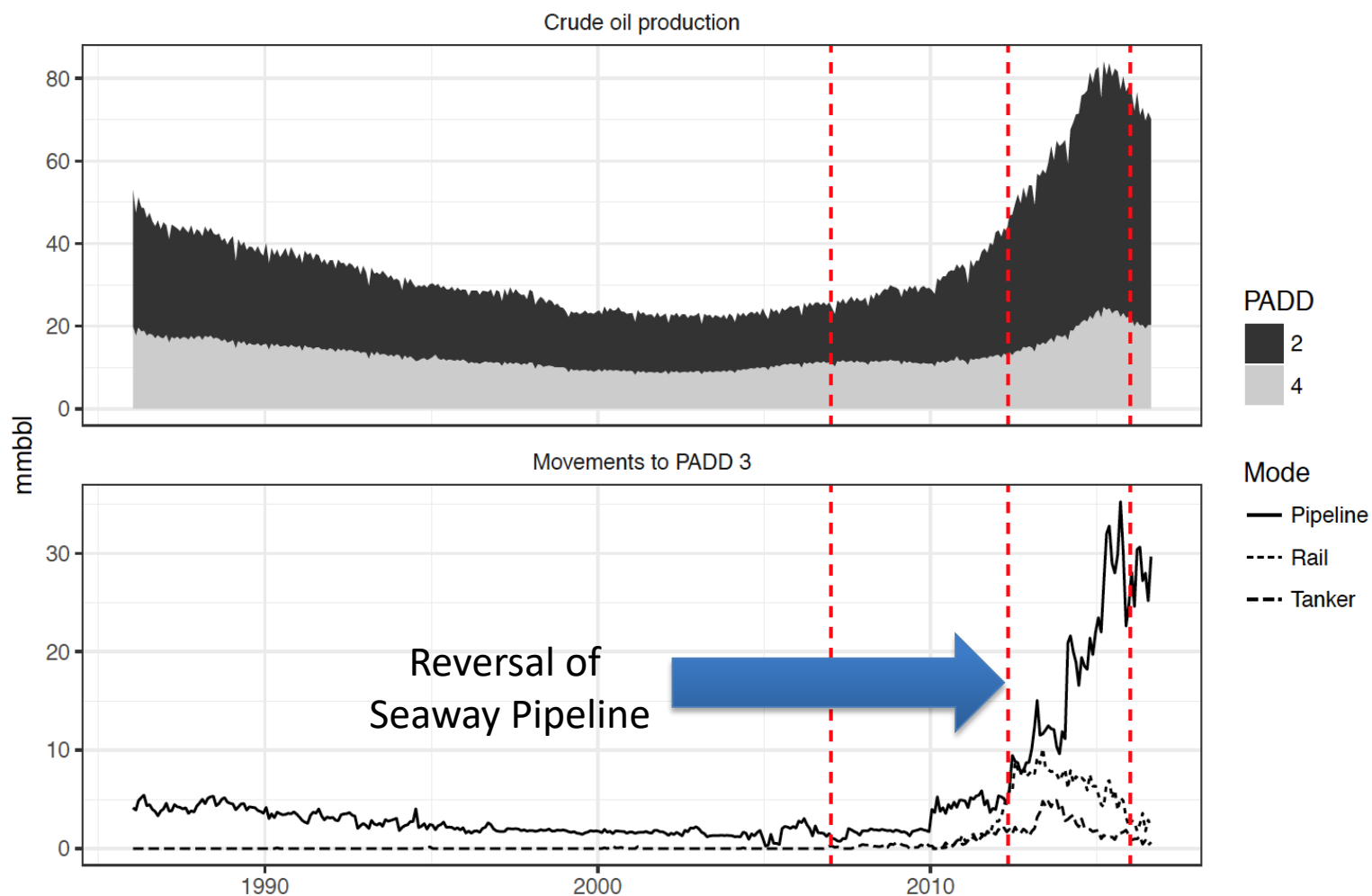


Price Differentials and Shipping Constraints



Lines at Jan 2007, May 2012, Jan 2016

Price Differentials and Shipping Constraints



Lines at Jan 2007, May 2012, Jan 2016

North American Natural Gas Pipeline Investments

