



2020 Gulf Coast Energy Outlook.

Professional Landman's Association of New Orleans (PLANO) and the New Orleans Geological Society (NOGS) Luncheon, New Orleans, LA, December 5, 2019.

David E. Dismukes, Ph.D.
Center for Energy Studies
Louisiana State University

Gulf Coast Energy Outlook



Platinum



Gold



Silver



Bronze



Contributor



Takeaways....Opportunities and challenges.

- **Continued opportunities** for regional capital formation, resource development and investment at all aspects of the energy value chain.
- Large number of headwinds that are **creating uncertainty that is chilling economic activity** and could result in **substantial unanticipated negative outcomes for the energy sector**.

UNCERTAINTIES FOR UPSTREAM ACTIVITY

- Current supply/demand balance and prices.
- Capital structure/finance.
- Drilling/price/output relationships

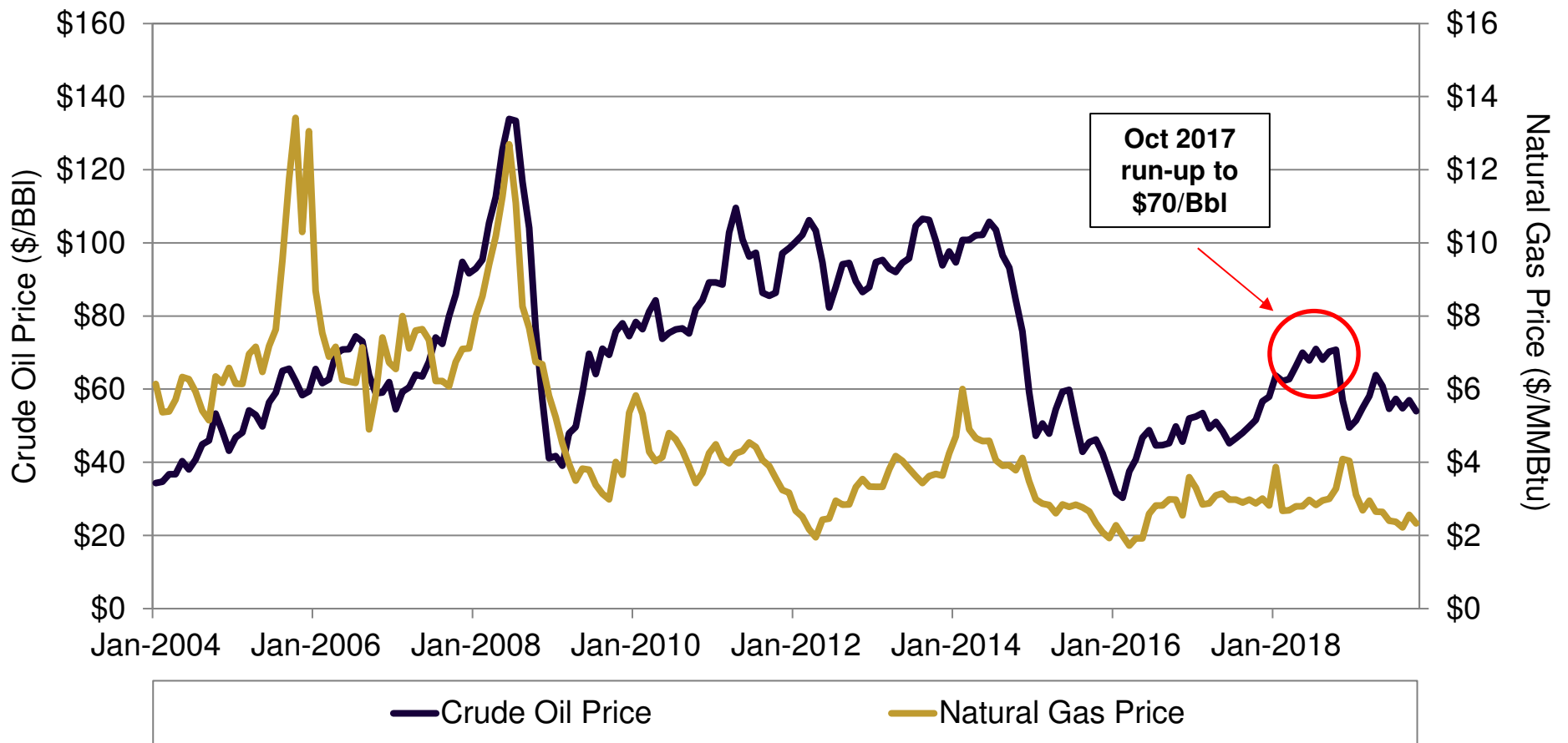
UNCERTAINTIES FOR REFINING, PROCESSING AND EXPORT

- Trade disputes and economic growth.
- Exchange rates (U.S. monetary policy)
- Geopolitical issues
 - Iran instability and nuclear treaty
 - Saudi attacks and retaliation.
 - Hong Kong
 - Latin America

Upstream trends

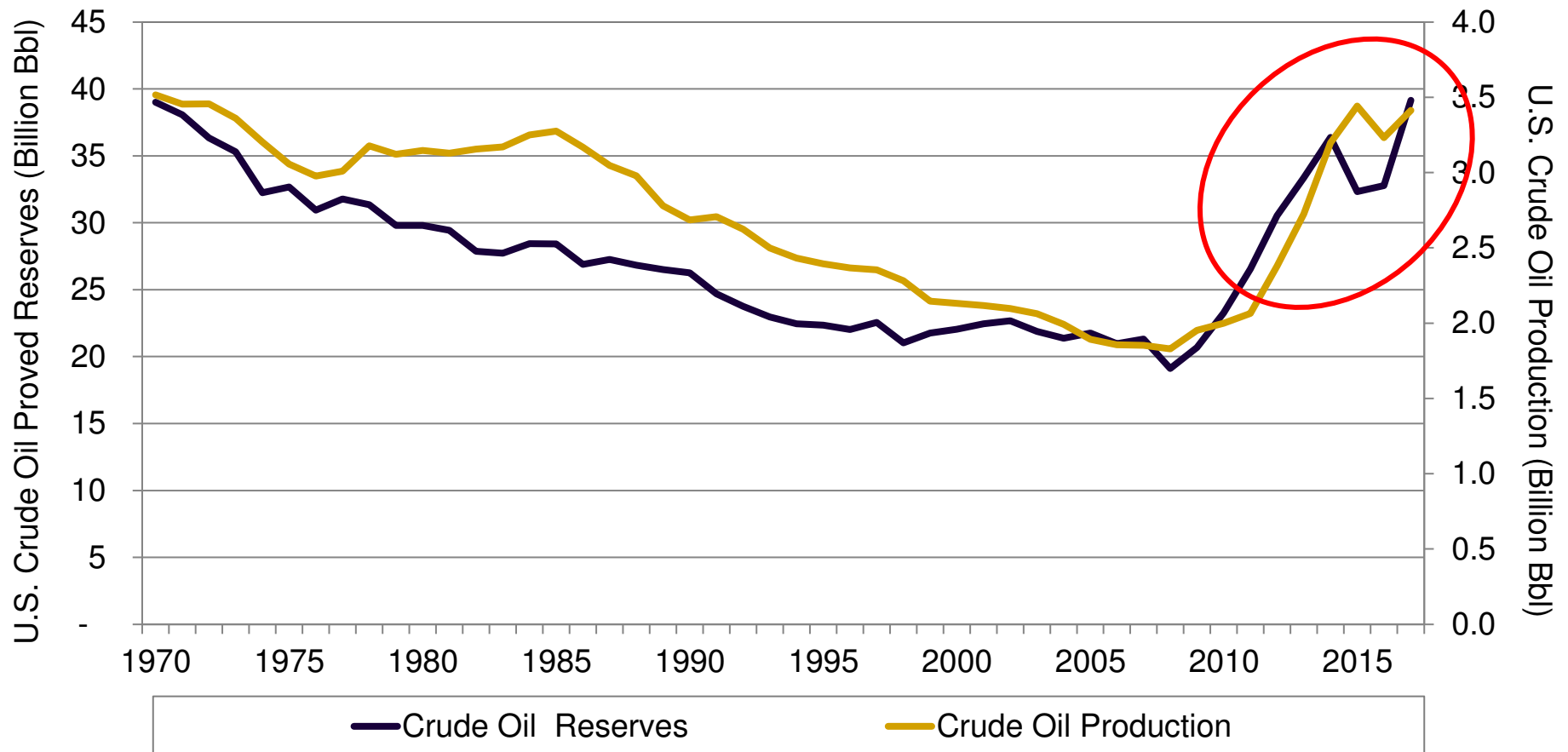
Natural gas and crude oil prices

Prices are starting to encroach on their 2014-2015 lows despite brief run up from summer 2017 to October 2018.



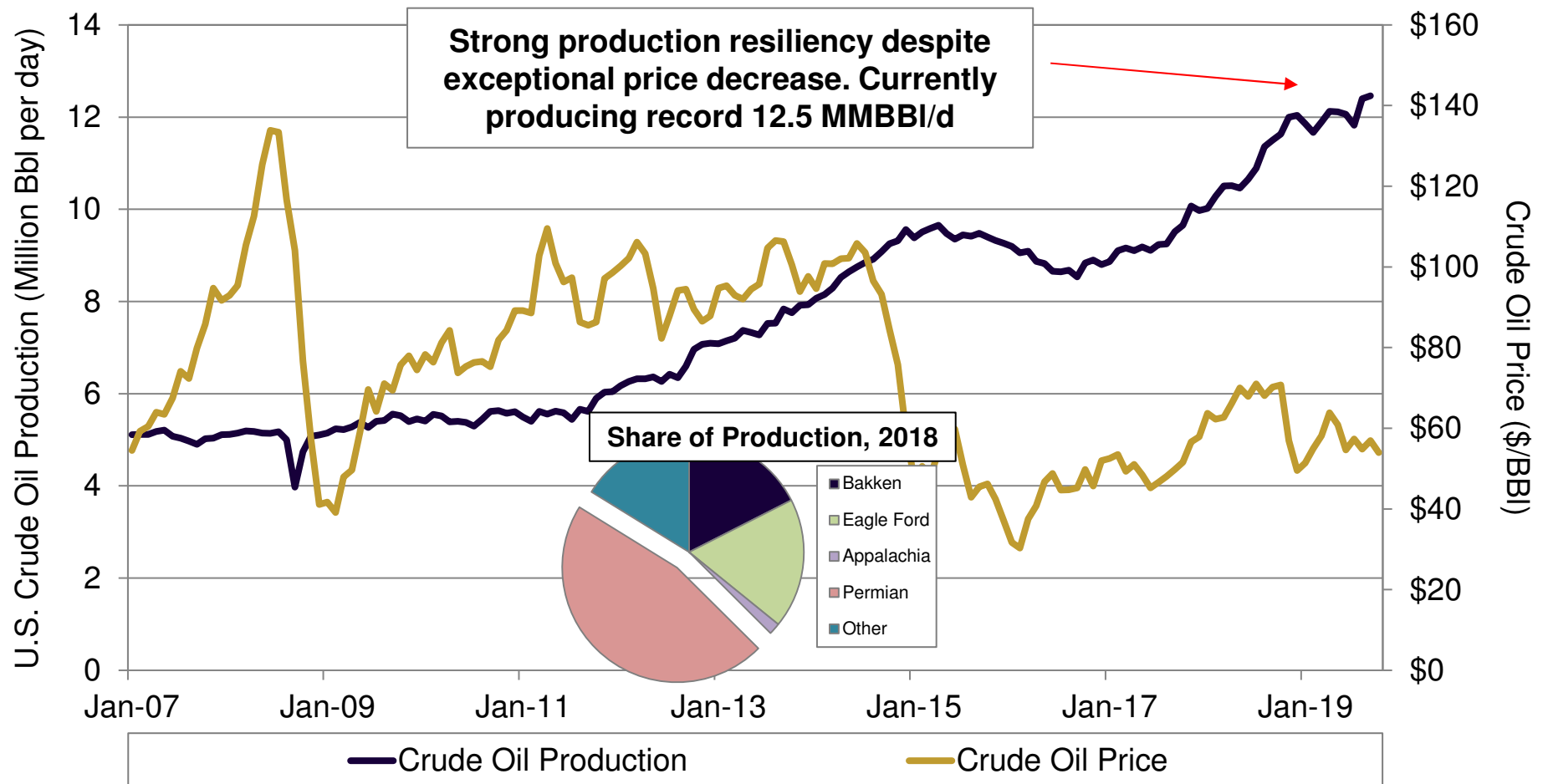
Changes in crude oil reserves and production

Crude oil production and reserves are climbing back to levels **not seen since the early 1980s (reserves)**. Creates **new domestic resource opportunities** for U.S. refineries.



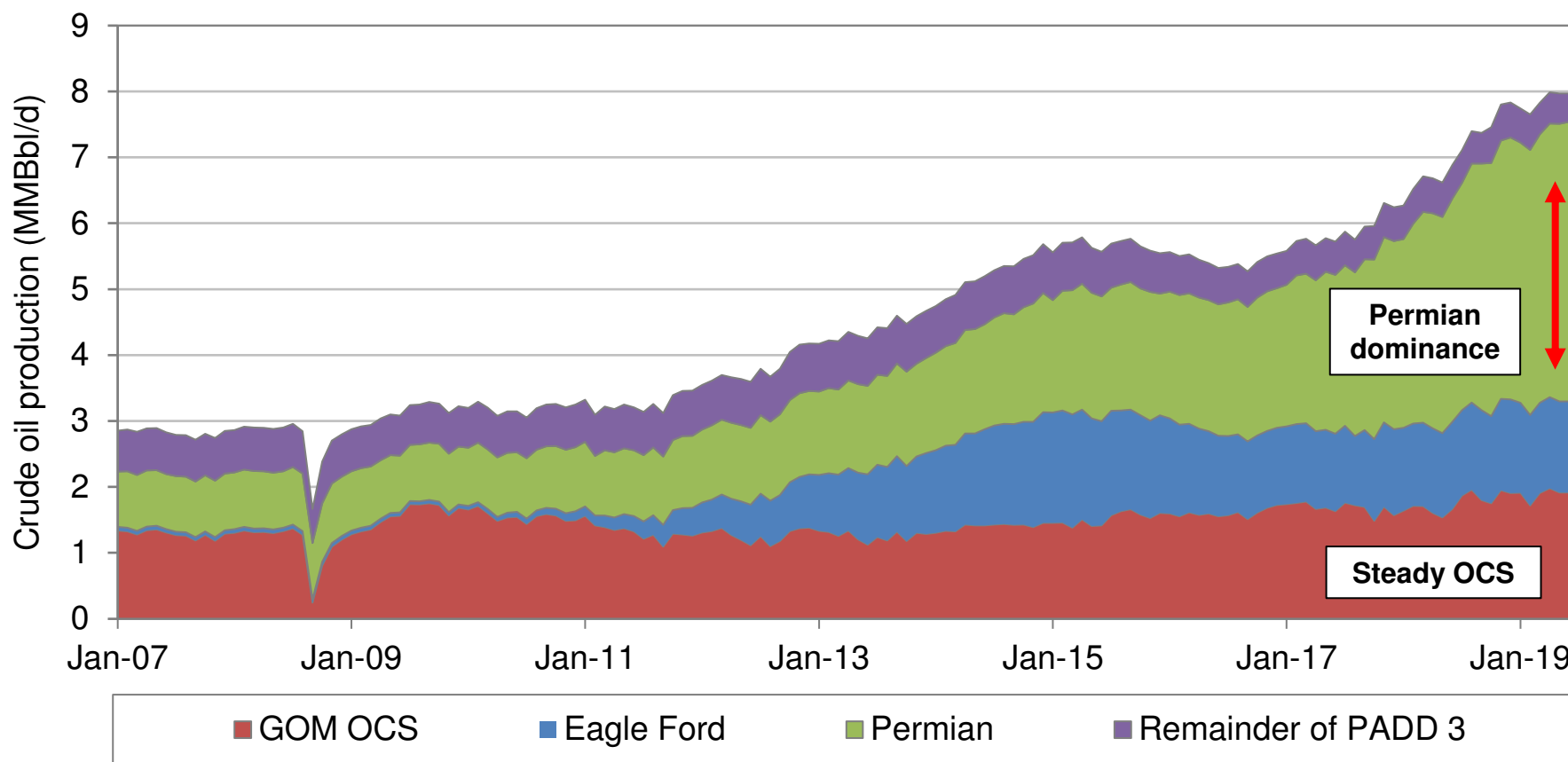
Monthly U.S. crude oil production.

U.S. crude oil production volumes are up by **over 100 percent** relative to historic trends.



