

# Crude Oil Price Forecasting: Is it real? SWAG, or WAG?

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# Overview: ARM Energy

## *Who is ARM?*

ARM is a premier North American producer services firm. Formed in 2004, we provide innovative solutions within the energy landscape. We partner with 130+ producers, with activity in every major oil and gas basin in North America.

## *Why ARM exists?*

**All of our actions are geared to improving our clients value or netback.**

## *How we engage?*

We align with our clients. Leveraging our knowledge, experience and relationships within the physical, financial and midstream markets, we're able to boost our clients business by taking advantage of market opportunities and/or inefficiencies.

## *What do we provide?*

Our clients are able to utilize an analyst team that is second to none, full time experienced traders, precise and comprehensive reporting combined with executives deeply knowledgeable with the entire energy landscape.

# Producer Solutions

*Each of our business units work together to provide a comprehensive product and positive outcome for our clients.*

midstream  
& logistics  
solutions

physical  
marketing  
services

commodity  
hedging  
advisory

market  
analysis



*Transparency is the hallmark of our business.*

# ARM Energy Midstream

**Kingfisher  
Midstream  
Feb-18**

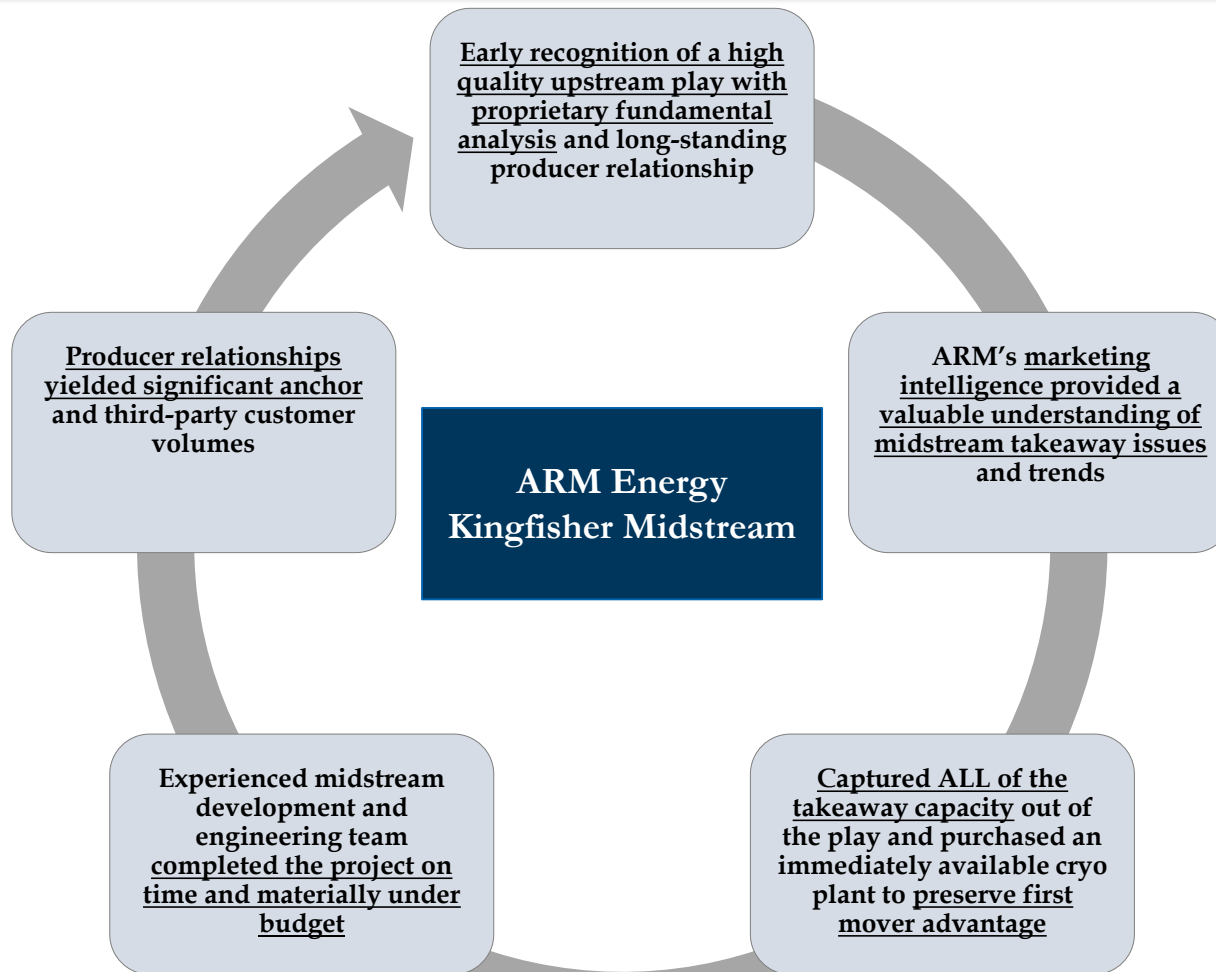
**STACK**

**Salt Creek  
Midstream  
May '17 - current**

**Delaware - Permian**

# The Kingfisher Midstream Thesis

Having the courage to act on proprietary information and marketing insight is ARM's key differentiator



*Forecasting Crude Oil Prices  
A Fool's Errand?*

# Crude Oil or Refined Product Pricing

## *Which Commodity Controls?*

### **Definitions matter: Is it Oil or is it “Liquids”**

- IEA Headline “Oil production growth from the United States.....”
- What they should have said “Liquid production growth.....”

### **Refinery capacity is sufficient**

- Transportation fuels remain dominant use of oil (refined)
- Longer term petrochem usage will drive growth in annual demand
- Exports provide relief valve; U.S. is largest exporter of products

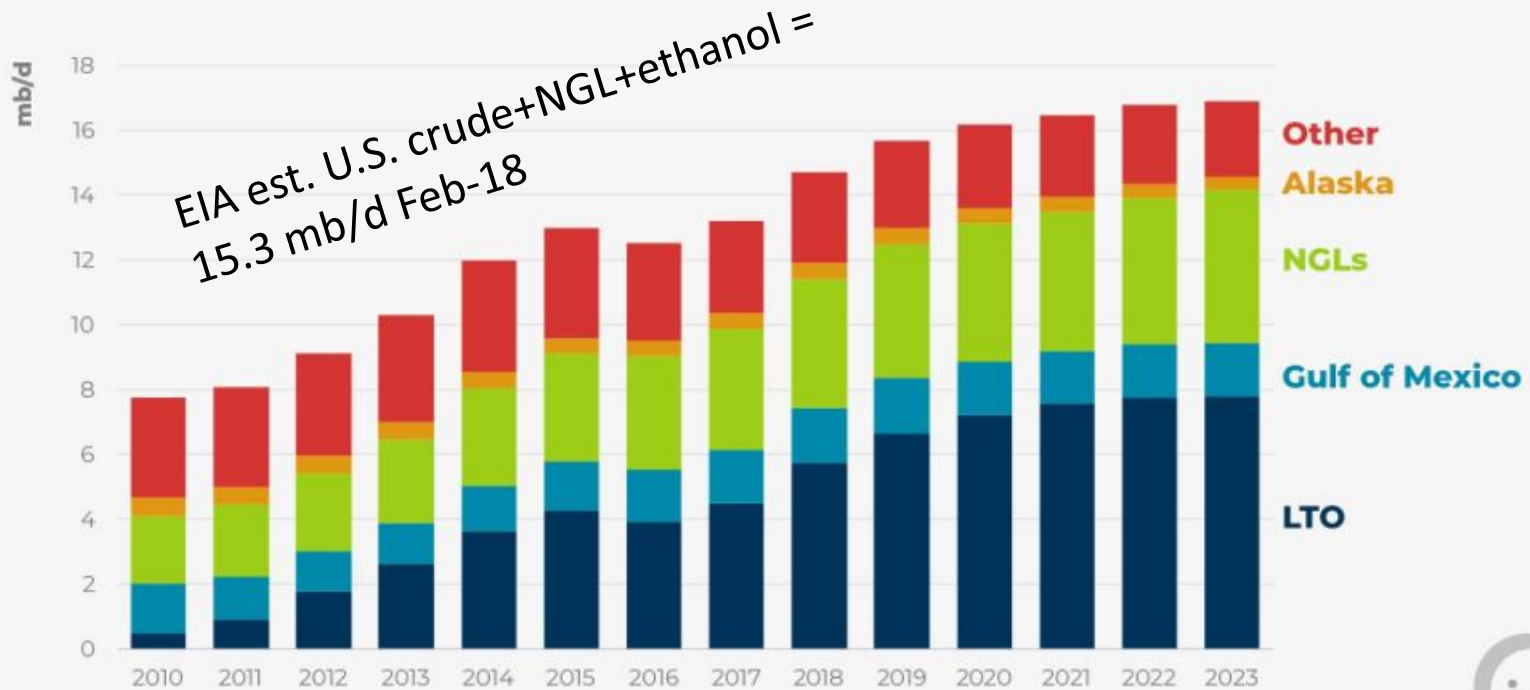
### **Mark Papa says U.S. ability to grow is illusion**