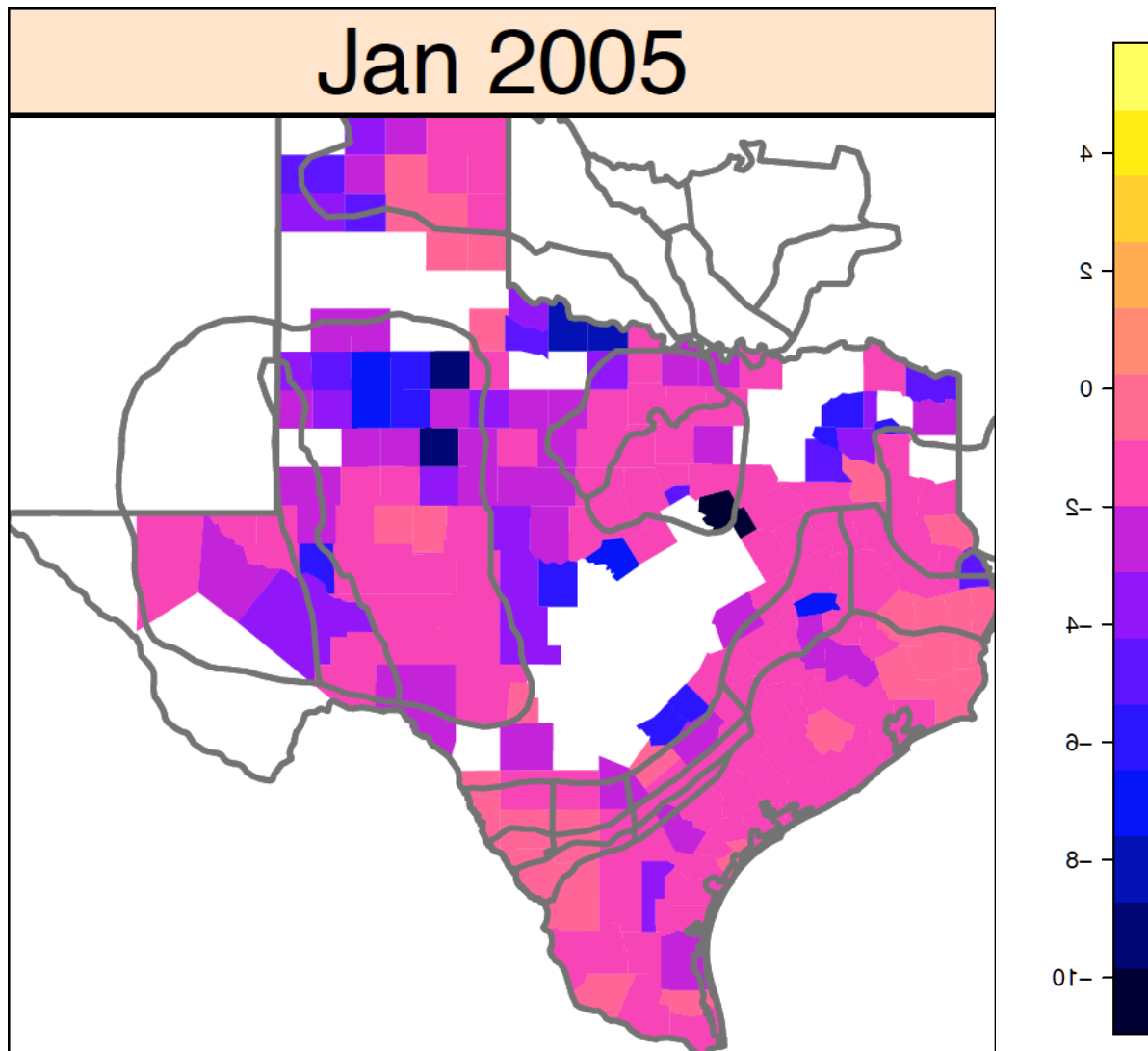
- Announced: 25
- Early Development: 33
- Advanced Development: 39
- Construction: 31
- Total: 128 projects

Project cost range from ~\$18M to \$5.2B.

Just for projects with listed costs (which is 59/128~46%), the total estimated cost is \$34B.