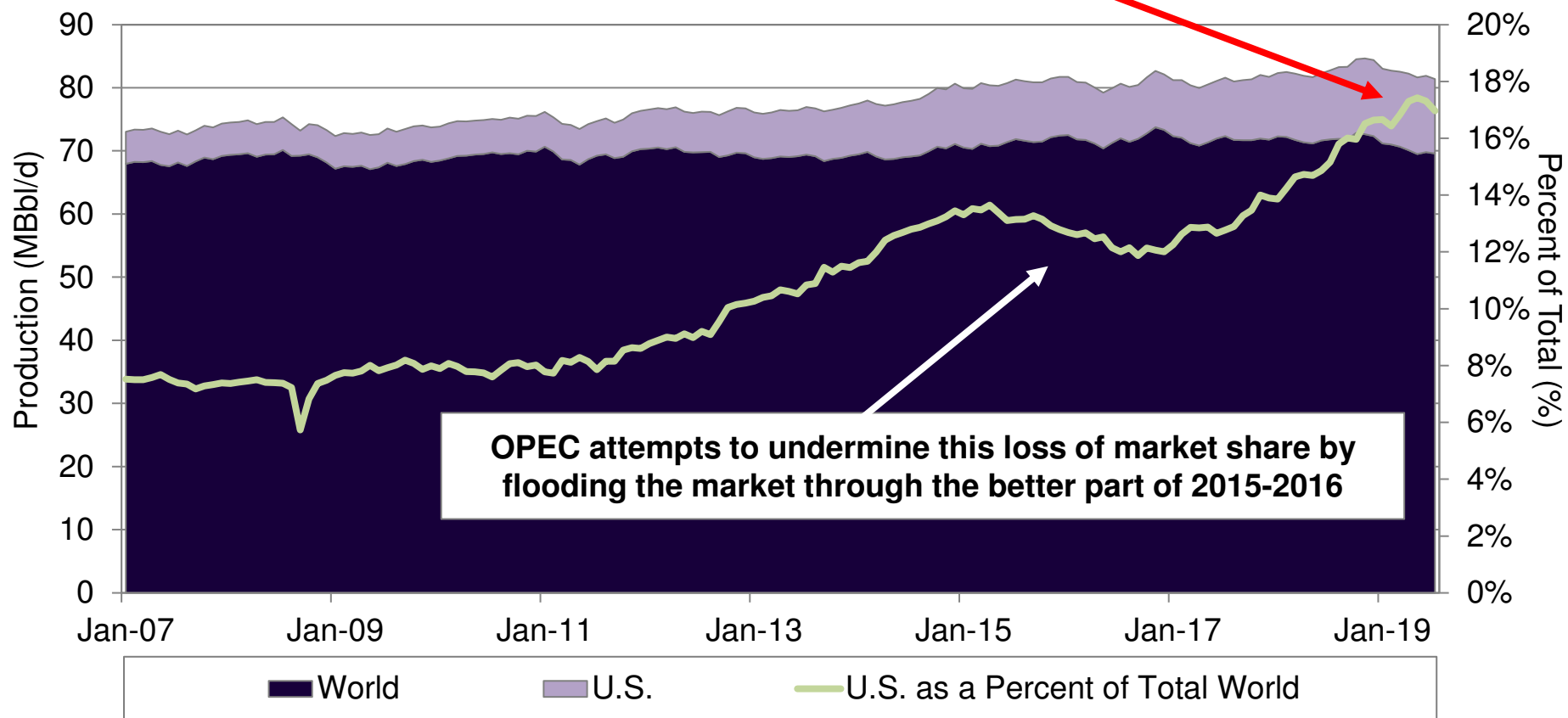
Regional crude oil production by major area/play

The **Permian has dominated** regional crude oil production in recent years at **4.2 MMBbl/d**. The **OCS** continues to be a regional workhorse at **1.9 MMBbl/d**. Eagle Ford follows closely behind at 1.3 MMBbl/d.



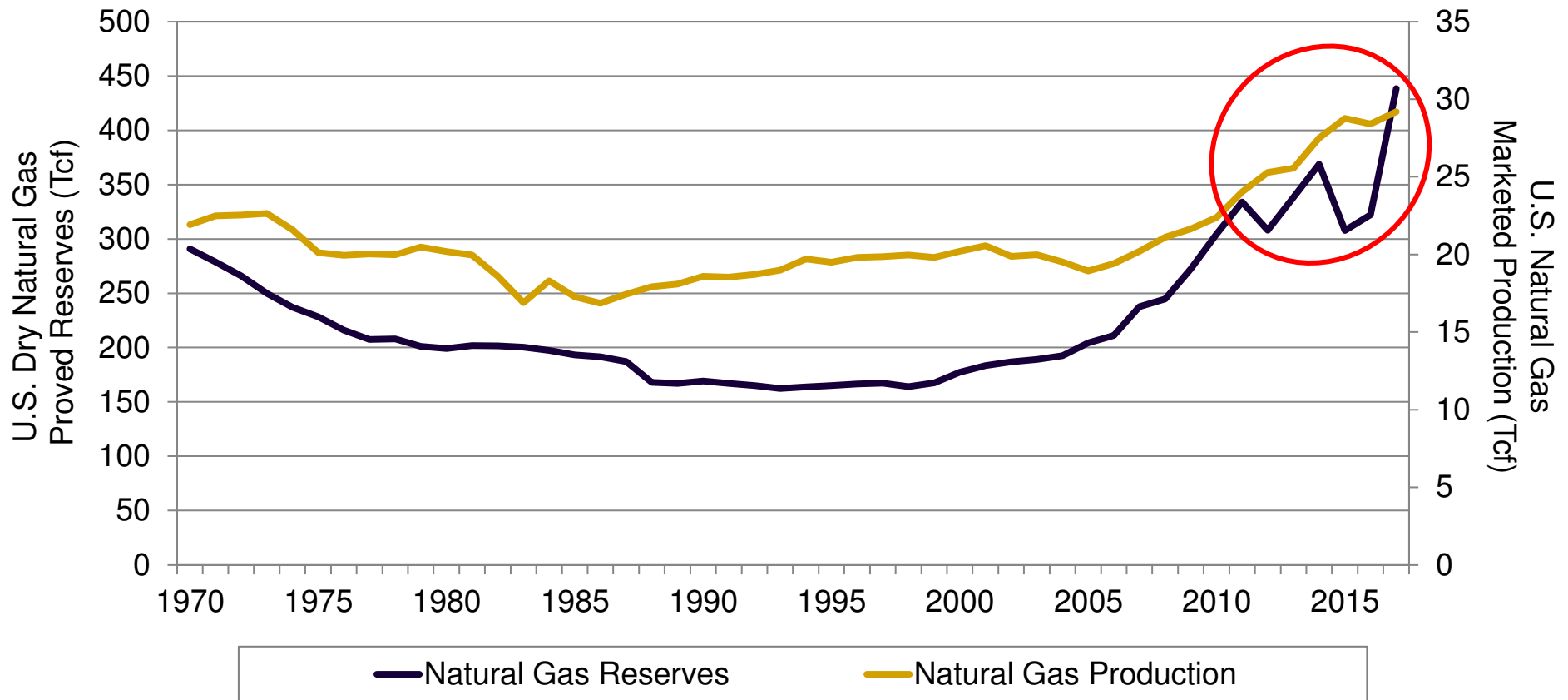
Monthly global and U.S. crude oil production.

U.S. share of world crude oil production has increased **from seven percent to around 17 percent.**



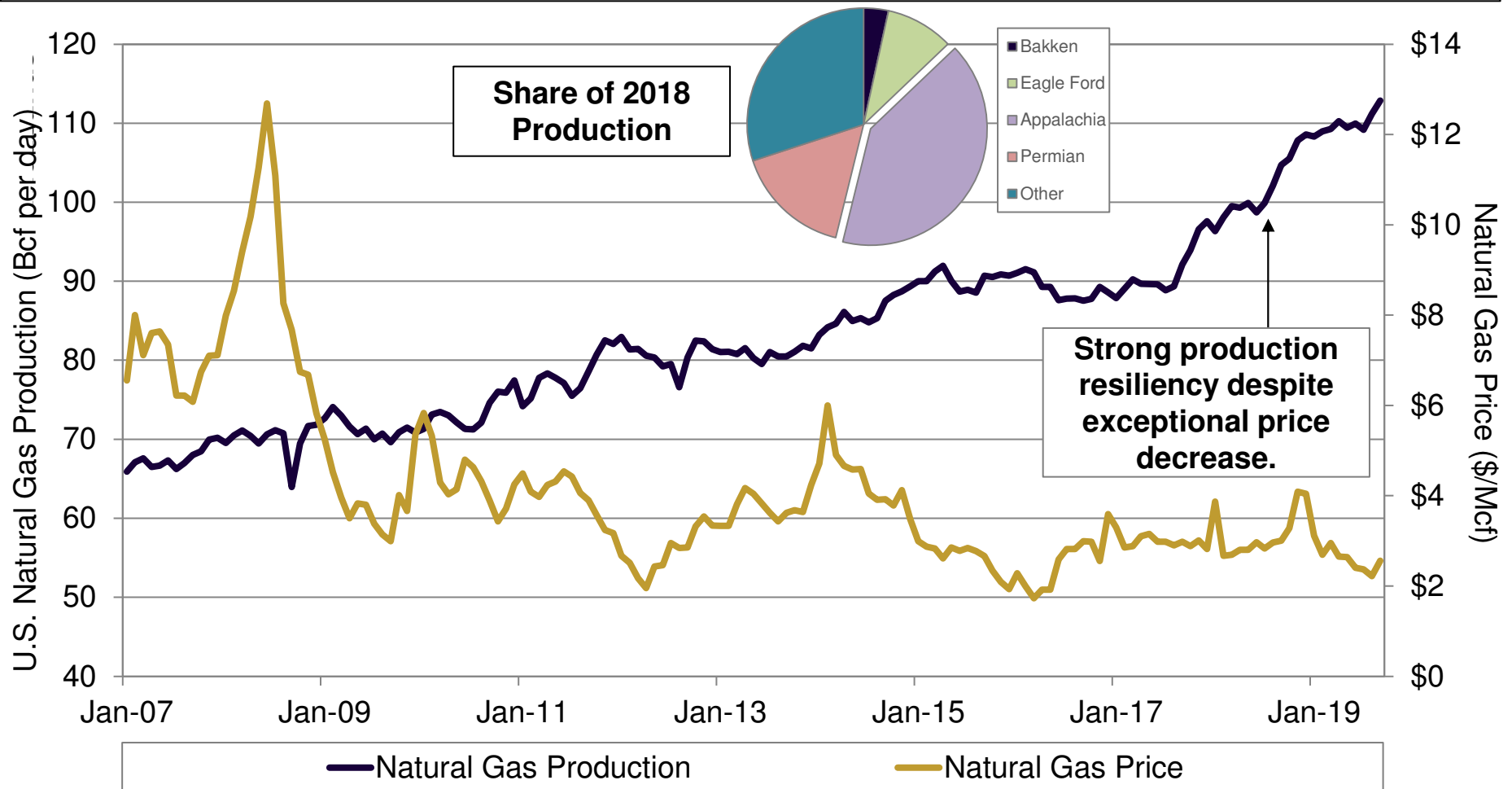
Changes in production and reserves.

Natural gas production and reserves surpass prior levels and are now at an **all-time recorded peak**.



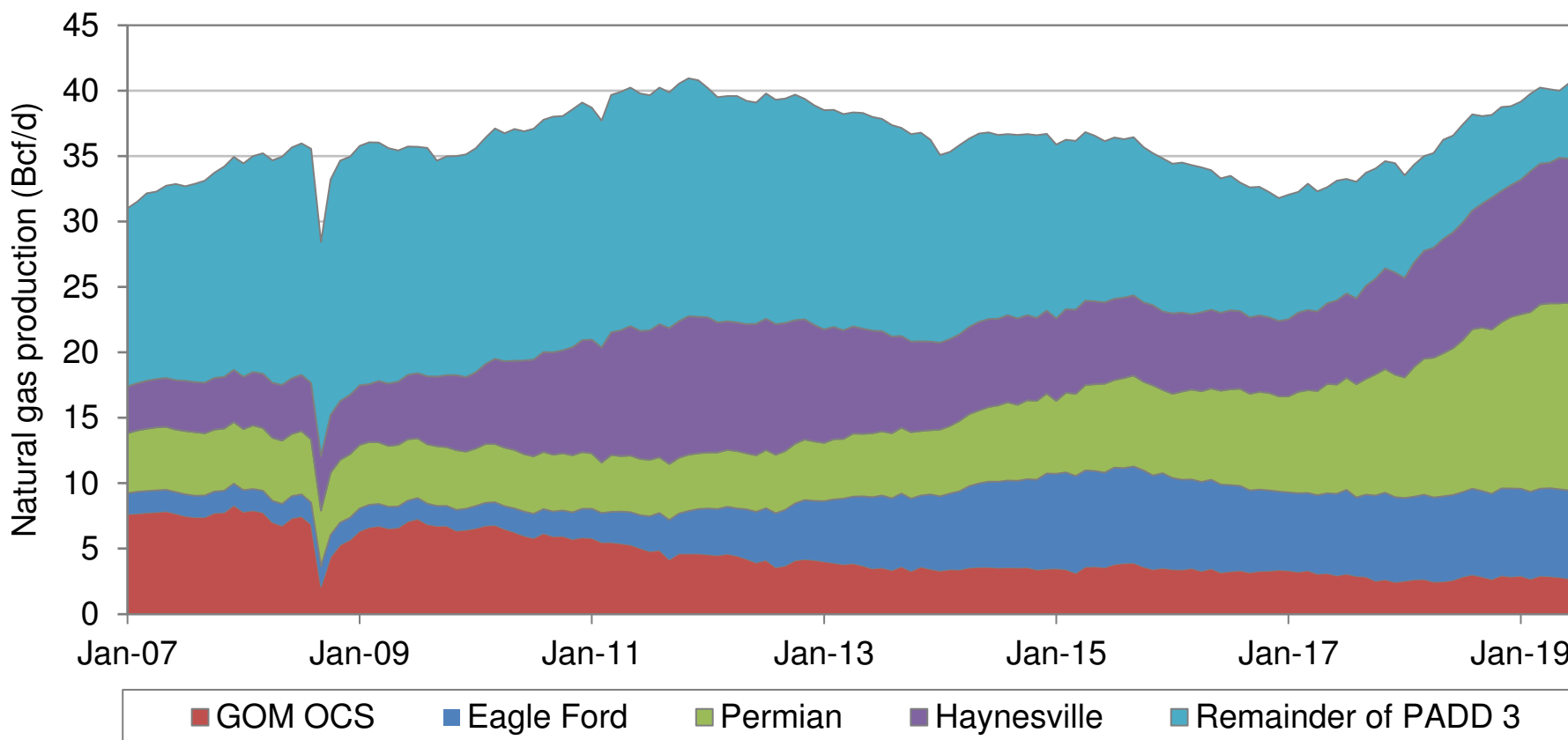
Monthly U.S. natural gas production.

U.S. natural gas production has increased **62 percent** in the last decade.
Production driven by Appalachia plays.



Regional natural gas production by major area/play.

Regional natural gas production has reached **record levels** with 2019 production on course to be the highest producing year in history at close to **45 Bcf/d**. This accounts for about **40 percent of total U.S. production**.



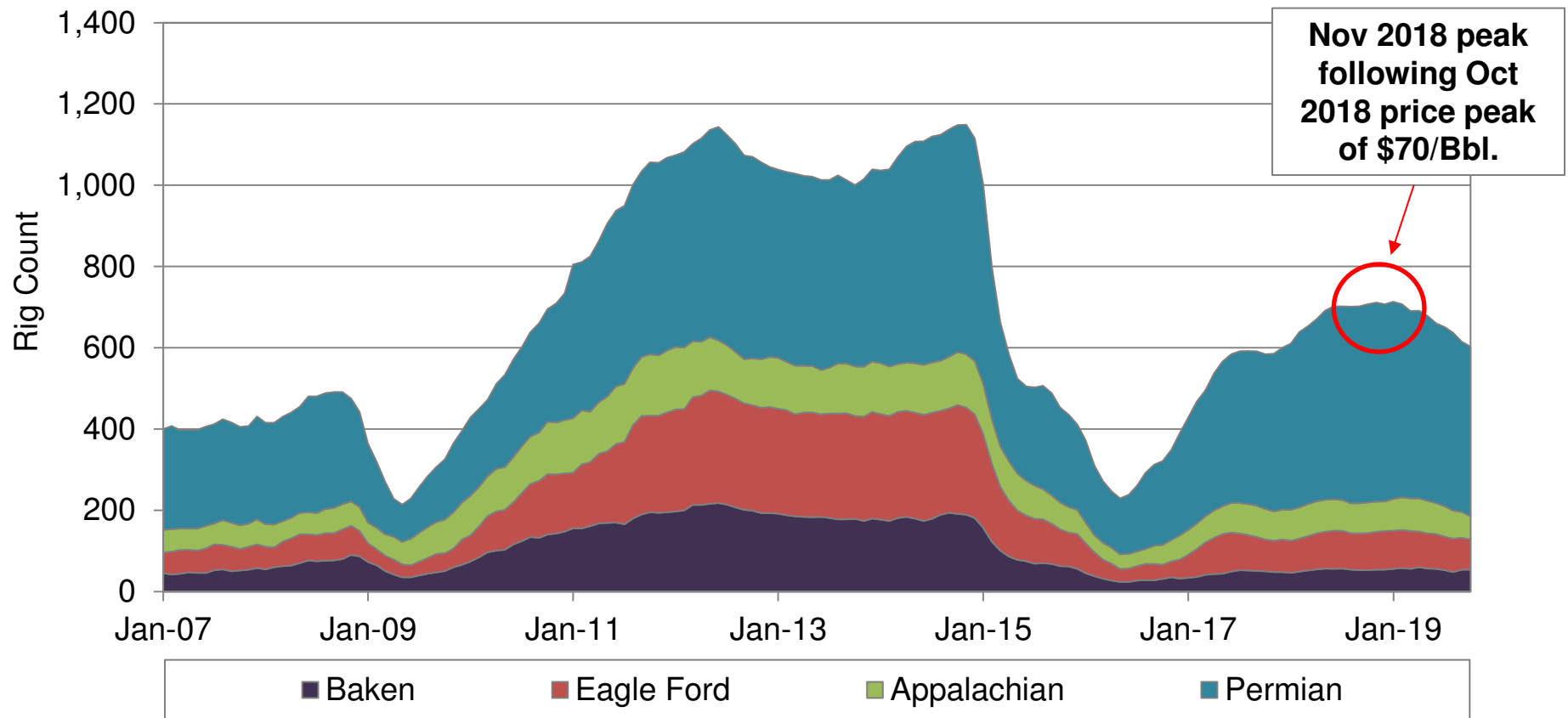
Note: Alabama and Mississippi are included in Remainder of PADD 3 however production estimates are only available through 2017. Values for 2018 and 2019 are estimated using average monthly trends from 2017.

