

# CORNERSTONE MACRO

Economics, Policy, Strategy & Technicals

Cornerstone Macro Conference

## Energy in Transition – What (not) to like in 2019

**We like Oil** – see low \$60s WTI / \$70s Brent  
**US Natural Gas** = a \$2.80 commodity, but we **Like LNG**  
**Renewables** – more cost-deflation, solar growth and CCUS\*-- **Like**

New York Energy Forum, January 15<sup>th</sup> 2019

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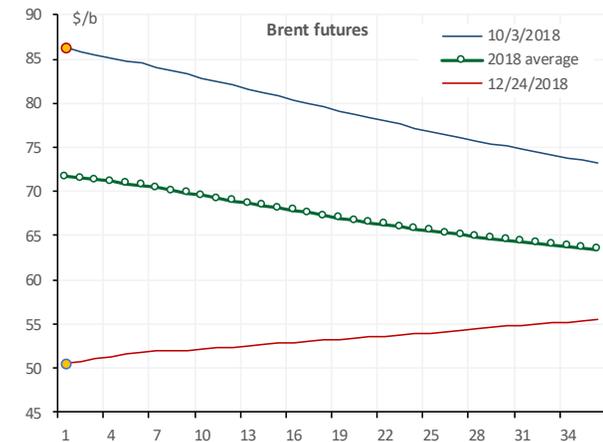
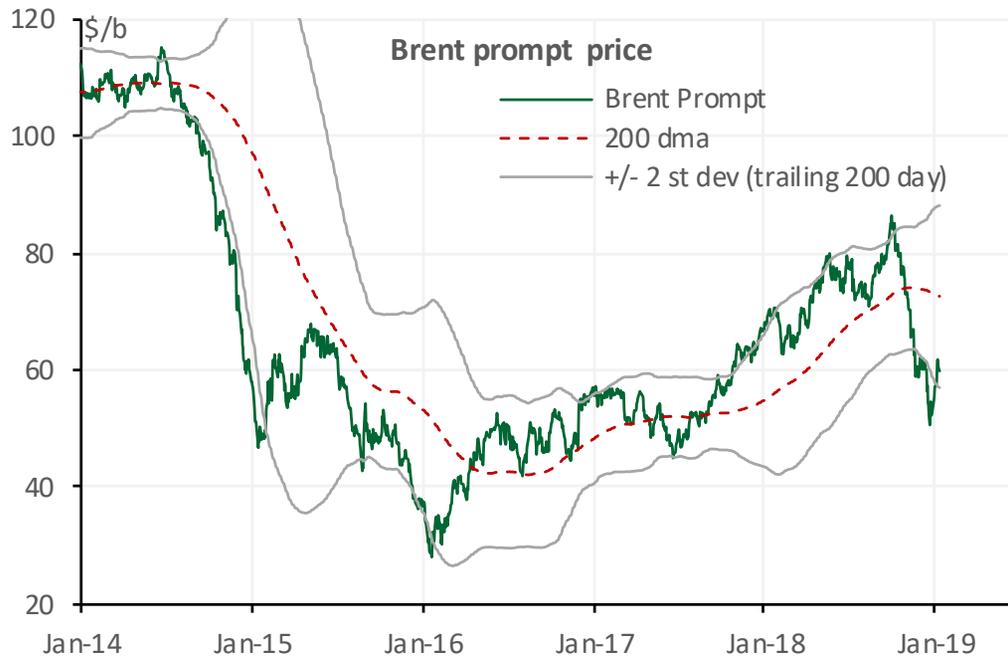
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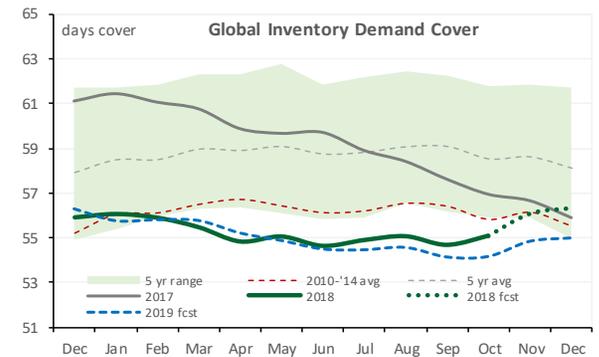
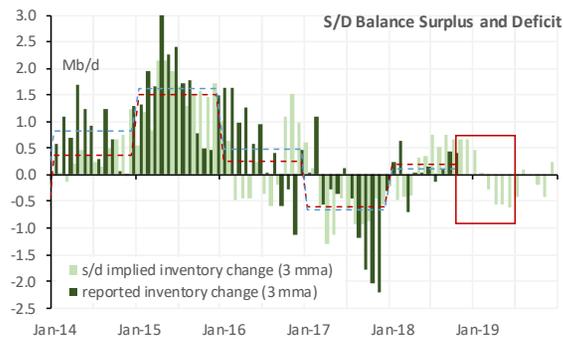
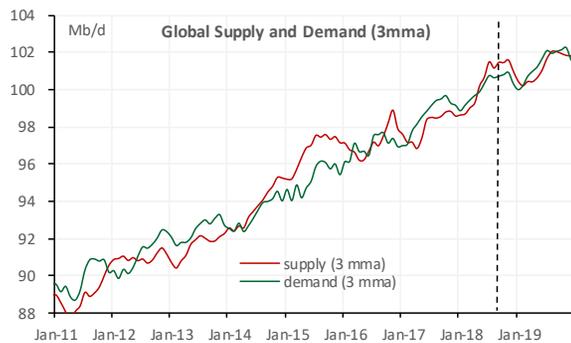
## WE THINK OF OIL PRICES AS A STORY OF FUTURES CURVES