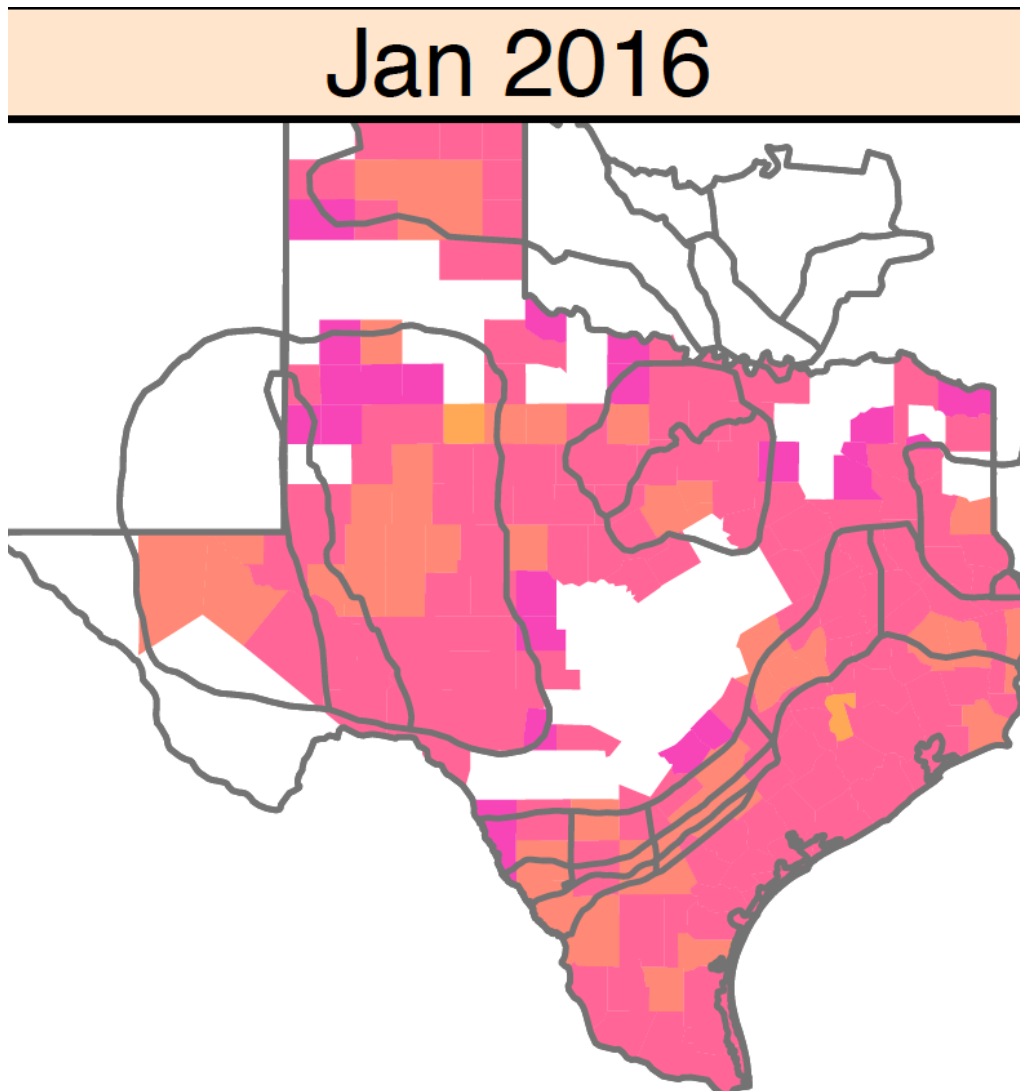
Natural Gas Price Premium to HH

During the peak of the natural gas boom, natural gas wellhead prices in west Texas were discounted heavily to Henry Hub.