Source: U.S. Energy Information Administration.

Upstream challenges

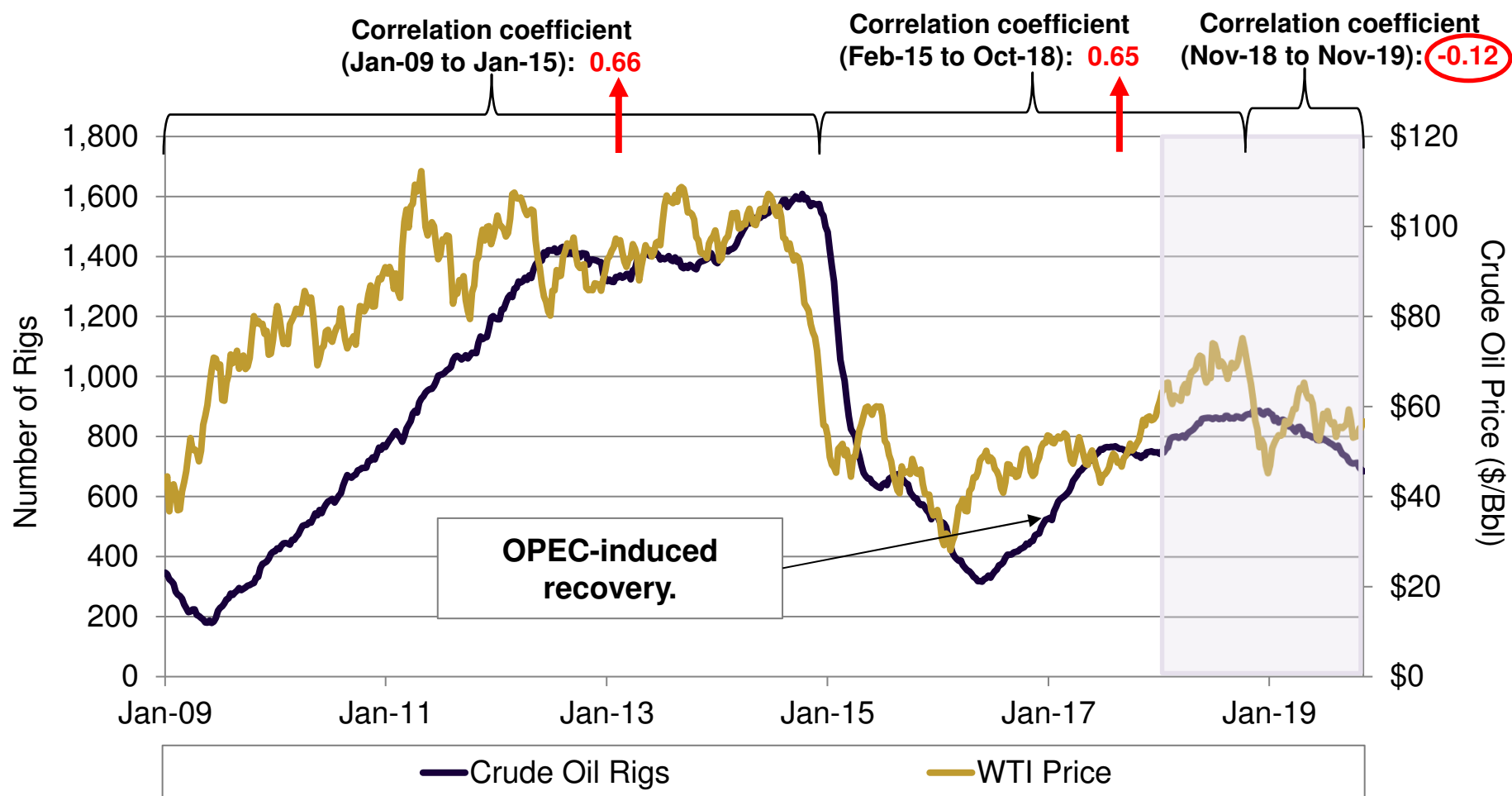
Monthly U.S. horizontal drilling rig activity (per major basin).

Rig activity up since 2015 (400 percent). **Currently 15 percent lower than Nov 2018 peak, highly dominated by Permian.**



U.S. crude oil prices and rig count.

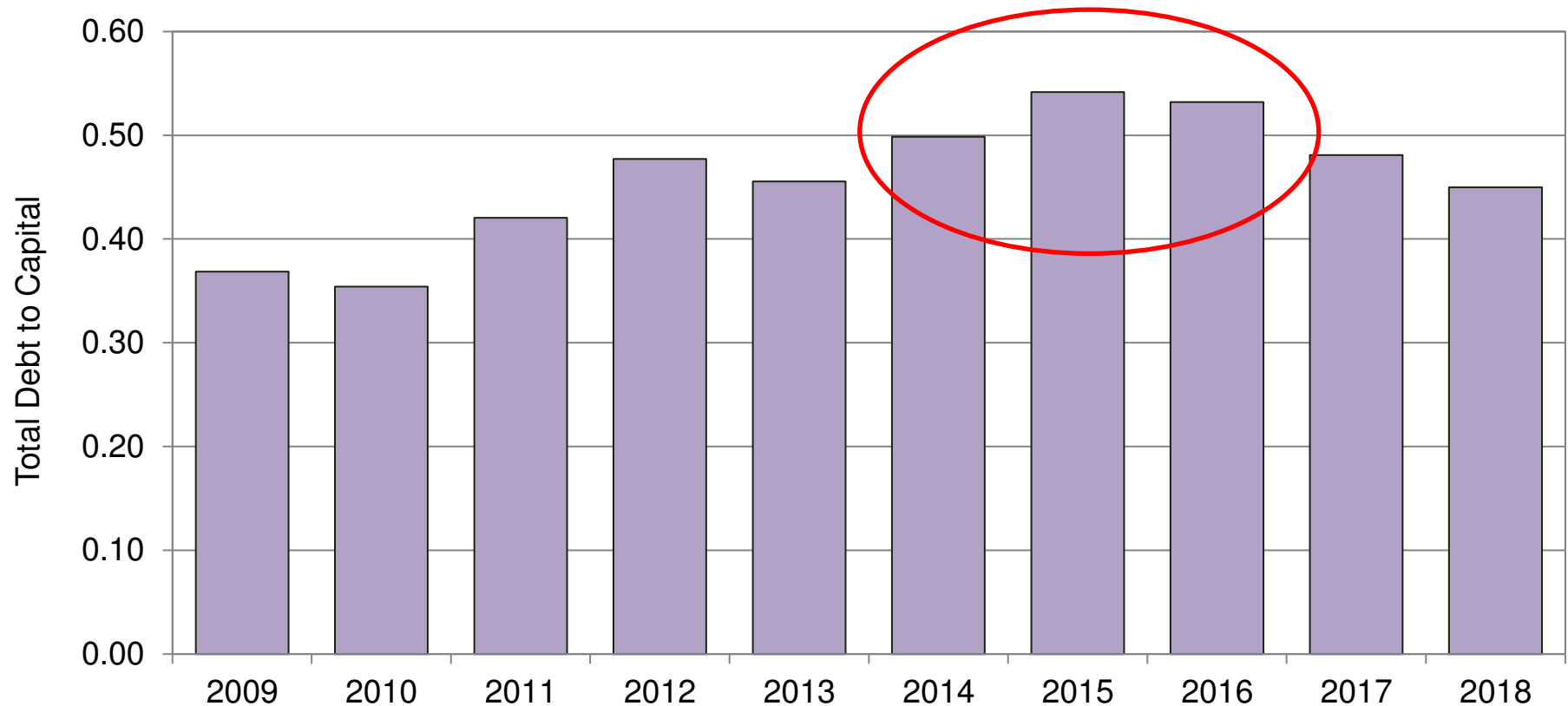
Price/rig price responsiveness is weakening considerably since mid-year 2017 (shaded area).



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

S&P Oil & Gas E&P Select Industry Index, total debt to capital.

Independent oil and gas sector debt shares after the 2014 oil price crash.
Improvement occurring, but slow.



Source: S&P Global Capital IQ.

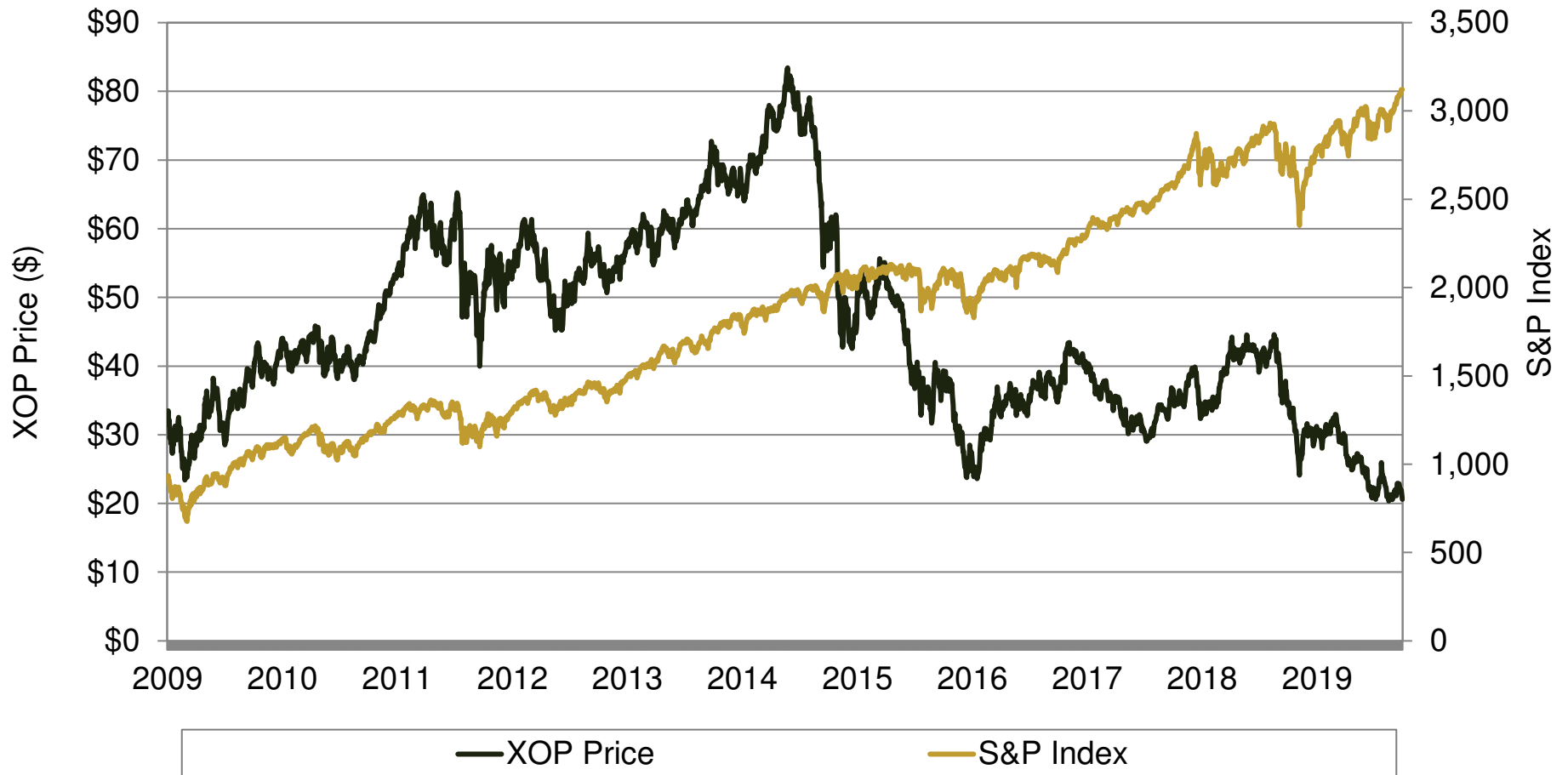
Select independent E&P company debt shares.

Several individual E&P companies have **far worse balance sheets** than the S&P composite index.

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Debt Share (%)									
Chesapeake Energy Corporation	50.3%	45.8%	37.7%	41.9%	41.8%	38.9%	81.7%	113.0%	103.9%	94.3%
Comstock Resources, Inc.	30.6%	32.5%	53.6%	58.7%	45.6%	54.9%	115.9%	135.1%	149.8%	68.6%
Continental Resources, Inc.	33.7%	43.4%	35.2%	52.8%	54.4%	54.4%	60.4%	60.5%	55.3%	47.3%
Devon Energy Corporation	31.9%	22.6%	31.3%	35.4%	37.0%	30.0%	54.3%	44.5%	32.9%	39.3%
EOG Resources, Inc.	21.9%	33.8%	28.4%	32.2%	27.7%	25.0%	34.0%	33.3%	28.2%	23.9%
Pioneer Natural Resources Company	43.1%	38.1%	31.1%	38.9%	28.7%	23.6%	30.4%	23.6%	19.5%	15.9%
QEP Resources, Inc.	33.1%	33.3%	33.4%	49.2%	43.6%	35.2%	35.7%	36.6%	36.3%	47.7%
Range Resources Corporation	41.8%	46.9%	45.2%	55.0%	56.5%	46.7%	49.0%	41.1%	41.6%	48.6%
Average	35.8%	37.0%	37.0%	45.5%	41.9%	38.6%	57.7%	61.0%	58.4%	48.2%

XOP share price (S&P oil & gas exploration & production select industry index).

Financial challenges are clearly obvious in these companies' **poor relative share price performance** dating back to the price crash of 2014.



OPEC crude oil production adjustments.

OPEC and its partners have pledged to trim **1.2 MMBbl/d**. OPEC compliance is inconsistent (highlighted rows are over-producers).

Country	Reference Output	Pledged Cut	Output Target	October 2019	Difference
Algeria	1,057	- 32	1,025	1,019	- 6
Angola	1,528	- 47	1,481	1,356	- 125
Congo	325	- 10	315	325	10
Ecuador	531	- 16	515	448	- 67
Eq. Guinea	127	- 4	123	125	2
Gabon	187	- 6	181	207	26
Iraq	4,653	- 141	4,512	4,690	178
Kuwait	2,809	- 85	2,724	2,674	- 50
Nigeria	1,827	- 53	1,774	1,811	37
Saudi Arabia	10,633	- 322	10,311	9,890	- 421
U.A.E.	3,168	- 96	3,072	3,106	34
Total OPEC	26,845	- 812	26,033	25,651	- 382
Azerbaijan	797	- 20	777	718	- 59
Bahrain	227	- 5	222	211	- 11
Brunei	135	- 3	132	114	- 18
Kazakhstan	2,028	- 40	1,988	1,938	- 50
Malaysia	653	- 15	638	715	77
Mexico	2,017	- 40	1,977	1,949	- 28
Oman	995	- 25	970	978	8
Russia	11,747	- 230	11,517	11,562	45
South Sudan	132	- 3	129	153	24
Sudan	74	- 2	72	71	- 1
Total Non-OPEC	18,805	- 383	18,422	18,409	- 13
Total OPEC+	45,650	- 1,195	44,455	44,060	- 395

← Overproducing by as much as agreed cut.

← Overproducing by more than agreed cut.