Here's some context around what happened to oil prices in 2018: A boom, and a bust, and a whole lot of shape shifting of the futures curve (of Brent, the more global of the two key benchmarks, in this example).



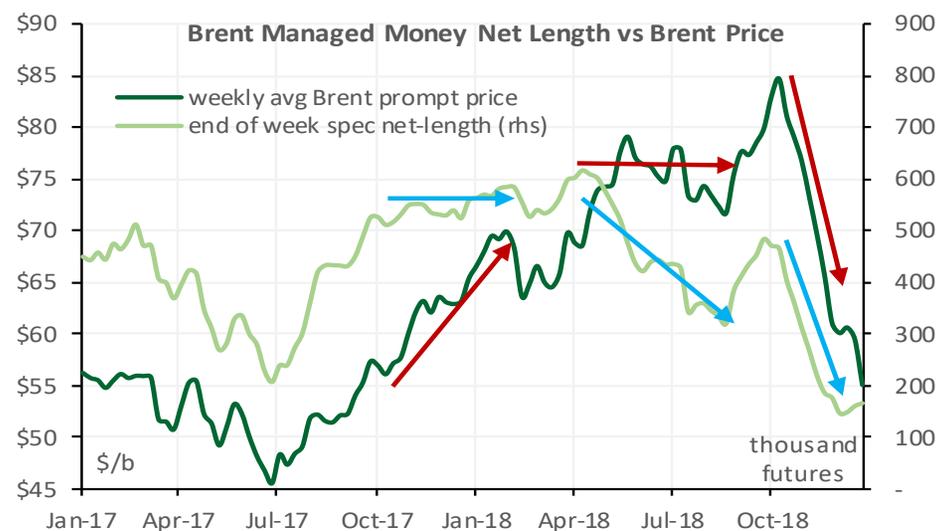
## SUPPLY AND DEMAND → INVENTORY CHANGES → FUTURES CURVE SHAPE-SHIFTS

Fundamentals matter, even in an age of machines: The 2013-'14 supply surge tipped balances into surplus and prices collapsed. Supply growth momentum ebbed in H2'15. But Opec added to supply-side driven misery through Q1-'17: Inventories finally began to fall in Q2 of 2017. The supply deficit widened out big time only in H2-2017. However, as early as late last year fundamentals shifted back into surplus.