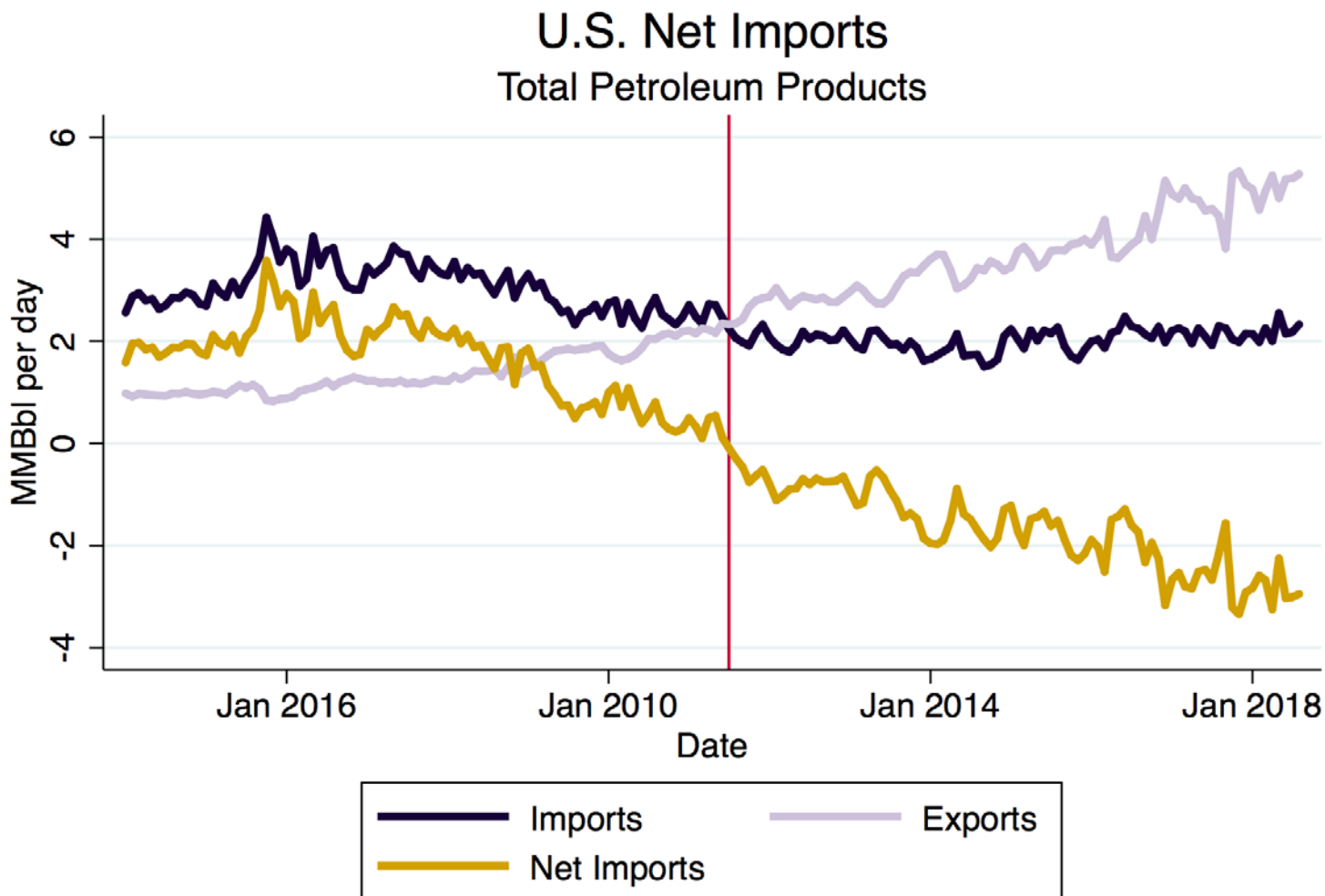
Natural Gas Price Premium to HH

Recently, well head price differentials have stabilized and most areas counties are experiencing wellhead prices similar to Henry Hub.