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**ARM believes technology and new plays continue the merry go round of opportunity to grow supply of crude and NGL volumes**

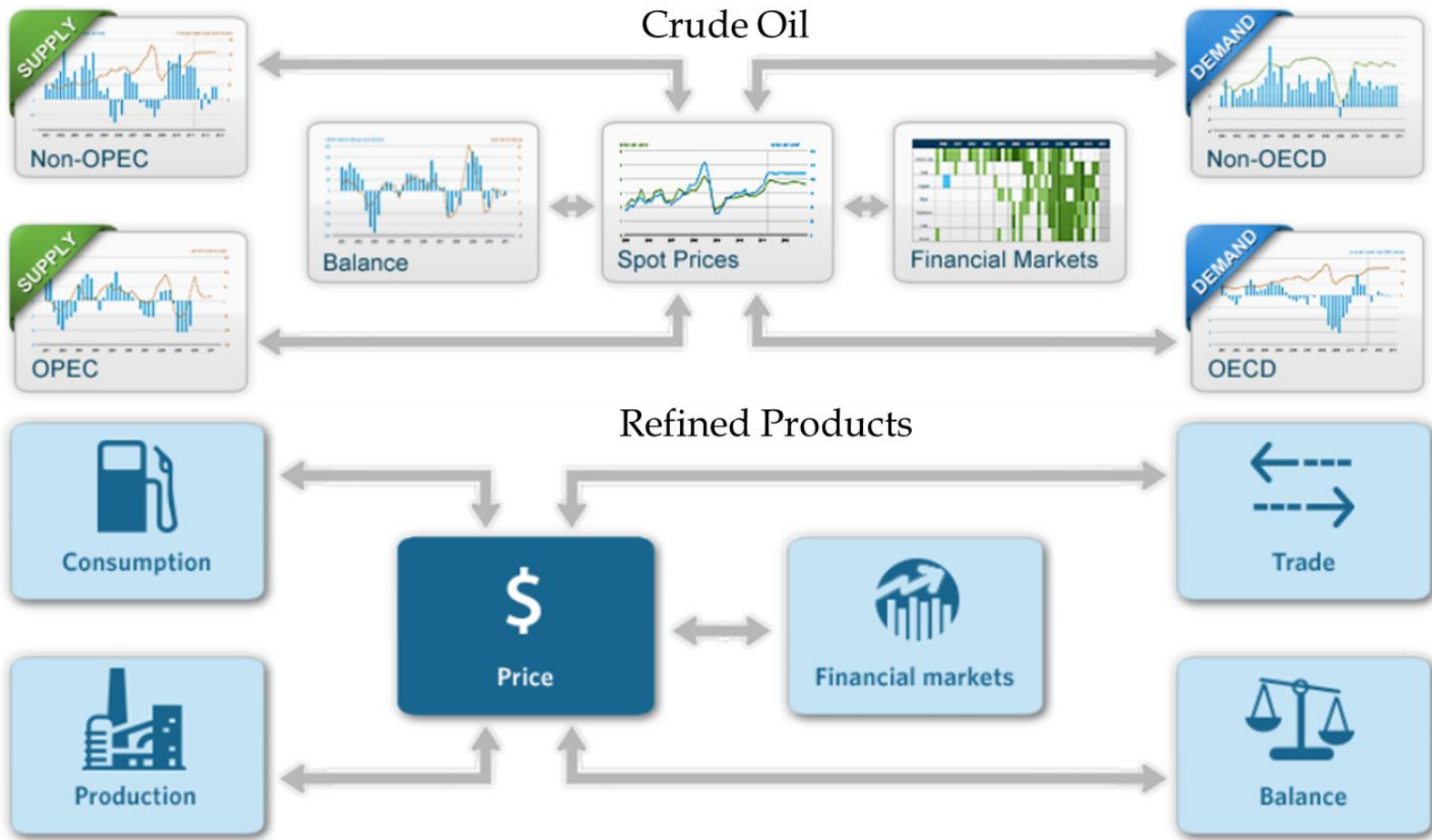
# United States oil supply, 2010-23

Oil 2017



**IEA's most recent 5-year outlook has global demand growing 1+ mb/d per year through 2023 with U.S. supplying 80%**



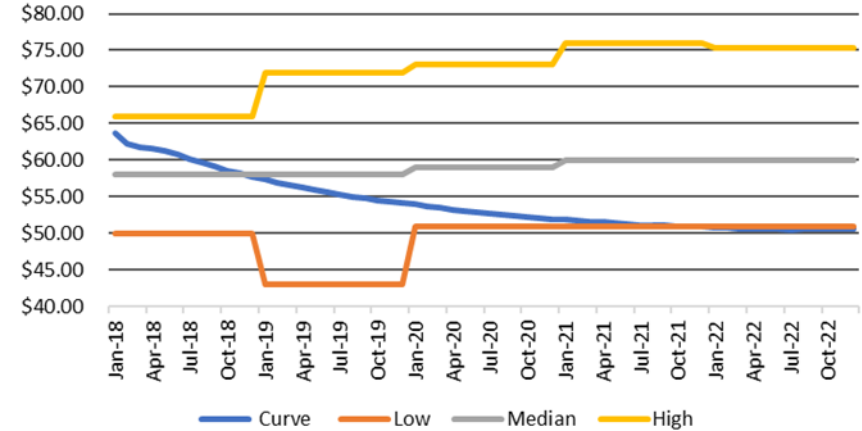


**What Drives the Price? US Dollar? Supply & Demand? Pesky Speculators? OPEC?**

### Prompt Month WTI (\$/bbl)

Year	Average	High	Low	Range
2011	\$95.10	\$113.93	\$75.67	\$38.26
2012	\$94.16	\$109.77	\$77.69	\$32.08
2013	\$98.05	\$110.53	\$86.68	\$23.85
2014	\$92.91	\$107.26	\$53.27	\$53.99
2015	\$48.76	\$61.43	\$34.73	\$26.70
2016	\$42.89	\$51.79	\$26.21	\$25.58
2017	<b>\$50.80</b>	<b>\$60.42</b>	<b>\$42.53</b>	<b>\$17.89</b>
2018	<b>\$57.50</b>	<b>\$68.00</b>	<b>\$50.00</b>	<b>\$18.00</b>
2019	<b>\$61.00</b>	<b>\$69.00</b>	<b>\$50.00</b>	<b>\$19.00</b>