## FUNDAMENTALS, PERCEPTION AND EXPECTATIONS: SPECULATIVE POSITIONING

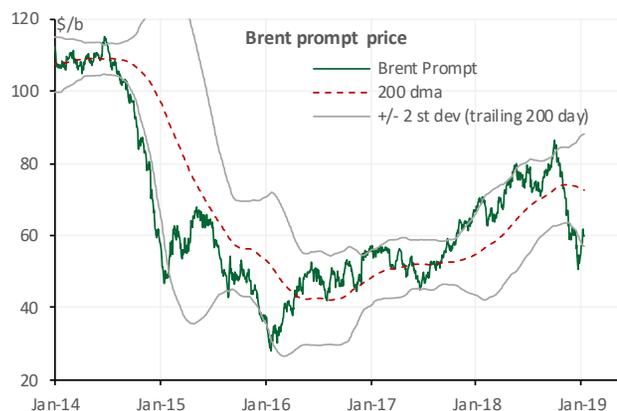
In Nancy's world, the 'US Recession Risk Index' is composed of "real" economy as well as financial markets indicators. For oil prices, there are fundamentals and then there is macro risk. The Brent Managed Money category and its positioning does a good job of reflecting broader risk appetite ... Obviously positioning matters. From this perspective too we felt that prices should bounce from the low \$50s (Brent).



## WHAT HAPPENED IN 2018 ...

Last year's boom and bust of oil prices:

- We expected tight fundamentals, -300 kb/d of stockdraws, and a corresponding \$14/b average Brent backwardation of the 1-36 time spread - thanks to softer fundamentals in H2, we got a 200 kb/d stock build and an \$8/b average backwardation;
- But instead of the long end averaging \$62/b, it actually averaged \$63 and we missed our 2018 Brent price forecast of \$76/b by \$4
- In much the same way we missed our year-average WTI price target of \$69/b by \$4 – we did get most of the relevant spreads right

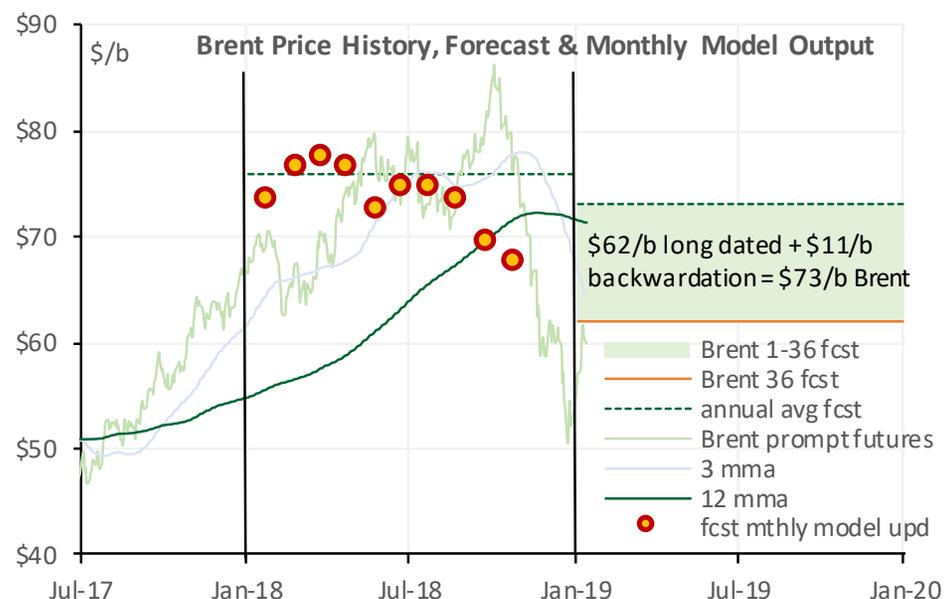


Source: The BLOOMBERG PROFESSIONAL™ Service, CSM Research

## MONTHLY DATA (THROUGH OCT'18) AND OUR 2019-'20 PRICE FORECAST

This year we forecast an \$11 average backwardation of the Brent curve and peg the long-dated price at \$62. Next year's softer fundamentals and small stock-build should come with a \$7 average backwardation and a long dated price of \$65 (smack at the mid-cycle / normal level).