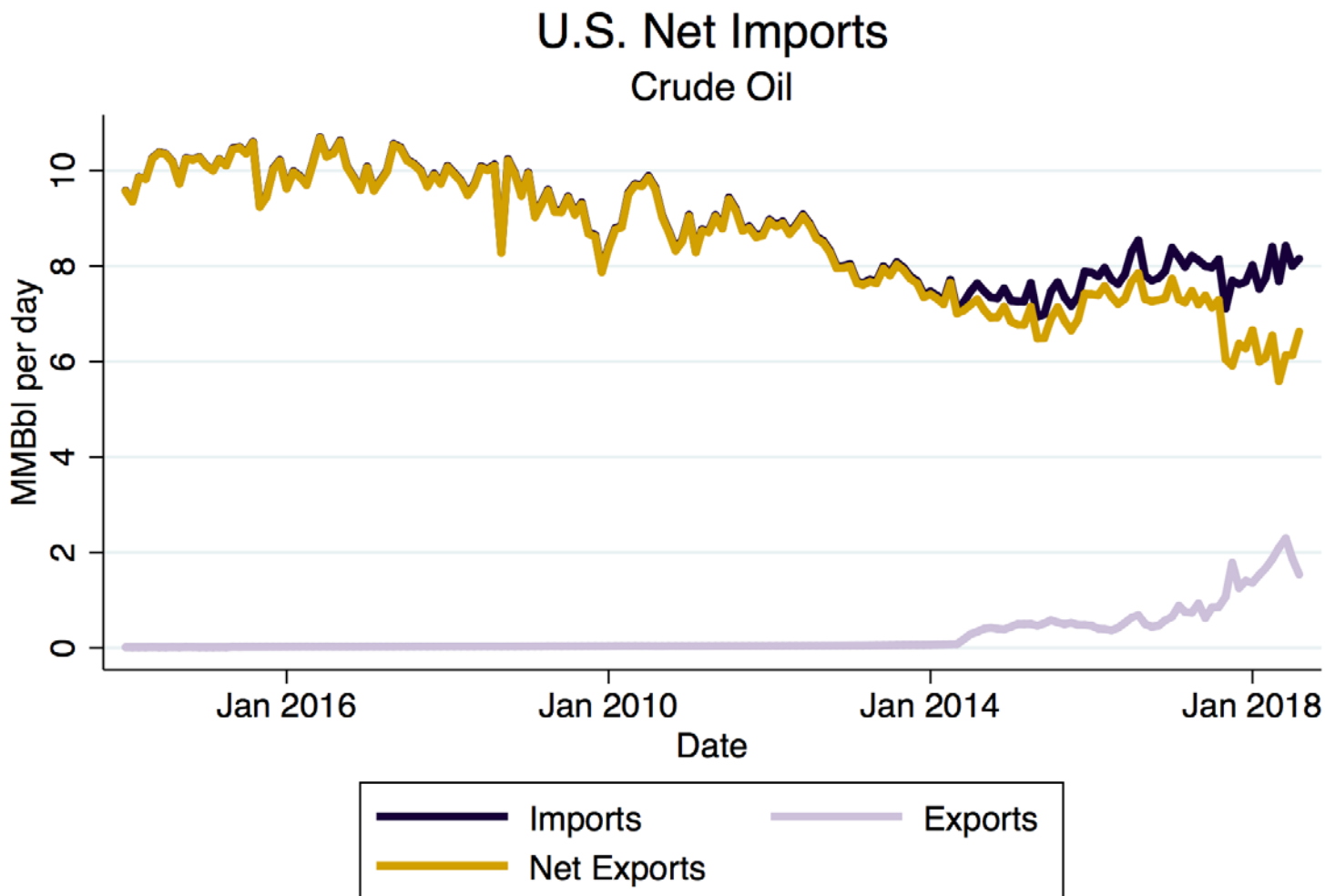
Export Economy

U.S. Net Imports



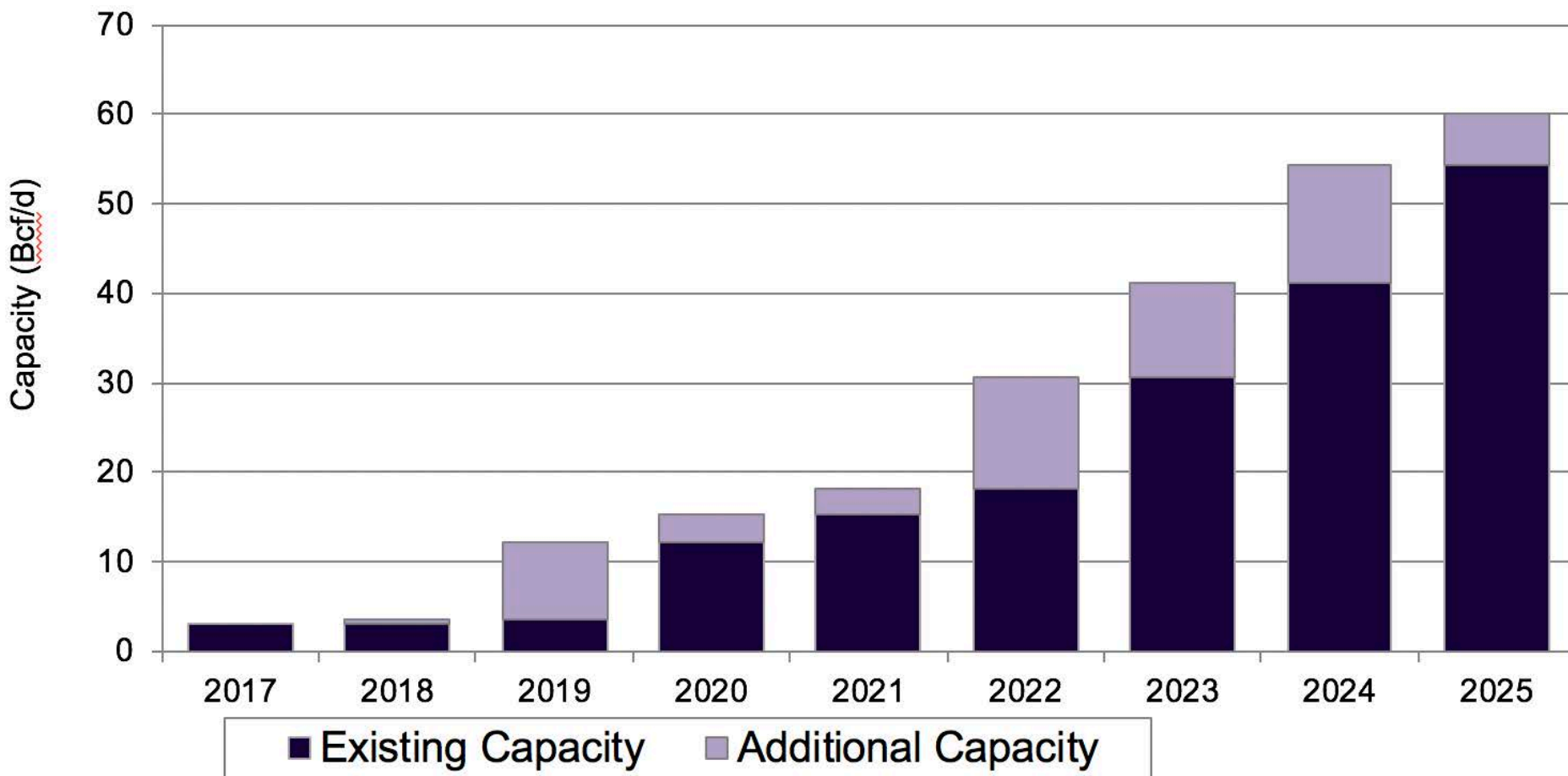
Source: Energy Information Administration, U.S. Department of Energy.

U.S. Net Imports



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

LNG Applications



Conclusions

Conclusions

- U.S. and Gulf Coast domestic **crude oil and natural gas** production should **continue to be strong**.
 - The nation and region will build upon existing productivity gains and higher overall prices will continue to facilitate more drilling activity.
 - This **drilling activity** may start to **diversify**, in terms of location, over the upcoming few years, but not enough to knock the Permian basin off its perch as being the premier U.S. unconventional basin.
- The **price outlook** (crude oil, natural gas) is a little **more complicated** than last year.
 - Last year the main question was the resilience of shale production to the price drop.
 - But now, we have seen crude prices rise with natural gas prices remaining steady.
 - Futures models predict that **crude prices will decline**, but **not back in tandem** with natural gas.

Conclusions

- The 2019 GCEO **petrochemical industry outlook is flat.**
 - The capacity utilization outlook for existing and recent investments will likely not increase in any measurable fashion given a number of global headwinds that include: (a) a slow-down in Asian demand; (b) increased dollar valuations; and (c) continued trade policy uncertainties.
 - The GCEO does not anticipate any chemical industry or LNG project cancellations, but it is not implausible to see that many **currently-announced projects move out** their anticipated project commercial **operation dates** in order to account for the current global market and geo-political uncertainties.
- The 2019 GCEO sees a **continued positive, yet limited growth outlook for U.S. refining.** Refineries will benefit from continued growth of U.S. crude oil supplies and the geographic diversity of those supplies. The sector will also benefit from continued pipeline infrastructure moving into and within the region.

Conclusions

- Thus, on an overall basis, the GCEO anticipates, on average, that the region will **build upon its economic gains of the last year**, although those gains will likely be slower due to concerns about economic growth and several geopolitical tensions that create uncertainties that are not conducive for capital formation and growth in this industry.
 - Also, there is trepidation about the **late cycle stimulus** and the **potential for a correction** in coming years.
- The region will continue to become a more integrated part of the overall world energy market and will likely place itself in a favorable position for future growth once some of these uncertainties start to evaporate.

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