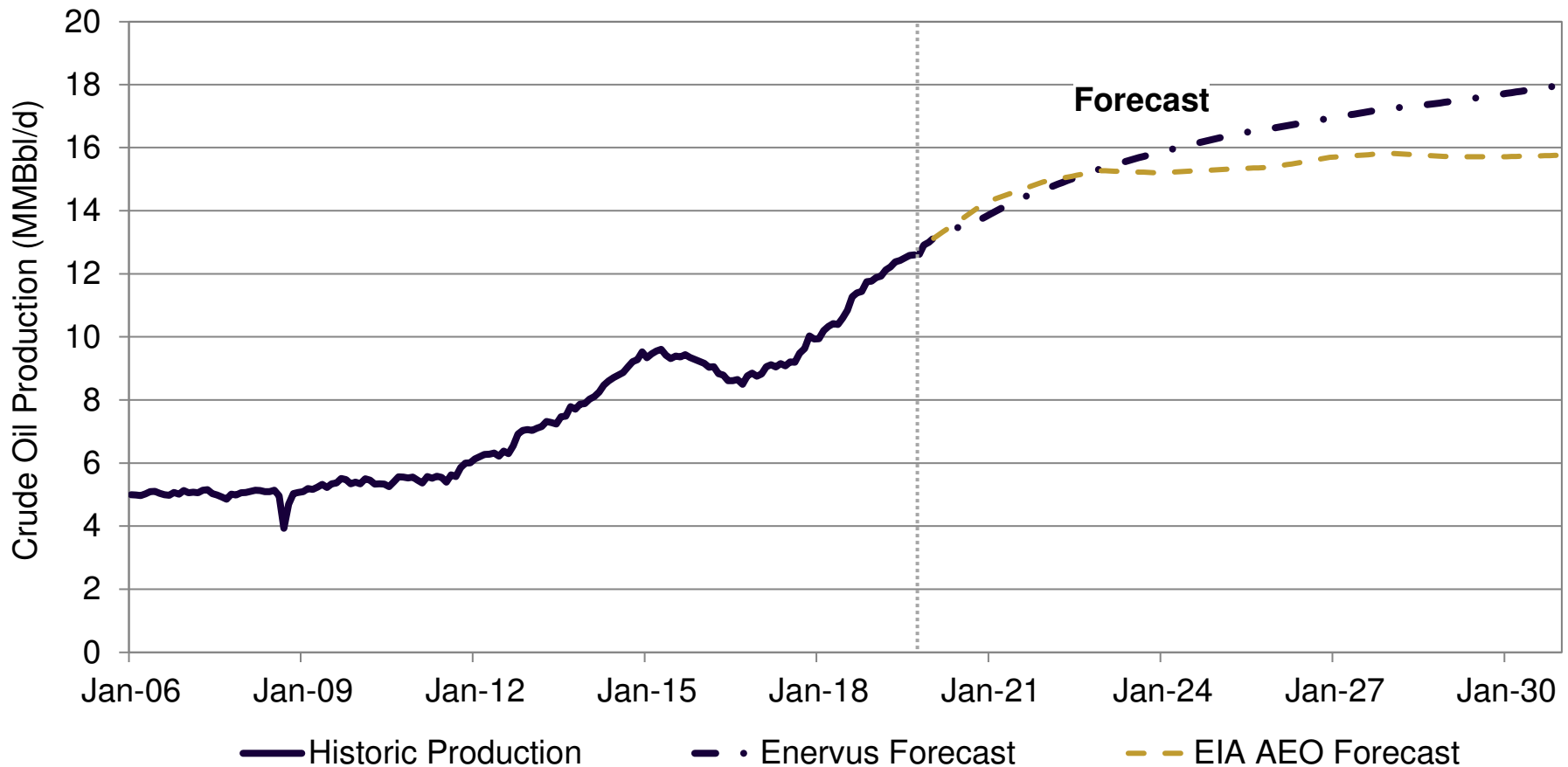
← Saudi is making up a substantial portion of the difference.

← Russia is close to compliance, but still over agreed cut.

Upstream outlook

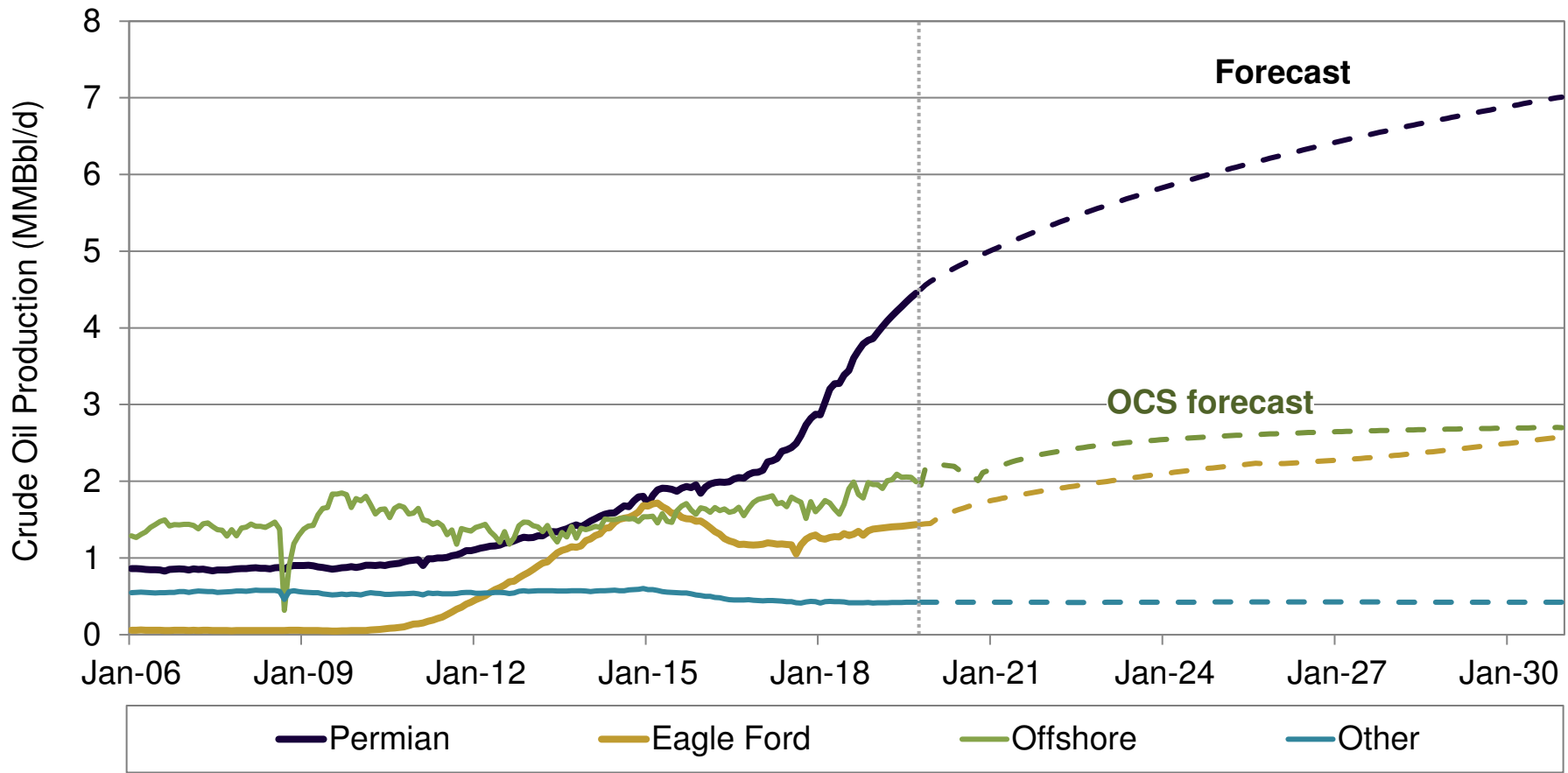
U.S. crude oil production forecast.

GCEO anticipates U.S. crude oil production will increase to 2030. Near term, GCEO is lower than EIA; longer term, GCEO is higher than EIA.



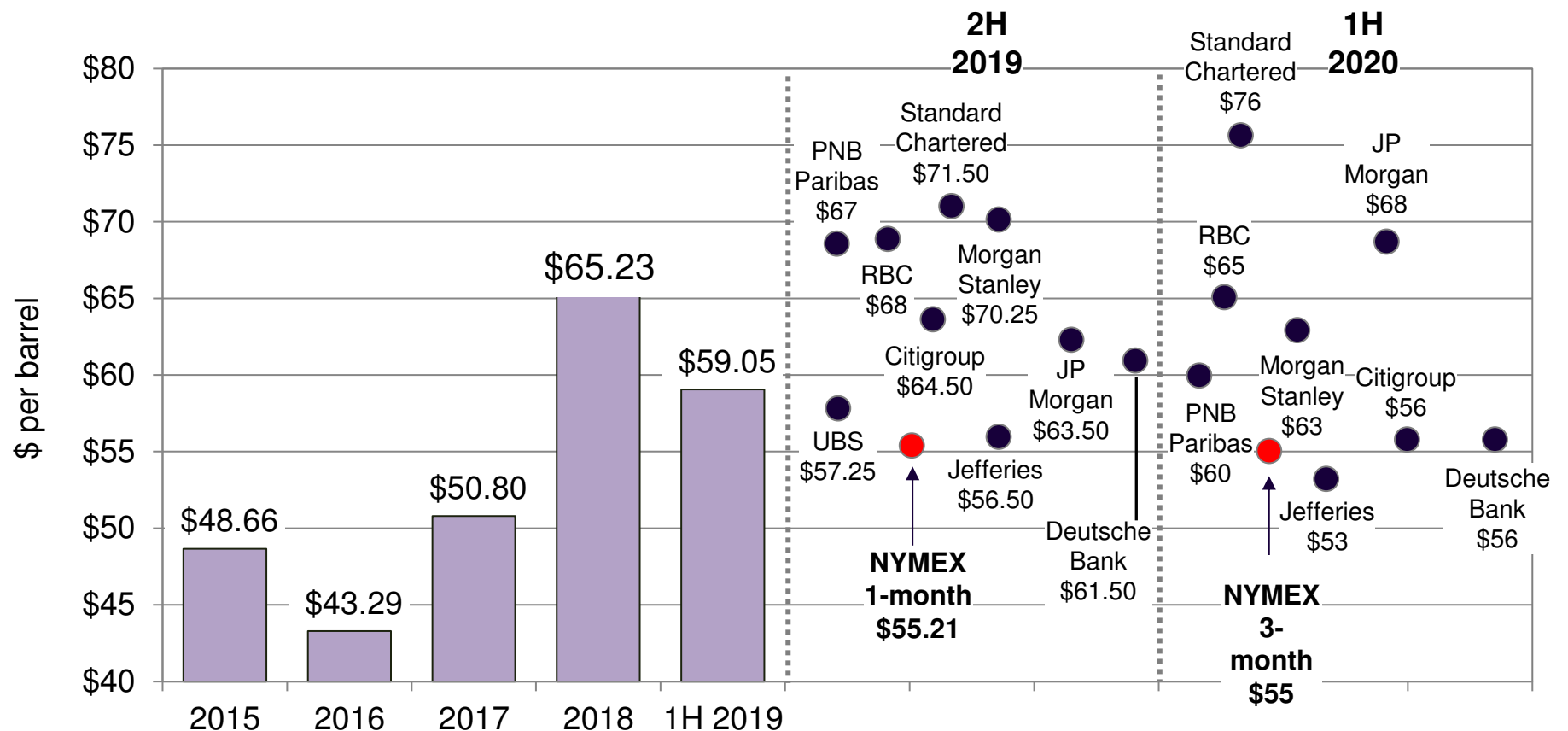
PADD 3 crude oil production forecast.

Regionally, **GCEO anticipates Permian will dominate** follows by continued consistent **OCS crude oil production slightly under 3 MMBbl/d.**



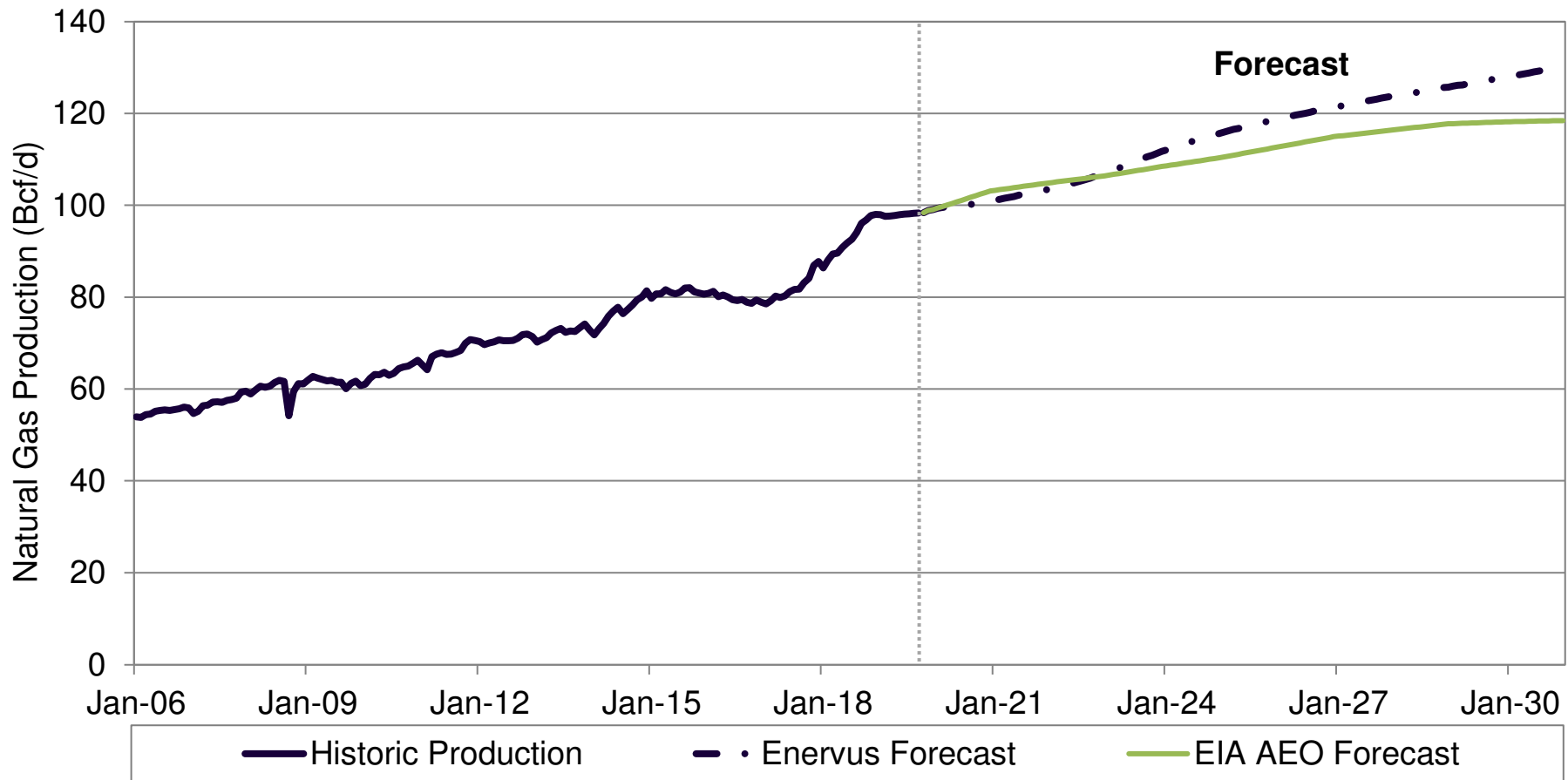
Crude oil price outlook (WSJ survey).

Most **crude oil price projections** for the second half of 2019 and first half of 2020 are between **\$52 and \$75 per barrel**.