WTI diffs to Brent of \$10/b this year, narrow to \$7/b next year for an average of \$63/b and \$65/b



## FRAMING THE CURVE SHAPE: OUR S&D BALANCE

If oil prices are stories of futures curves, the shape of those curves is a story of near-term fundamentals. That story has four principal actors: Demand, Opec supply, non-Opec supply – and in that last category the break out performance of the US shale stands out.

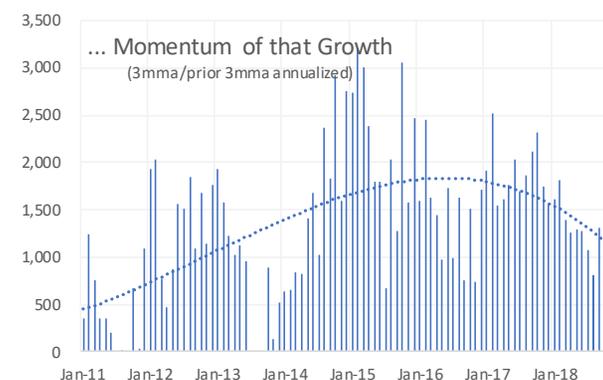
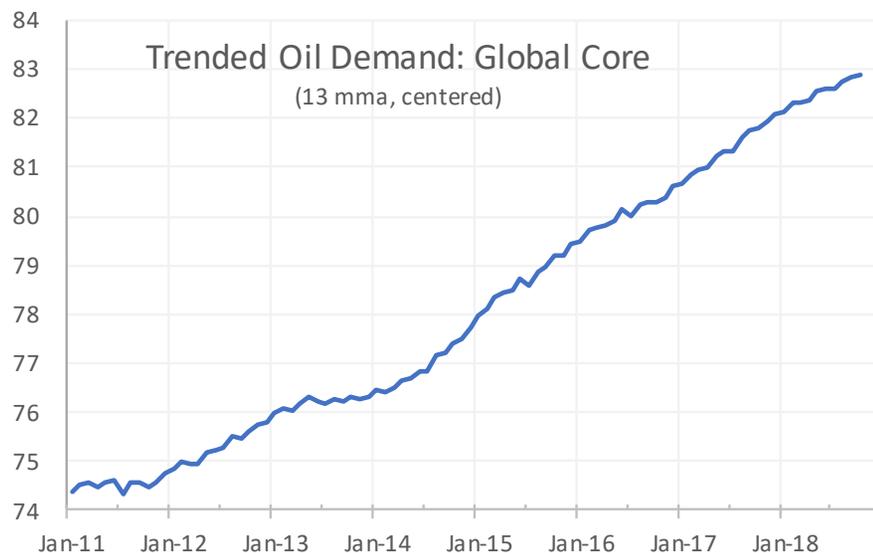
- Note the significant stock-draws in Q2 and the modest (nearly neutral) build indicated for 2020