### WTI Crude Prices (\$/bbl)



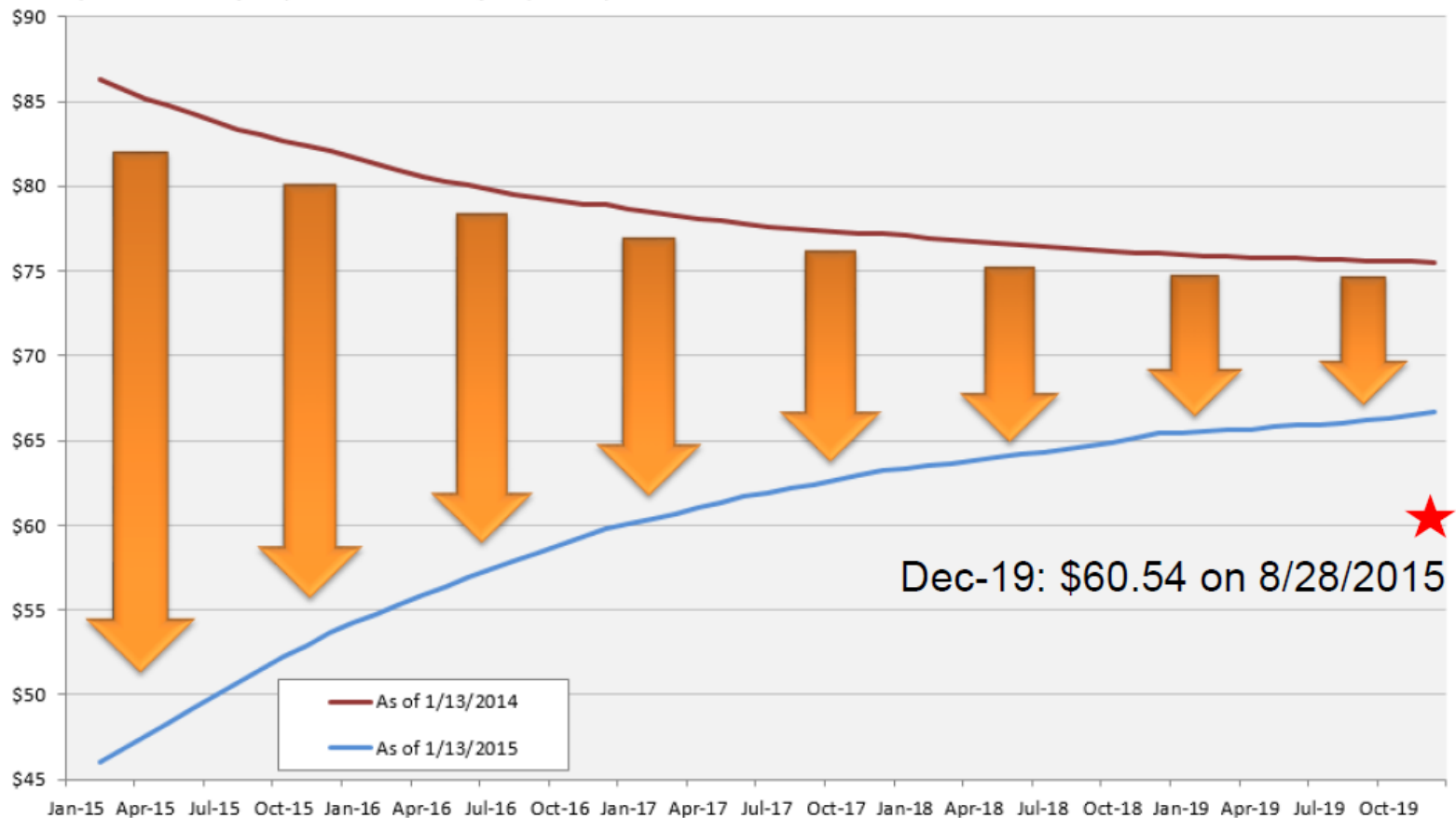
### YEARLY FORECASTS (IN DOLLARS PER BARREL)

Period	-----BRENT-----					-----WTI-----				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Mean	62.37	61.29	64.52	65.25	64.58	58.11	57.74	60.79	61.76	61.30
Median	62.00	62.00	64.77	65.00	65.00	58.00	58.00	59.04	60.00	60.00
Highest Forecasts	70.00	78.00	79.00	80.00	78.29	66.00	72.00	73.00	76.00	75.29
Lowest Forecasts	53.10	43.10	50.00	50.00	50.00	50.00	43.00	51.00	51.00	51.00
No. of Forecasts	33	29	26	20	18	28	25	22	17	15

The prompt month in crude shows wide fluctuations, which translate along the price curve. Note: The futures curve is not a price forecast!

## WTI Forward Curve

(As of January 13, 2014 & January 13, 2015)