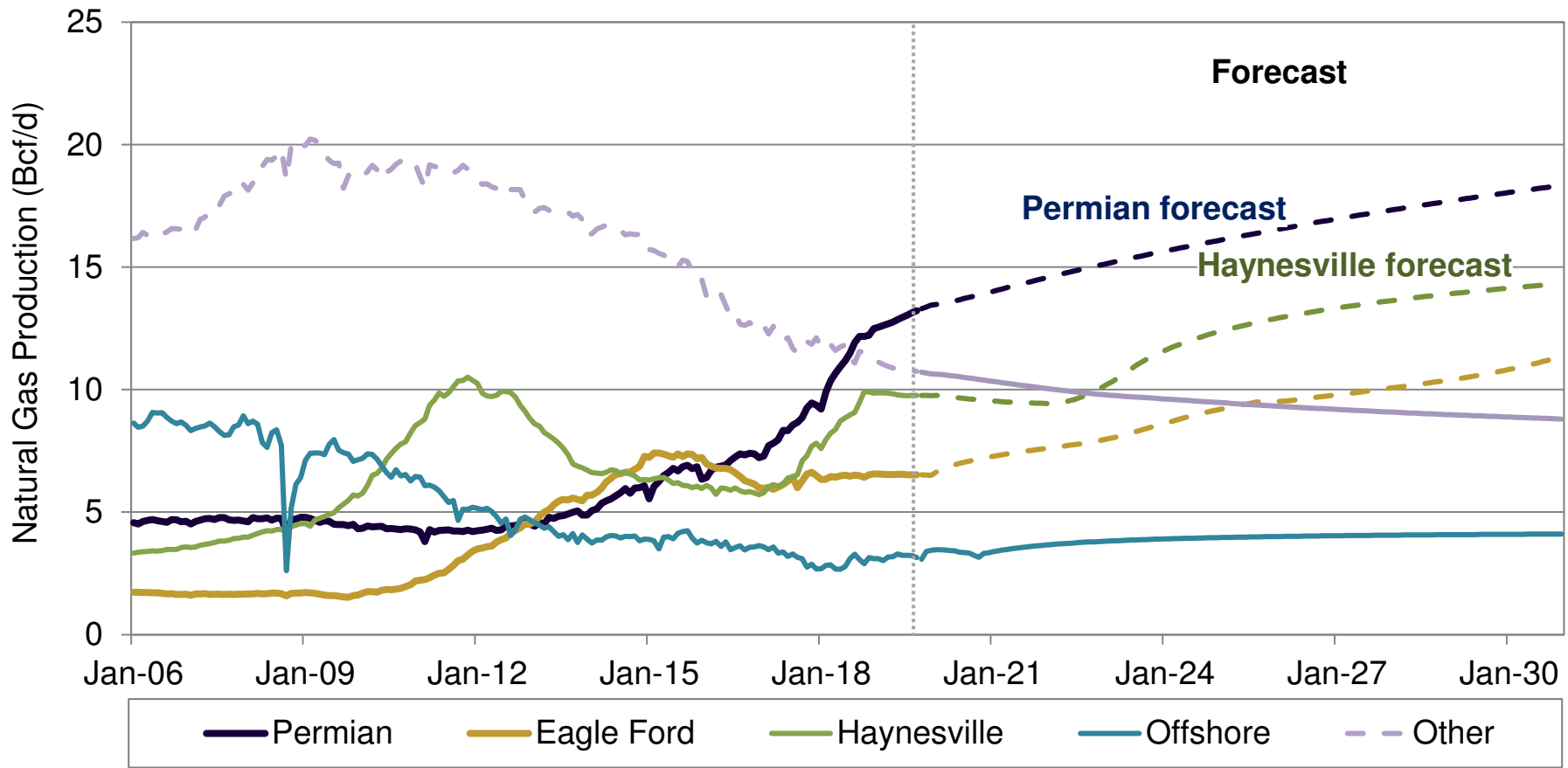
U.S. natural gas production forecast.

GCEO anticipates continued **growth of natural gas supplies** moving **past 100 Bcf/d** (36.5 TCF market).



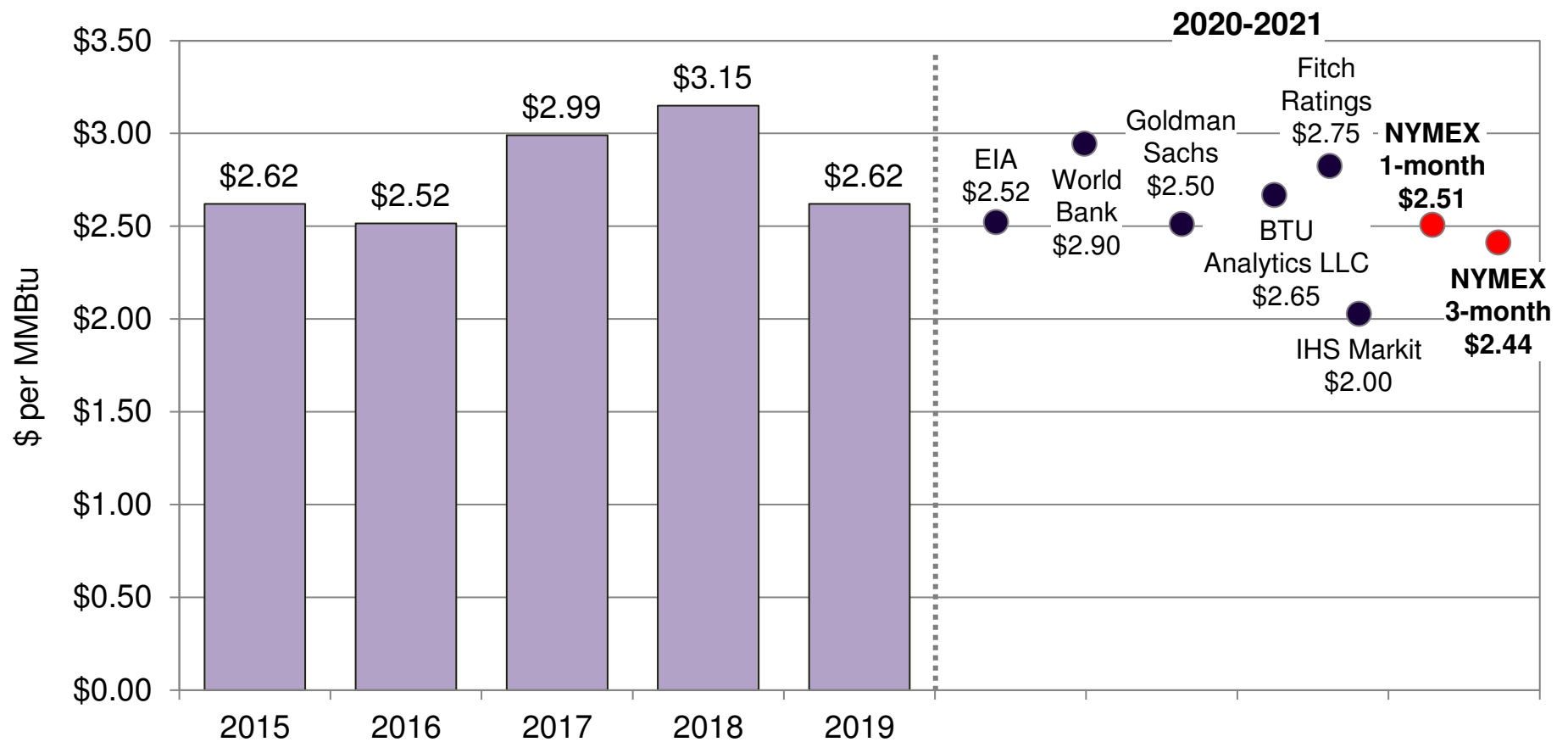
PADD 3 natural gas production forecast

Regionally, Permian and Haynesville will dominate future natural gas production.



Natural gas price outlook (WSJ survey).

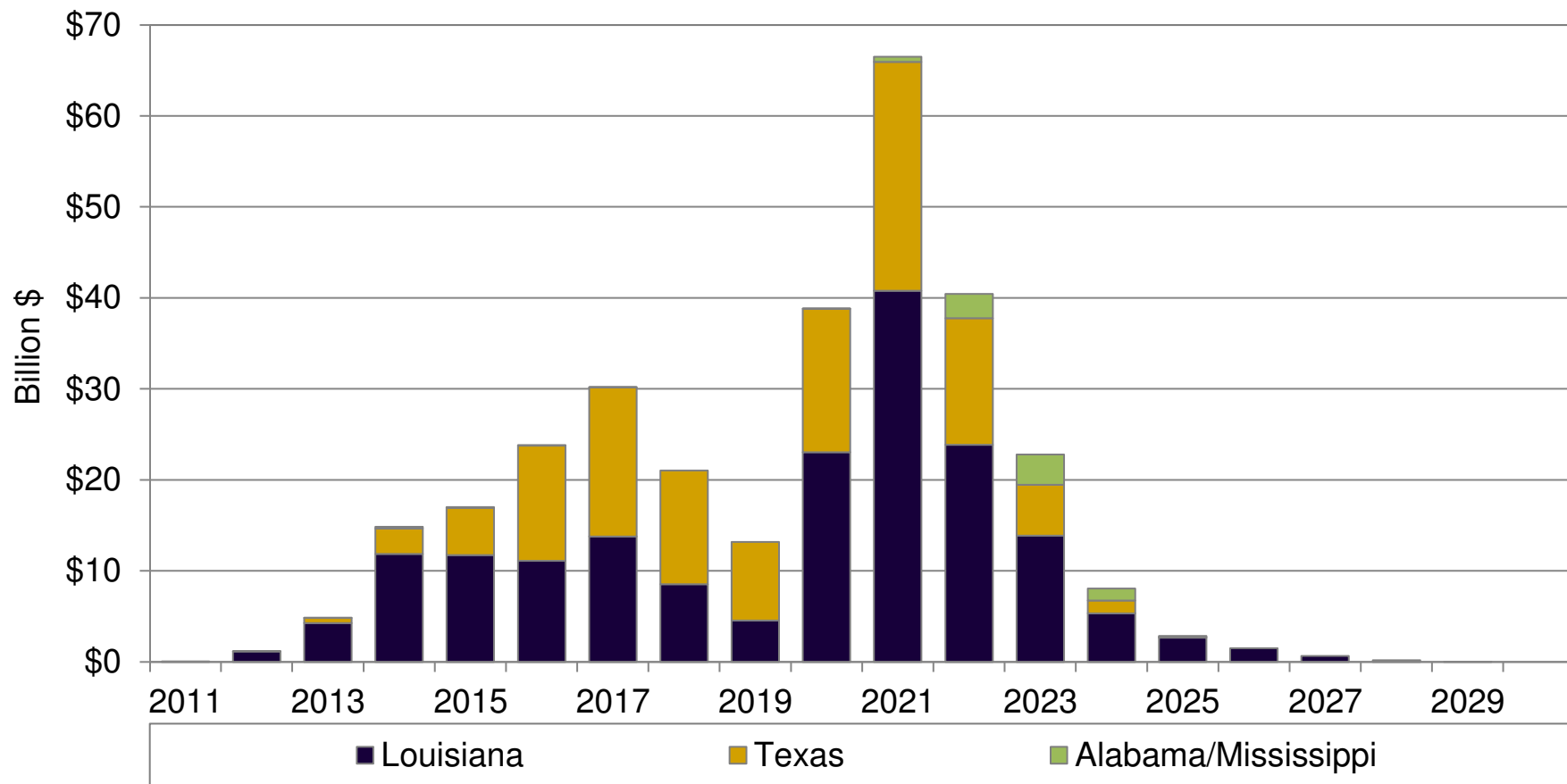
Natural gas prices are **expected to drop below \$3 per MMBtu** for the foreseeable future.



Industrial development trends & challenges

GOM energy manufacturing investments by state.

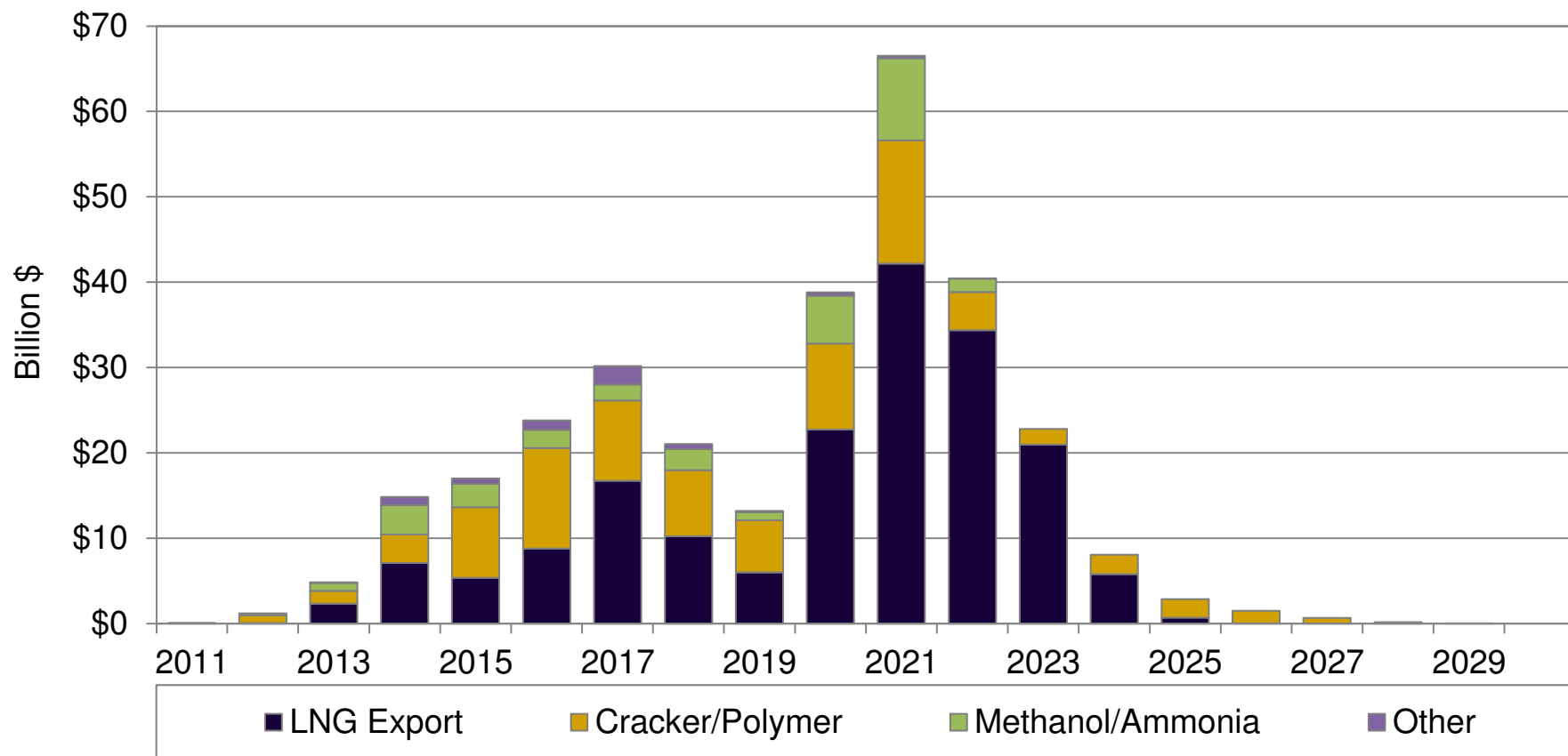
The continued low natural gas price outlook has facilitated considerable development of almost \$308 billion: **\$113 billion already completed (through 2018)** and **\$195 billion remaining**, but heavily concentrated in LNG export facilities.



Source: Author's construct from project announcements.

GOM energy manufacturing investments by sector.

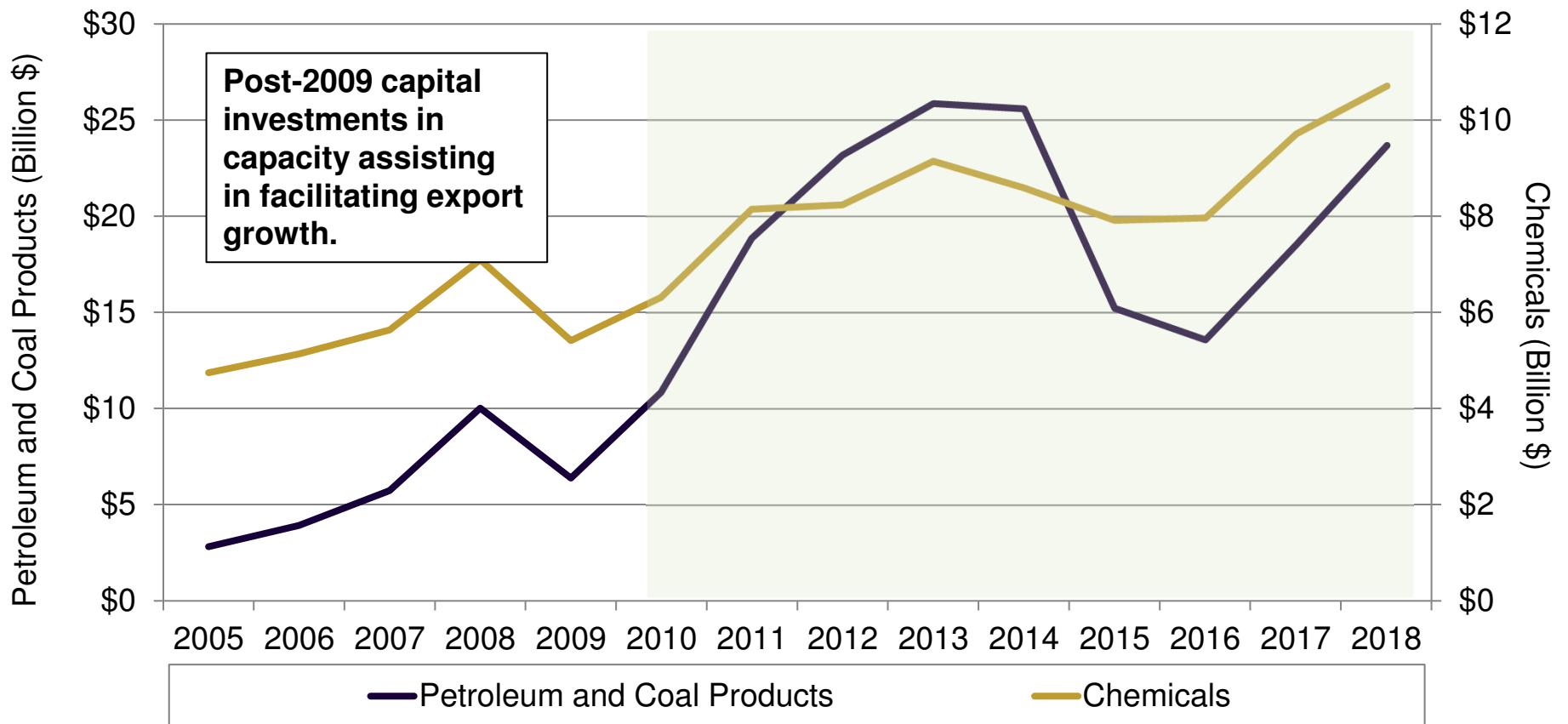
Prior to 2019, **LNG investments accounted for \$55 billion (45 percent)** of all capital investments along the Gulf Coast. Olefins (cracker) and other petrochemical-based investments accounted for \$43 billion (38 percent).