Global Oil Balances	2014	2015	2016	Q1-'17	Q2-'17	Q3-'17	Q4-'17	2017	Q1-'18	Q2-'18	Q3-'18	Q4-'18	2018	Q1-'19	Q2-'19	Q3-'19	Q4-'19	2019	2020
<b>Supply</b>	<b>93.7</b>	<b>96.8</b>	<b>97.2</b>	<b>97.1</b>	<b>97.4</b>	<b>98.5</b>	<b>98.9</b>	<b>98.0</b>	<b>98.7</b>	<b>100.2</b>	<b>101.2</b>	<b>101.6</b>	<b>100.4</b>	<b>100.2</b>	<b>100.7</b>	<b>102.1</b>	<b>101.9</b>	<b>101.2</b>	<b>103.0</b>
yoy	2.2	3.1	0.4	0.4	1.2	1.5	-0.1	0.8	1.6	2.8	2.7	2.8	2.5	1.5	0.5	0.9	0.3	0.8	1.8
Opec	36.8	38.2	39.4	38.9	39.0	39.7	39.2	39.2	38.9	39.5	39.3	39.4	39.3	38.0	37.7	38.4	38.2	38.1	38.3
Opec crude	30.6	32.0	32.7	32.3	32.4	33.1	32.5	32.6	32.1	32.7	32.4	32.5	32.4	31.4	31.1	31.8	31.7	31.5	31.8
yoy	-0.3	1.4	0.7	0.2	0.0	0.2	-1.0	-0.1	-0.2	0.3	-0.7	0.0	-0.2	-0.8	-1.6	-0.6	-0.9	-1.0	0.3
Non Opec	54.4	55.9	55.2	55.7	55.7	56.1	57.0	56.1	57.2	57.9	59.2	59.6	58.5	59.6	60.2	61.0	61.0	60.5	62.0
yoy	2.3	1.5	-0.7	0.2	1.1	1.1	1.2	0.9	1.5	2.3	3.1	2.6	2.4	2.4	2.3	1.8	1.4	2.0	1.6
US crude	8.8	9.4	8.8	9.0	9.1	9.3	10.0	9.4	10.2	10.5	11.2	11.6	10.9	11.8	11.9	12.2	12.4	12.1	13.1
yoy	1.3	0.7	-0.6	-0.1	0.3	0.7	1.1	0.5	1.2	1.4	1.9	1.7	1.6	1.6	1.4	1.0	0.8	1.2	1.1
<b>Demand</b>	<b>93.4</b>	<b>95.2</b>	<b>97.0</b>	<b>97.1</b>	<b>98.5</b>	<b>99.4</b>	<b>99.3</b>	<b>98.6</b>	<b>99.2</b>	<b>99.9</b>	<b>100.7</b>	<b>100.9</b>	<b>100.2</b>	<b>100.2</b>	<b>101.2</b>	<b>102.0</b>	<b>102.3</b>	<b>101.4</b>	<b>102.6</b>
yoy %	1.0%	2.0%	1.8%	1.0%	1.9%	1.9%	1.9%	1.7%	2.2%	1.4%	1.2%	1.7%	1.6%	1.1%	1.3%	1.3%	1.3%	1.2%	1.1%
Non-OECD	47.6	48.7	50.0	50.1	51.5	51.8	51.2	51.2	51.4	52.7	52.6	52.3	52.3	52.4	53.8	53.7	53.4	53.3	54.4
yoy	1.2	1.1	1.3	0.9	1.0	1.6	1.3	1.2	1.2	1.2	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
OECD	45.8	46.5	47.0	46.9	47.0	47.7	48.1	47.4	47.8	47.2	48.1	48.6	47.9	47.8	47.4	48.3	48.9	48.1	48.2
yoy	-0.3	0.7	0.4	0.0	0.9	0.3	0.6	0.5	0.9	0.1	0.4	0.6	0.5	0.0	0.2	0.2	0.2	0.2	0.1
<b>Implied Inventory Change</b>	<b>0.3</b>	<b>1.6</b>	<b>0.3</b>	<b>0.1</b>	<b>-1.1</b>	<b>-0.9</b>	<b>-0.4</b>	<b>-0.6</b>	<b>-0.5</b>	<b>0.3</b>	<b>0.5</b>	<b>0.7</b>	<b>0.3</b>	<b>0.0</b>	<b>-0.6</b>	<b>0.1</b>	<b>-0.4</b>	<b>-0.2</b>	<b>0.4</b>
<b>Reported Inventory Change</b>	<b>0.9</b>	<b>1.6</b>	<b>0.4</b>	<b>1.2</b>	<b>-0.4</b>	<b>-1.2</b>	<b>-2.2</b>	<b>-0.7</b>	<b>0.7</b>	<b>0.0</b>	<b>0.1</b>								
<b>Memo (crude oil supply):</b>																			
Iran	2.8	2.8	3.5	3.7	3.7	3.8	3.8	3.8	3.7	4.1	3.5	2.8	3.5	2.5	2.4	2.3	2.3	2.4	2.3
Venezuela	2.3	2.7	2.4	2.2	2.1	2.1	1.8	2.1	1.6	1.5	1.5	1.4	1.5	1.3	1.2	1.1	1.0	1.2	1.0
Saudi Arabia (incl. 1/2 Neutral Zone)	9.7	10.2	10.2	9.8	9.9	10.1	9.9	9.9	9.6	10.2	10.1	10.6	10.1	10.2	10.2	10.4	10.4	10.3	10.4

Source: IEA, JODI, BP, Rystad Energy, Country Data, The BLOOMBERG PROFESSIONAL™ Service, CSM Research