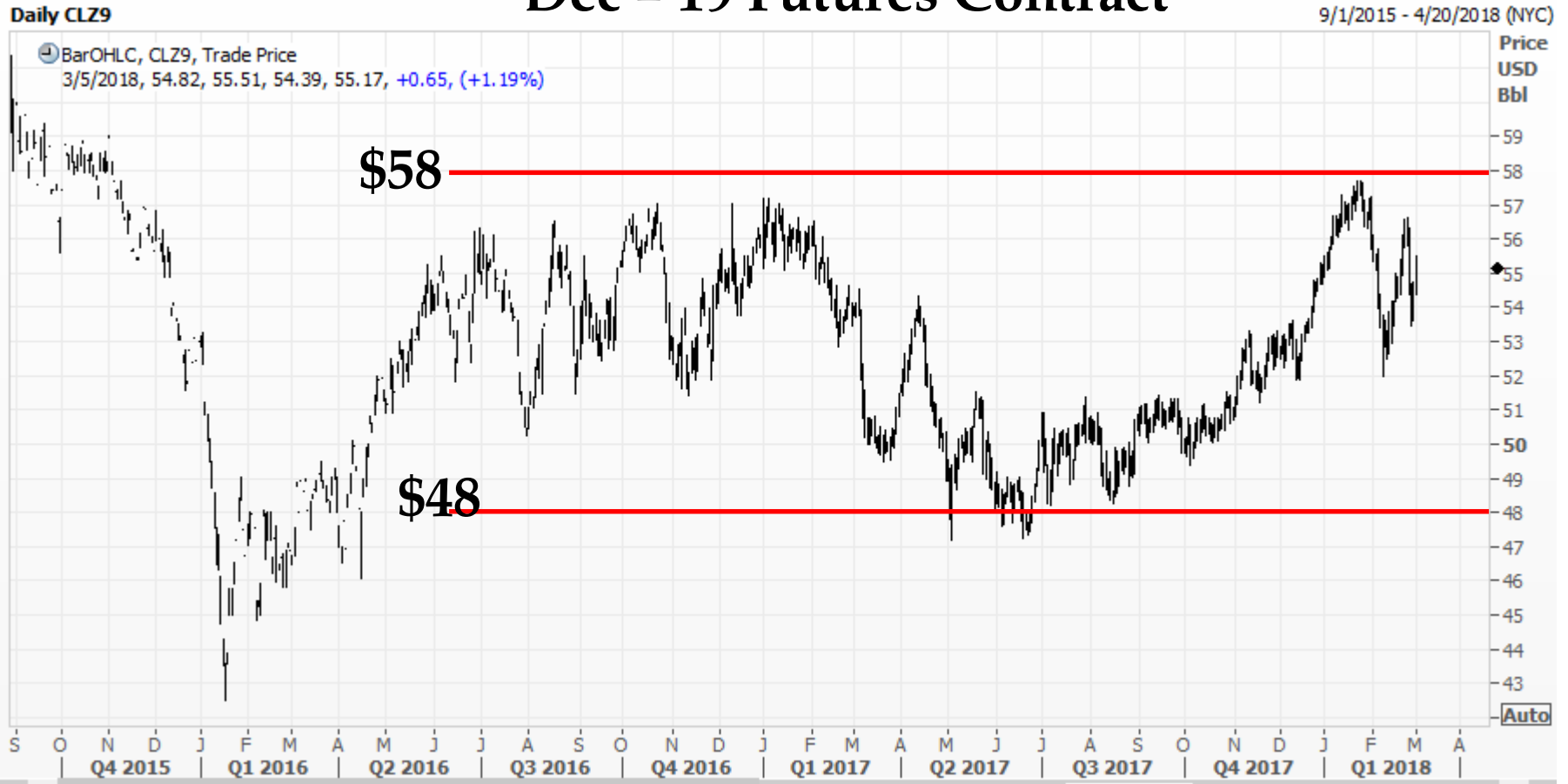


Showned this slide in Sept 2015 presentation to HAPL. What has prompt month and Dec-19 done since then?