Source: Author's construct from project announcements.

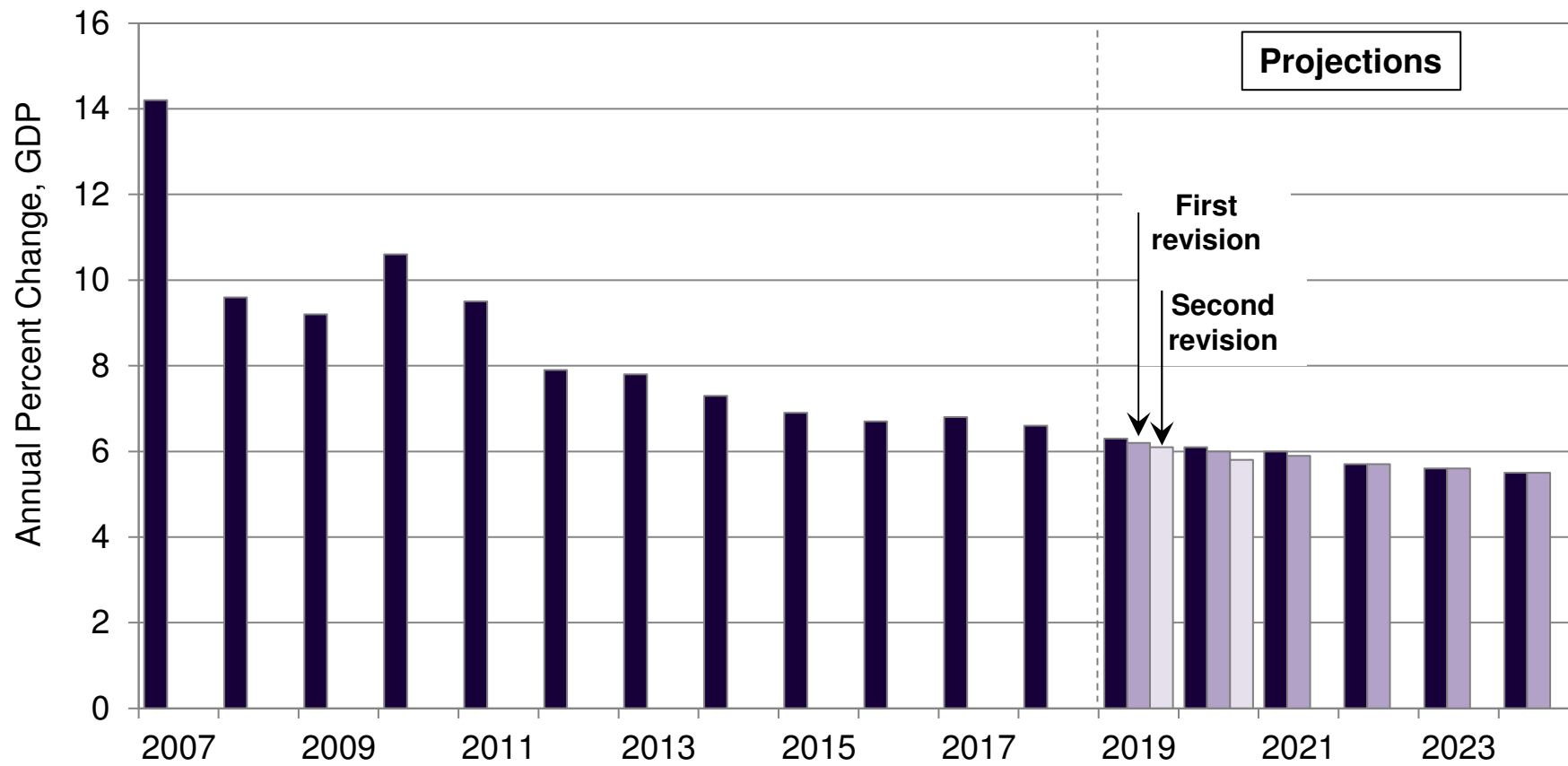
Louisiana exports (chemicals and refined product).

Louisiana petroleum and coal exports **increased 374 percent** between 2009-2014, fell in 2015-2016, back up. **Chemical exports increased 270 percent since 2009.**



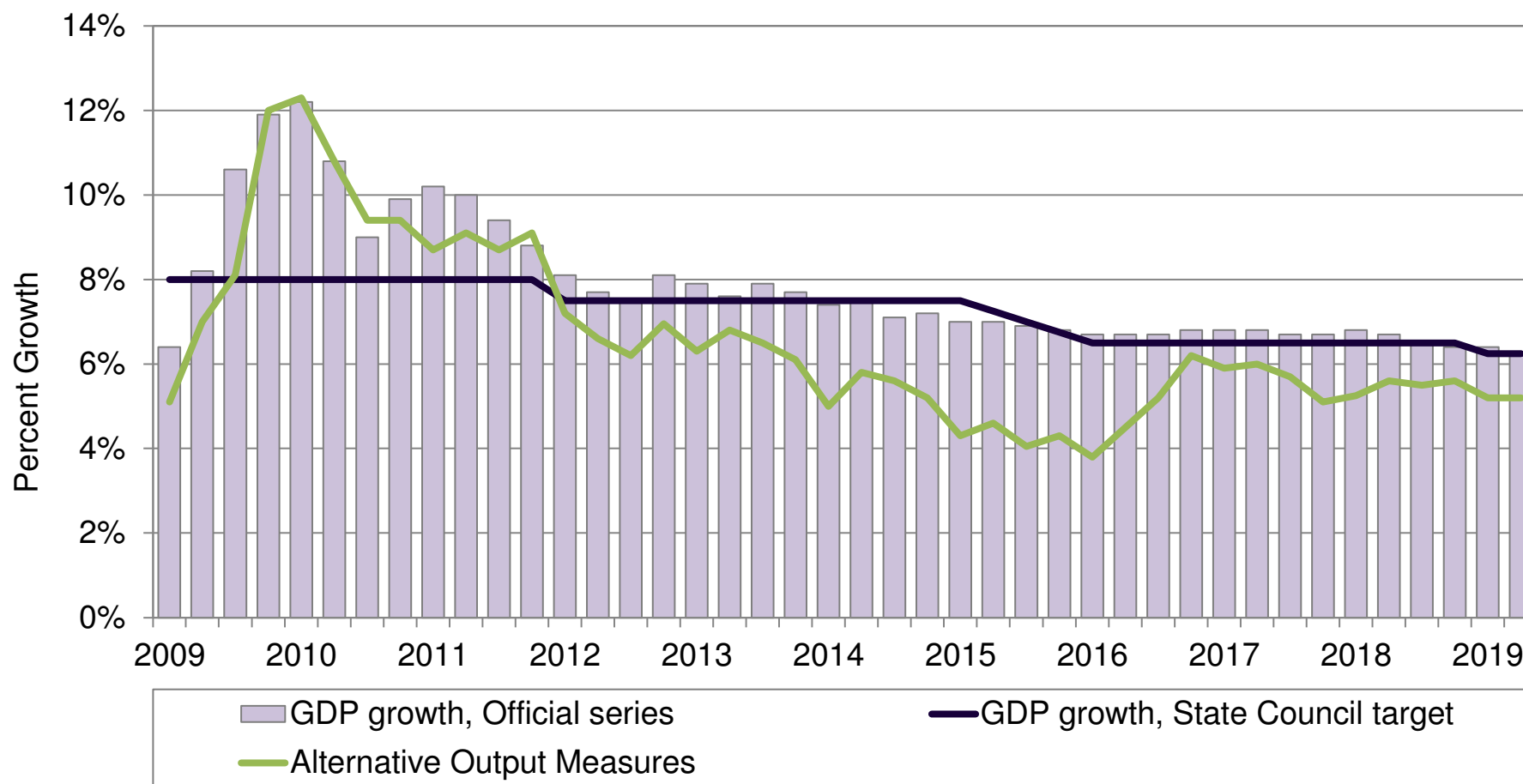
Changes in Chinese GDP forecasts.

Chinese economic growth officially reported at 6.6 percent. **Recent forecasts, however, have been revised downward more than once.**



China's GDP annual growth rate.

In recent years, **China's GDP growth** has been close to government targets, but **alternative measures reflect slower growth.**

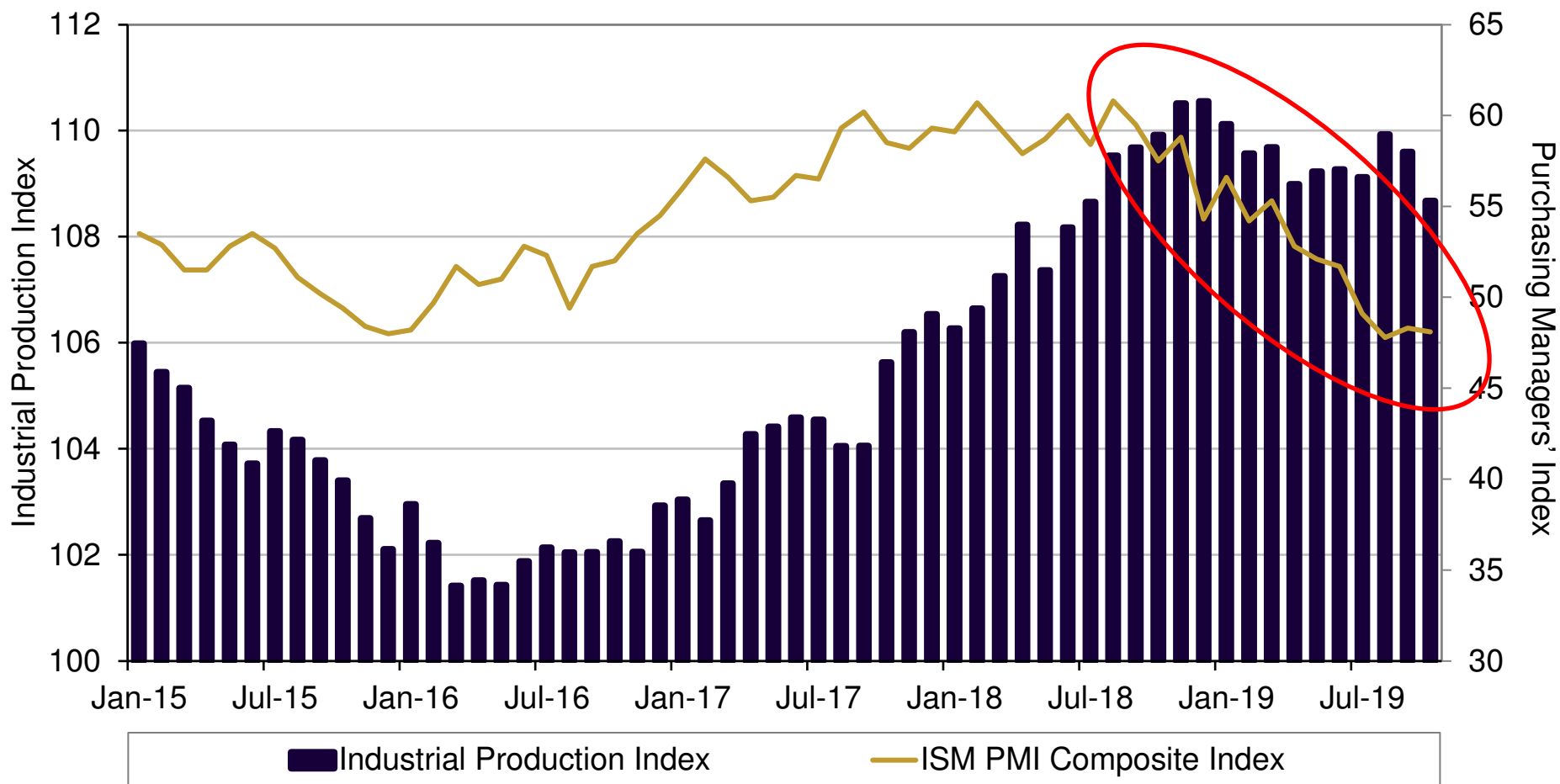


Note: Author's estimate from original sources.

Source: National Bureau of Statistics China; Capital Economics; Wall Street Journal; and various trade press.

U.S. industrial production index.

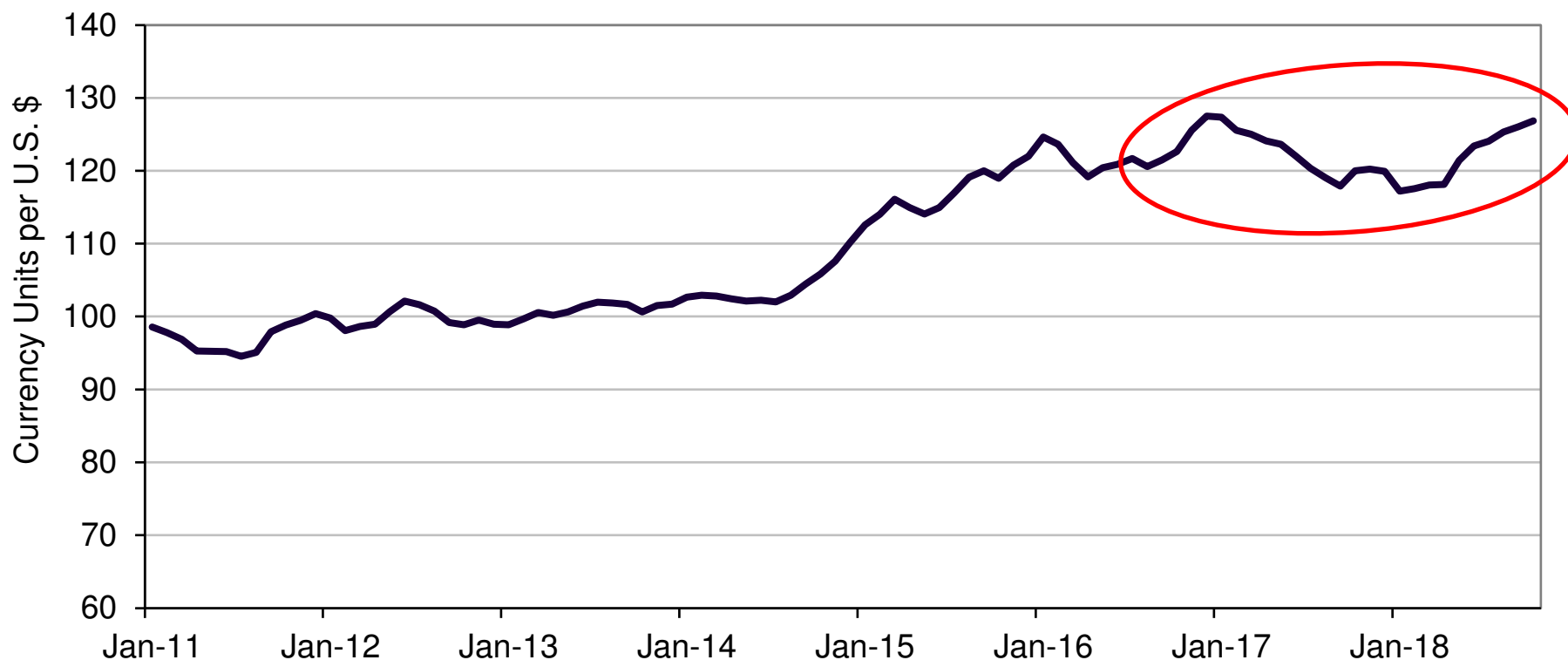
Industrial production and purchasing indices have been consistently increasing since the lows of 2016; but have been falling since December 2018.



Source: Federal Reserve Bank of St. Louis.

U.S. dollar valuation, Federal Reserve Broad Index.

The dollar is up relative to major trading partner currencies: 23 percent appreciation over last five years, but just three percent in the last 12 months.