## FIRST UP: OIL DEMAND GROWTH – WILL WE GET THE CYCLICAL UPTURN

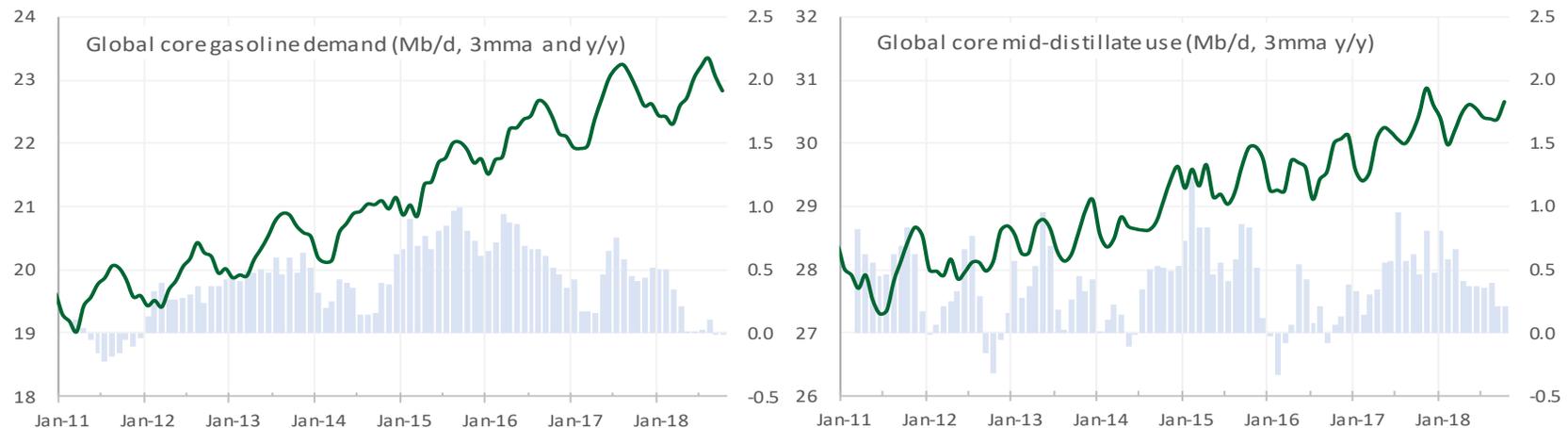
What the data say: There's no question that demand growth momentum has slowed, EM weakness in places and fading growth in 'old' Europe/Asia stand out; then there's the quality of the growth that remains



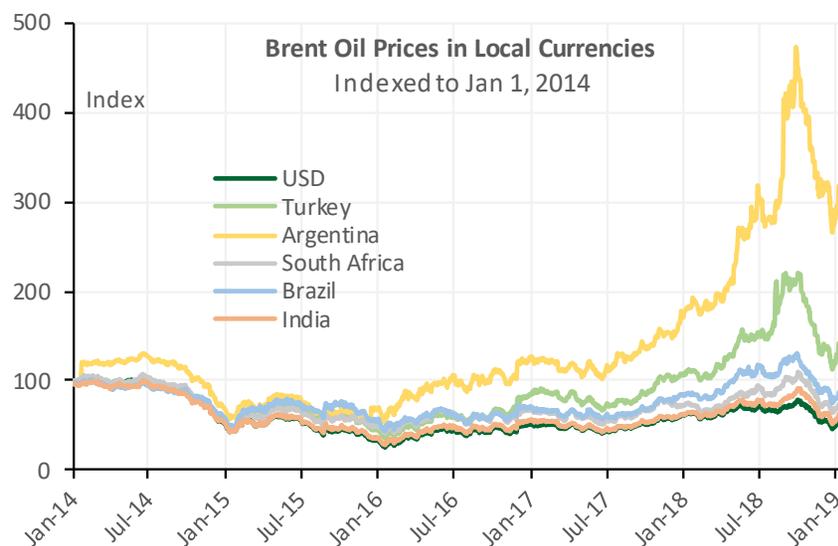
## TRANSPORT FUELS: DEMAND GROWTH CRITICAL TO REFINERS