Hint: Dec-19 is \$55.17 with Apr-18 at \$62.61

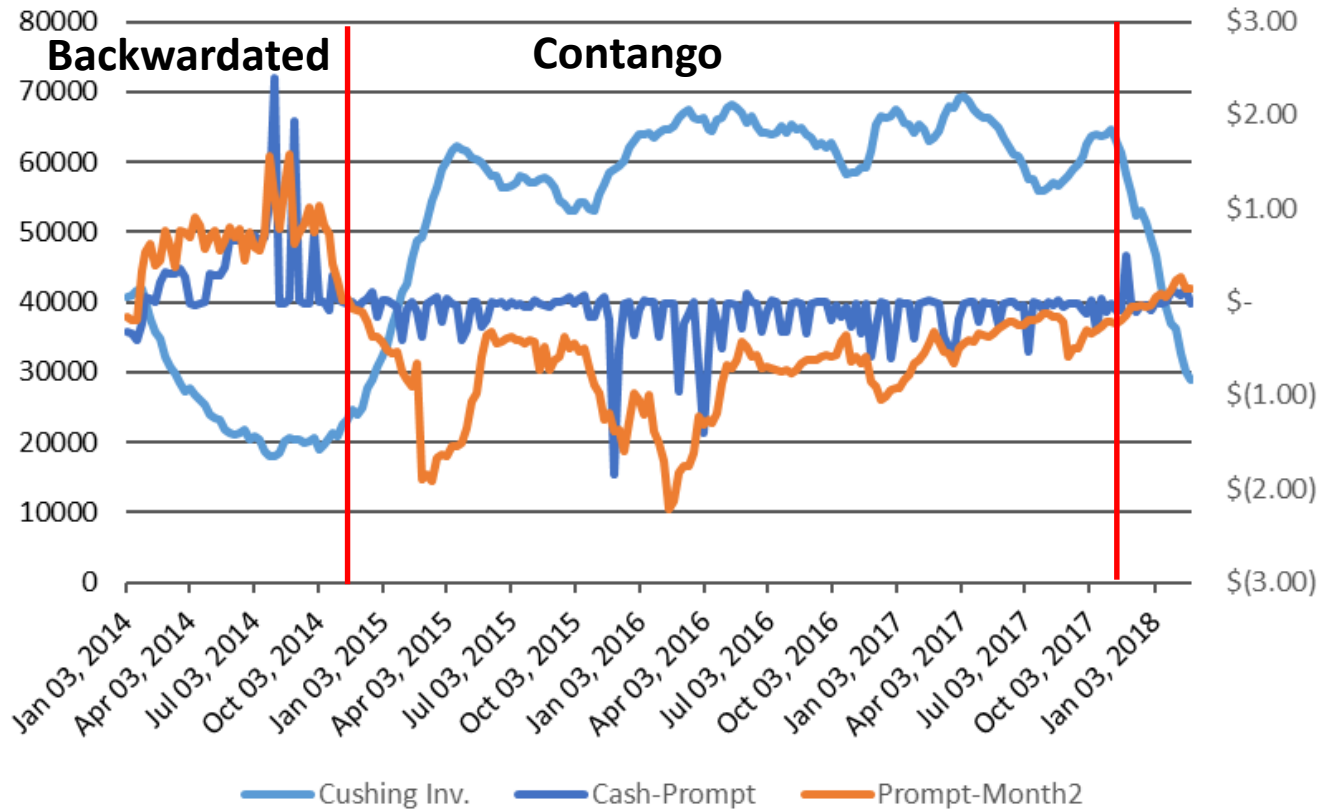


# Dec - 19 Futures Contract



**Dec-19 has not exceeded \$58 since late 2015; timing matters!  
Also relevant because we have considered it a pivot period  
for global S&D balance to reflect mega-project slowdown.**

Cushing Inventory 000bbl vs Price Curve \$/bbl



**While market was Backwardated Cushing pulled inventories to minimum levels; curve shifted and it refilled. Headed towards minimums again with consequence to Brent/WTI.**

# Crude Oil Outlook: Fundamentals, Psychology or Both?

## OPEC Meeting:

- Pre-positioning of cut success                      Russia / NOPEC Cooperation
  - Nigeria and Libya production caps              Tension between Saudi and Iran
- Forecast continuation of cuts thru 2018 with caveat on balances & price*