Note: The Broad Index is a weighted average of the foreign exchange values of the U.S. dollar against the currencies of a large group of major U.S. trading partners. Base year is 2002.

Source: Federal Reserve Bank of St. Louis.

Total GOM investment, all project announcements.

Texas total investment = \$70.6 billion; Louisiana total investment = \$116.3 billion; Total GOM investment = \$194.9 billion – assuming all projects are developed at anticipated cost and at anticipated schedule.

Year	Texas		Louisiana		Other GOM		Total GOM		Total
	LNG	Non-LNG	LNG	Non-LNG	LNG	Non-LNG	LNG	Non-LNG	
(million \$)									
2019	3,503	5,126	2,466	2,075	-	-	5,969	7,201	13,170
2020	5,374	10,387	17,337	5,688	11	-	22,723	16,075	38,798
2021	9,817	15,352	31,773	9,001	561	-	42,150	24,352	66,503
2022	10,419	3,502	21,291	2,560	2,665	-	34,375	6,062	40,437
2023	5,448	151	12,167	1,699	3,327	-	20,941	1,850	22,792
2024	1,421	-	3,033	2,279	1,332	-	5,786	2,279	8,065
2025	99	-	476	2,159	104	-	679	2,159	2,838
2026	-	-	29	1,442	-	-	29	1,442	1,471
2027	-	-	-	648	-	-	-	648	648
2028	-	-	-	162	-	-	-	162	162
2029	\$ -	\$ -	\$ -	\$ 11	\$ -	\$ -	\$ -	\$ 11	11
Total	\$ 36,082	\$ 34,518	\$ 88,571	\$ 27,724	\$ 8,000	\$ -	\$ 132,653	\$ 62,241	194,895

Good news/bad news: Louisiana announced investment is larger than Texas – but -- Louisiana announcements are heavily weighted towards LNG.

Total GOM investment, new baseline outlook.

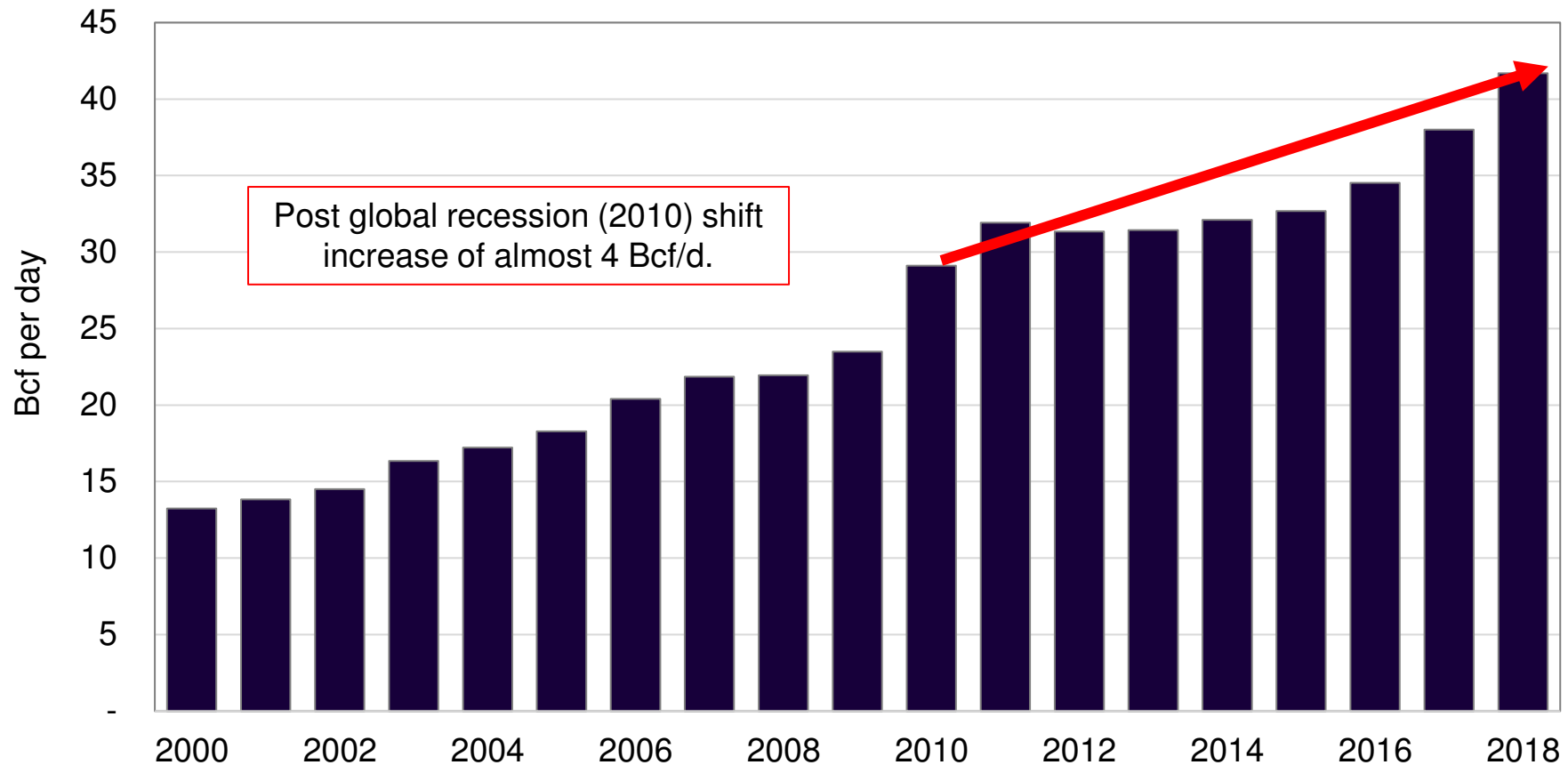
Revised outlook sees **31 percent reduction in total Texas investment, 29 percent reduction in Louisiana** – 33 percent reduction across GOM – all of these are far better than common energy infrastructure cancellation rates that have been as high as 50 percent.

Year	Texas		Louisiana		Other GOM		Total GOM		Total
	LNG	Non-LNG	LNG	Non-LNG	LNG	Non-LNG	LNG	Non-LNG	
(million \$)									
2019	\$ 3,417	\$ 4,975	\$ 2,205	\$ 1,991	\$ -	\$ -	\$ 5,622	\$ 6,966	12,588
2020	3,660	7,207	8,686	5,683	-	-	12,346	12,891	25,237
2021	4,667	9,655	11,830	9,001	-	-	16,497	18,655	35,152
2022	5,885	4,908	11,760	2,560	-	-	17,644	7,468	25,113
2023	3,037	491	11,642	1,699	-	-	14,679	2,191	16,870
2024	578	-	6,925	2,279	-	-	7,503	2,279	9,782
2025	34	-	1,891	2,159	-	-	1,924	2,159	4,084
2026	-	-	132	1,442	-	-	132	1,442	1,574
2027	-	-	-	648	-	-	-	648	648
2028	-	-	-	162	-	-	-	162	162
2029	\$ -	\$ -	\$ -	\$ 11	\$ -	\$ -	\$ -	\$ 11	11
Total	\$ 21,277	\$ 27,237	\$ 55,071	\$ 27,635	\$ -	\$ -	\$ 76,348	\$ 54,872	131,220

Energy exports.

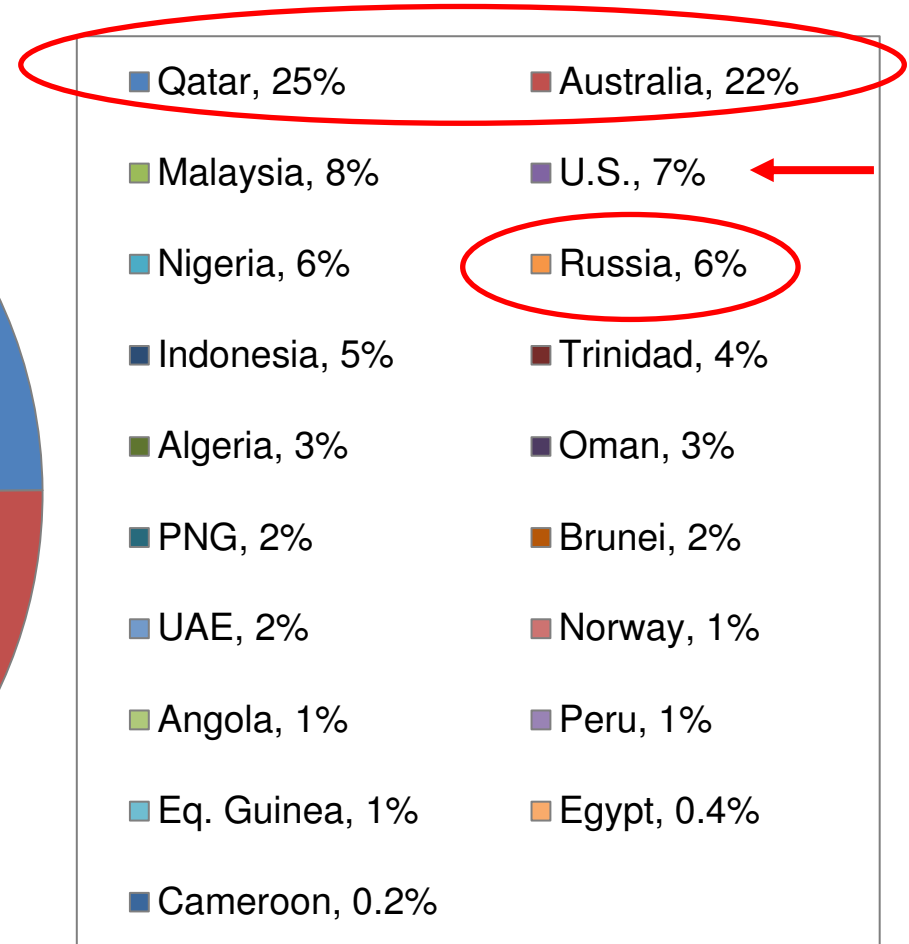
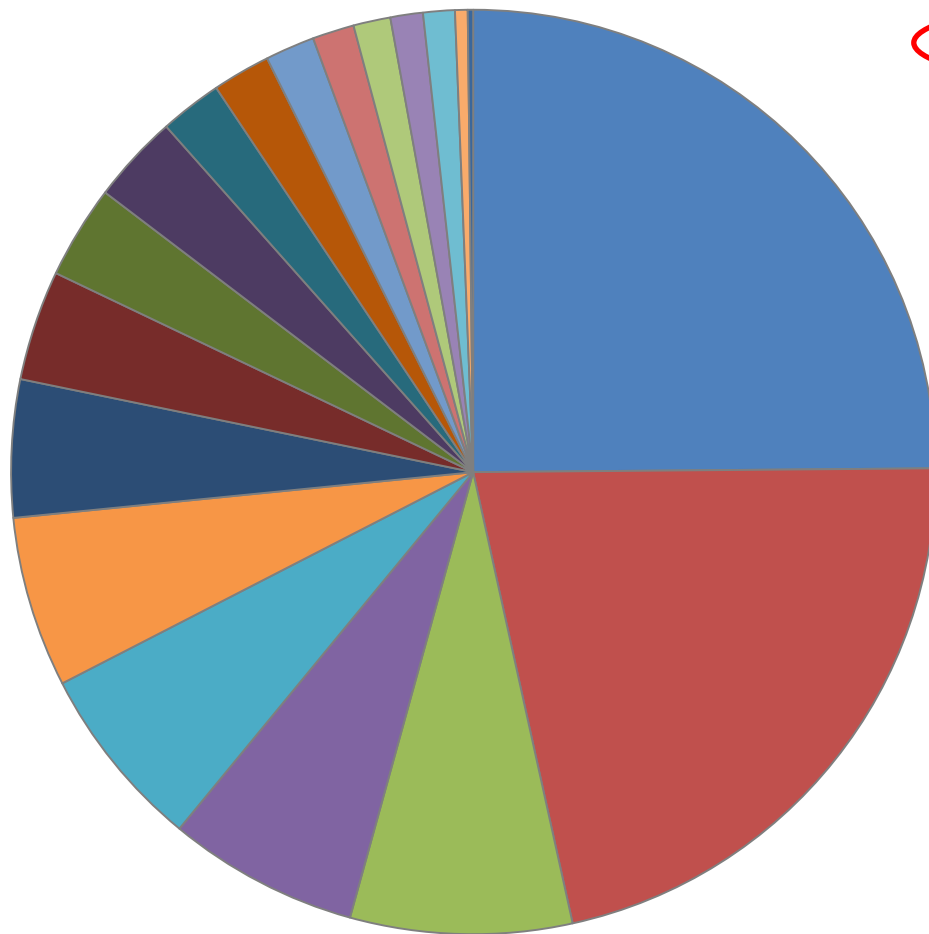
World LNG trade volumes.

World LNG trade volumes have increased at an **average annual rate of seven percent over the last 18 years** and have increased **77 percent over the last 10 years.**



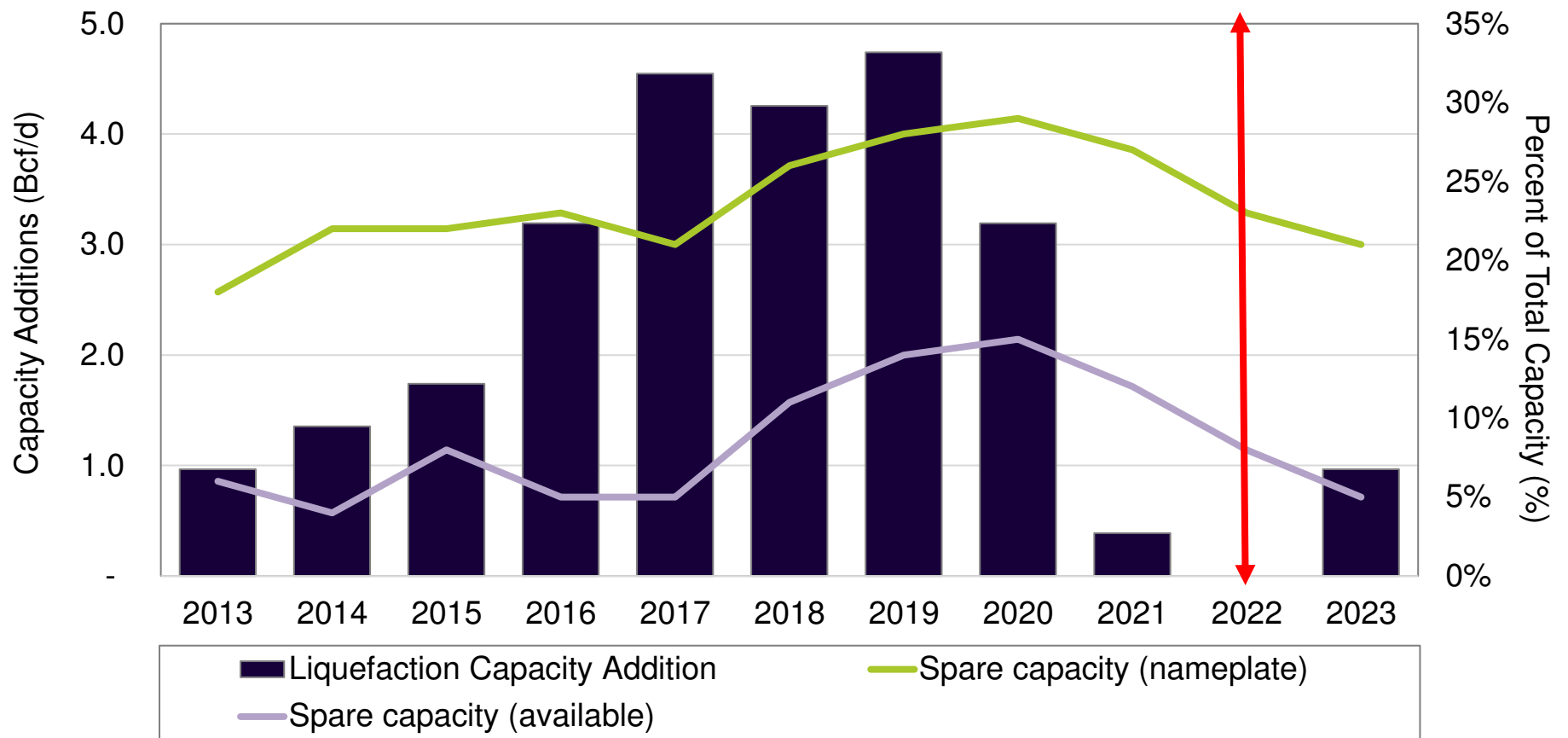
LNG exports and market share by country, 2018.

Qatar and Australia are the biggest competitors to U.S. LNG exports.



LNG liquefaction capacity additions.