## Destocking inventories is working

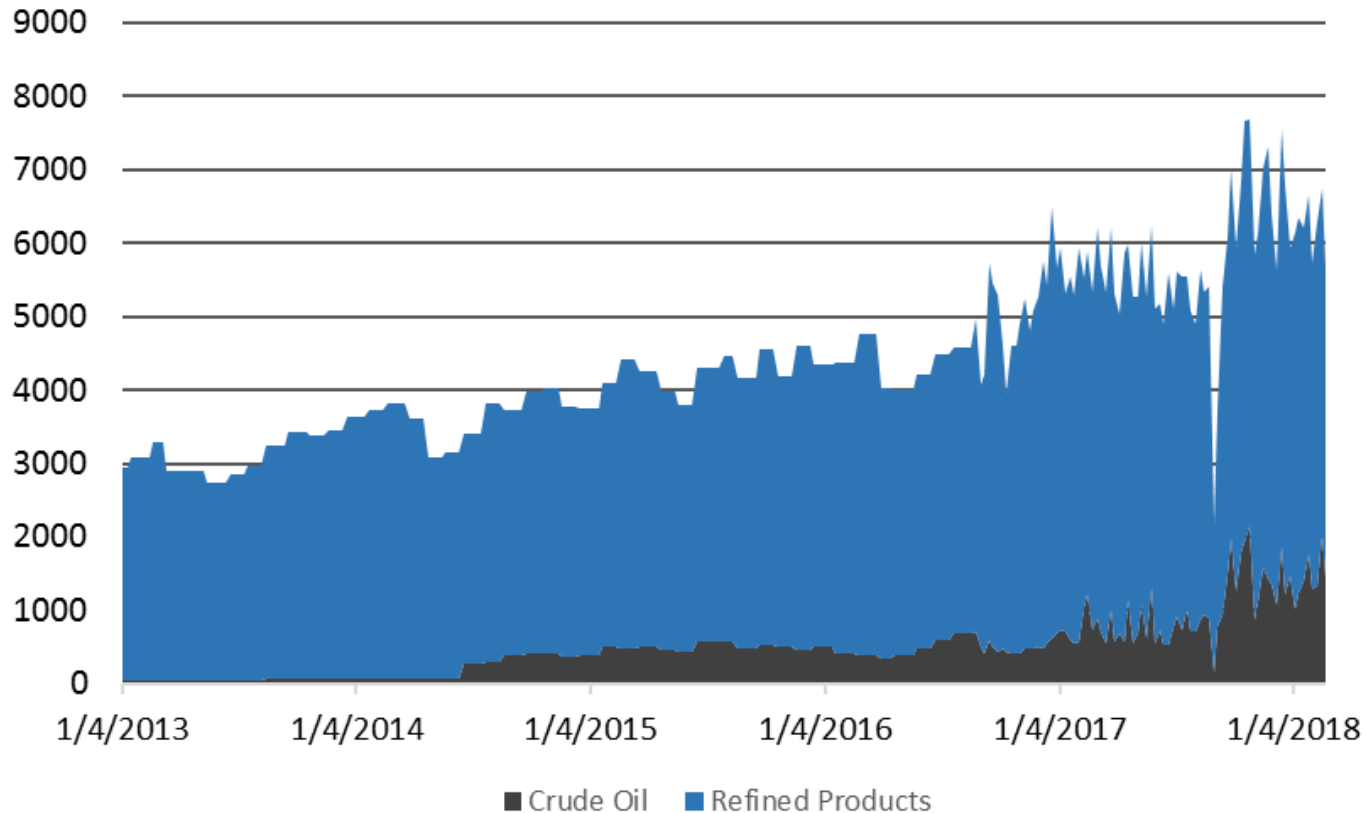
- OECD Dec-18 stock dropped 55.6 mb, steepest in 7 years ending 2017 at 52 mb above five year average inventories
- Global demand continues growing by 1.5+ MMb/d

## Geopolitical risk and supply disruption is recognized again

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**Curve shape and U.S. production response still key to \$\$\$**  
**U.S. Exports of crude and products alters global everything**

## Crude Oil and Product Exports (000b/d)



**Crude and refined product exports need to persist and grow to keep U.S. from congestion (lower) pricing pressure.**





**Market “believes” geopolitical risk to supply is pricing into market after 2+ year hiatus**

# Forecasting Truisms

- Forward curve is not a forecast
  - Crude market is efficient but value opportunities arise as curve moves
  - Forecast can be wrong even if all the assumptions are correct
  - Forecast can be right even if all assumptions turn out wrong
  - Don't chase the crowd, but.....
  - Don't be stubborn if the underlying data or psychology has changed
  - Four quarters still adds to a dollar
    - Quarter on hedge execution
    - Quarter on physical pricing index (uplift)
    - Quarter on the pricing roll
    - Quarter on price basis
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# Hedging Advice

- Not all hedge advisors are the same, you get what you pay for
- Actively manage price exposure
- Protect core cash flows always
- Be opportunistic looking for value and upside
- Prepare management and board of directors for opportunistic hedge structures, physical arrangements and midstream value opportunities