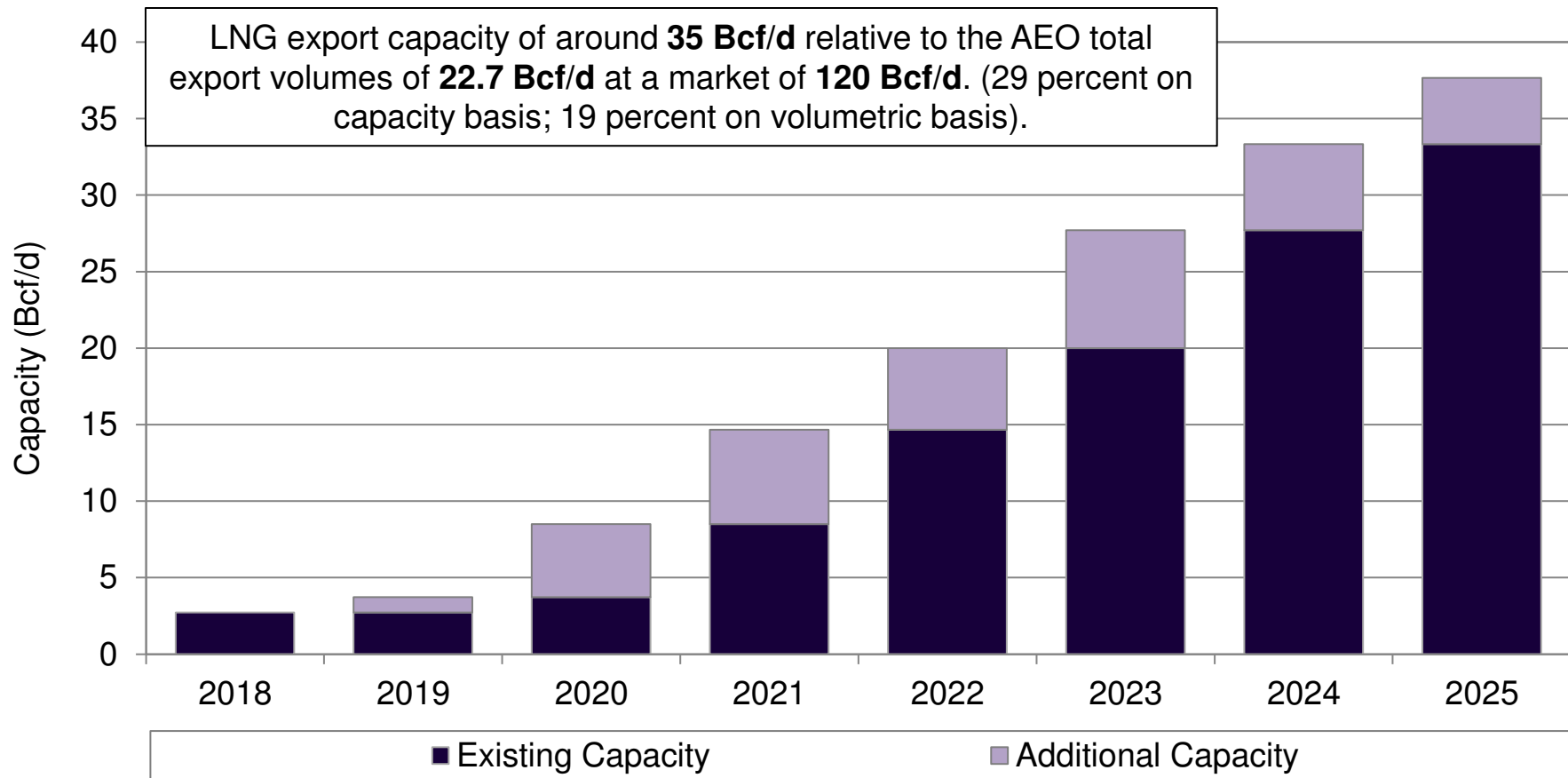
Excess capacity facilitating considerable competition – “nirvana” (for developers) is anticipated to arrive around **2021-2022** as capacity tightens and it becomes sellers’ market.



Source: International Energy Agency, Gas 2018.

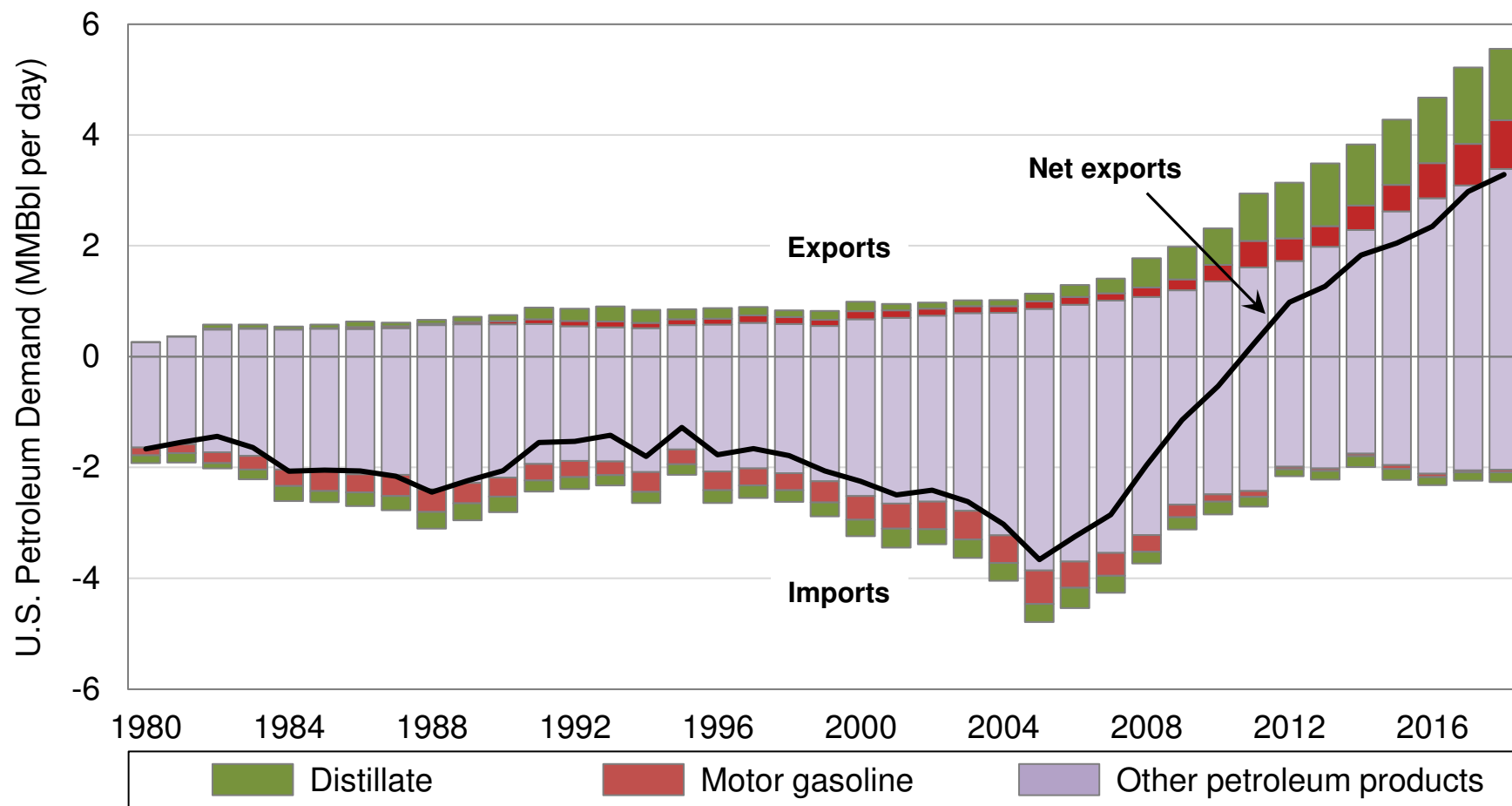
U.S. LNG export capacity development: new baseline forecast.

Using the GCEO baseline forecast for project development results in a lower estimate of **35 Bcf/d by 2025.**



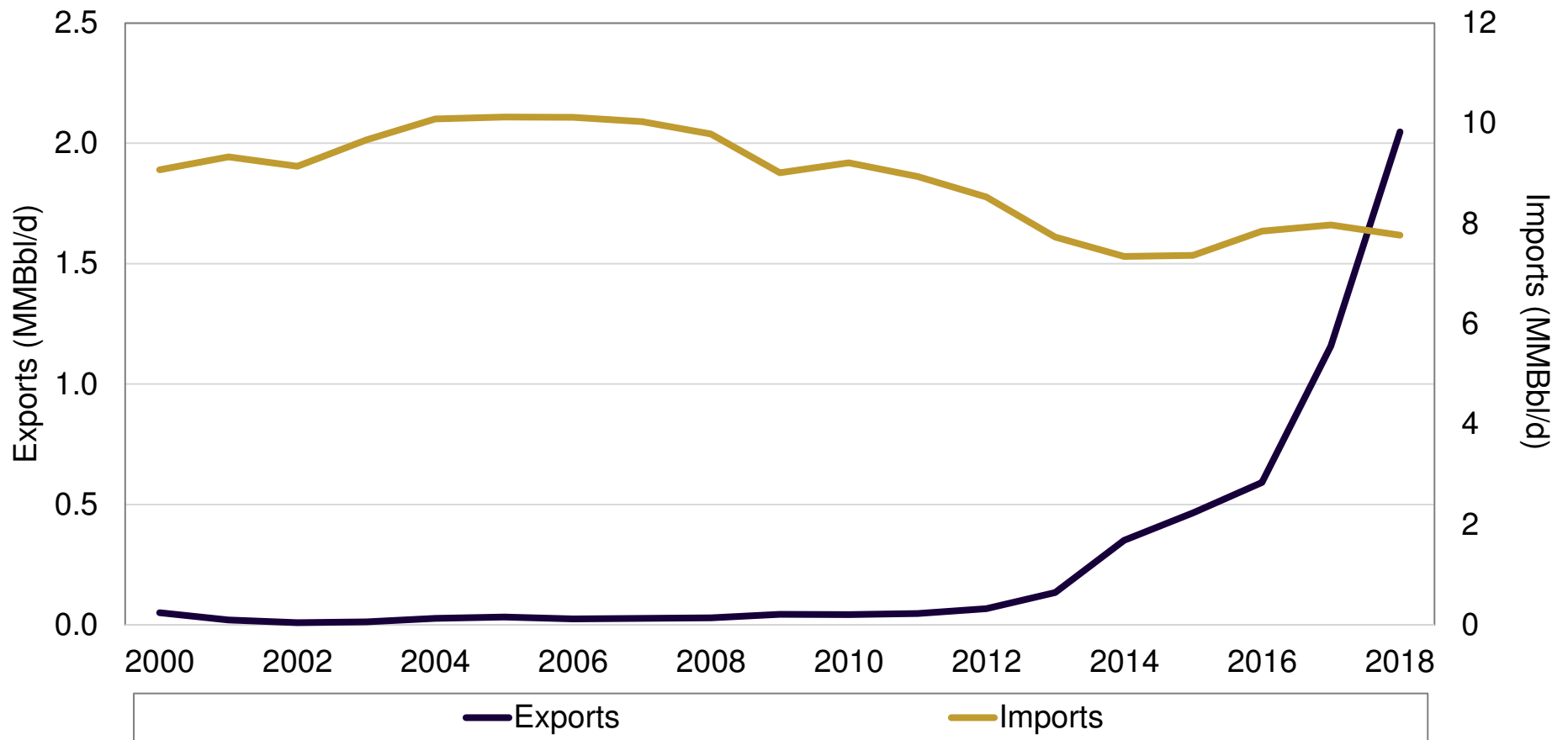
U.S. petroleum product imports and exports.

U.S. is **net exporter of petroleum products**, increasing by 600 percent since 2011. Refiners are leveraging capacity to produce **higher value distillates for export**.



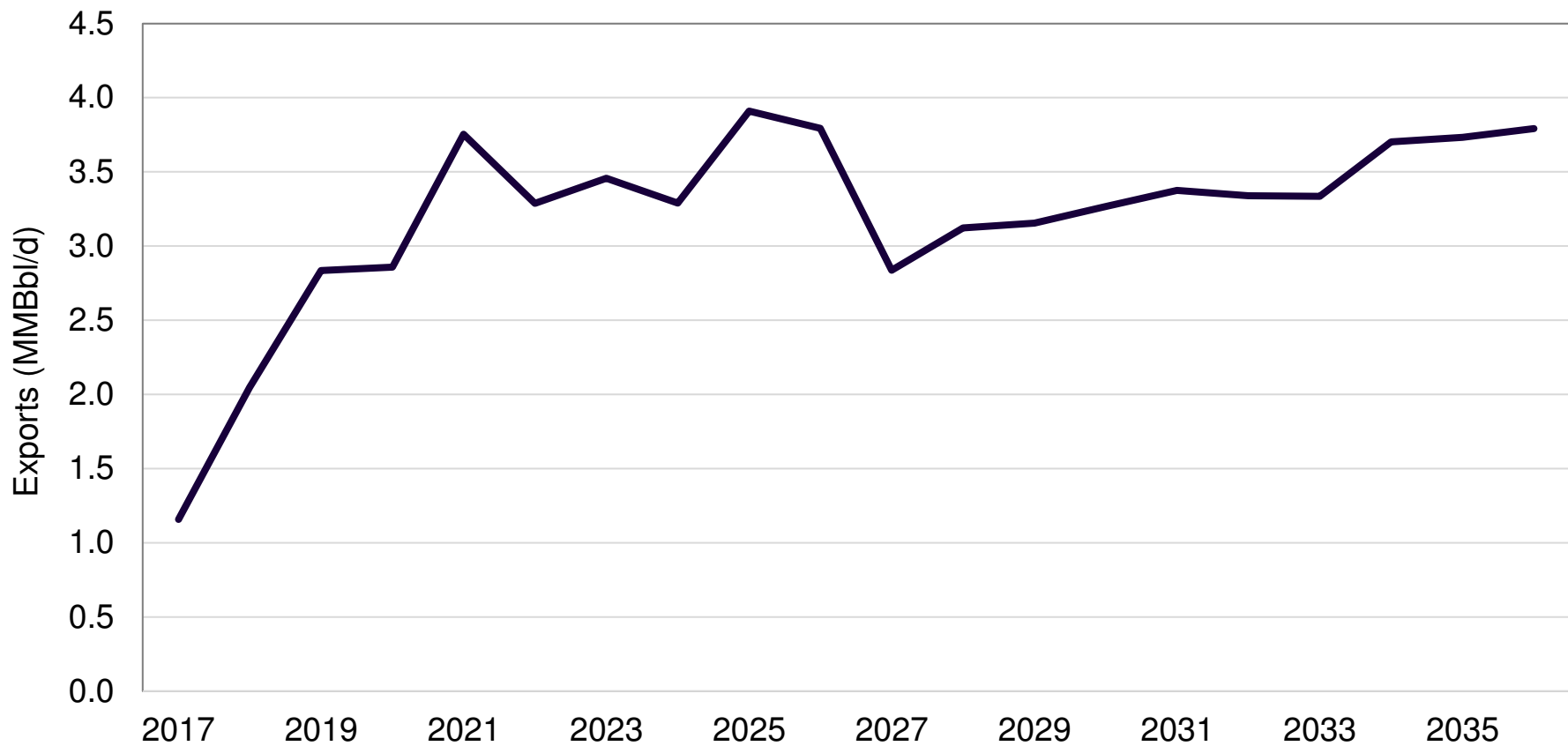
U.S. crude oil exports and imports.

U.S. crude oil exports have grown at a rapid pace, by as much as 20 percent since 2016. Crude oil imports are still substantial but falling.



U.S. crude oil exports

U.S. crude oil exports are anticipated to grow to **2.8 MMBbl/d by the end of 2019** and **over 3 MMBbl/d by 2021**. Most will originate and leave the Gulf Coast ports of either Corpus Christi or LOOP.



Conclusions

Conclusions.

- **Uncertainties will likely lead to the market moving “sideways” through 2020.** Trade talks are early in the process. **Trade is an important lynch-pin** in energy price recovery since these tensions are repeatedly being pointed to as the underlying **source of global economic weakness**.
- **Worst-case scenario.** Phase 1 **trade negotiations fall apart** or result in an outcome **generally seen as weak** or non-consequential resulting in:
 - A continued **faltering in world economic activity** making the current supply-demand imbalance worse.
 - **OPEC/Saudi hesitation** in rebalancing re-balance market.
 - **Prices fall** Considerably (like mid-\$40s/Bbl for WTI).
 - Flight to quality, **U.S. dollar appreciation** making U.S. exports more expensive, drives down dollar denominated energy commodity prices.
 - **Dramatic slowing** in U.S. (and global) **processing and export investment** (particularly acute here along the Gulf Coast).
 - Considerable **ripple impact to the U.S. economy** and already cooling U.S. energy demand growth.

Questions, comments and discussion.



David E. Dismukes

Professor and Executive Director

Center for Energy Studies

Email: dismukes@lsu.edu

Phone: 225-578-4343

URL: www.enrg.lsu.edu