We do not think that the Q3-'18 collapses are trend shifts – but markets are of a “shoot first” mind  
If we are right, demand growth re-accelerates for both gasoline and the all important middle distillates

- think China stimulus, bounces in Brazil, India and Mideast but with no surety until Q2



## EM STRESSES: DISPERSION NOT CONTAGION, LOWER PRICES SHOULD HELP NOW



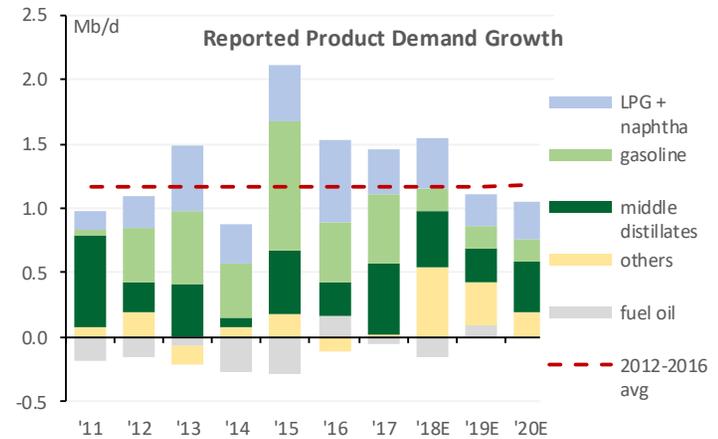
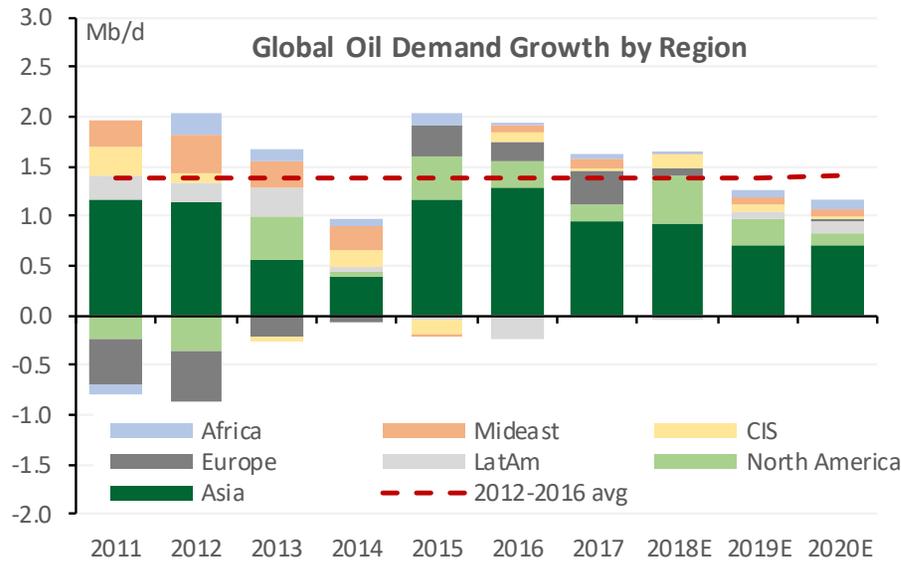
Dollar Debt % GDP		
2018:2Q		
Country	Rank	Dollar Debt % GDP
Chile	12	33.0
Turkey	11	22.1
Mexico	10	21.6
Argentina	9	19.5
Indonesia	8	15.9
Russia	7	11.9
Malaysia	6	11.6
South Africa	5	10.3
Brazil	4	9.0
Korea	3	7.4
China	2	4.0
India	1	3.8

EM Vulnerability Index (CSM)**		
2018:2Q		
Country	Rank	% World GDP*
Turkey	11.2	1.7
Argentina	9.8	0.7
Mexico	7.8	1.9
Chile	7.8	0.4
South Africa	7.2	0.6
Indonesia	7.2	2.6
India	6.2	7.7
Malaysia	5.2	0.7
China	4.6	18.7
Brazil	4.6	2.5
Russia	4.0	3.1
Korea	2.4	1.6

\*Source: IMF, 2018 using PPPs

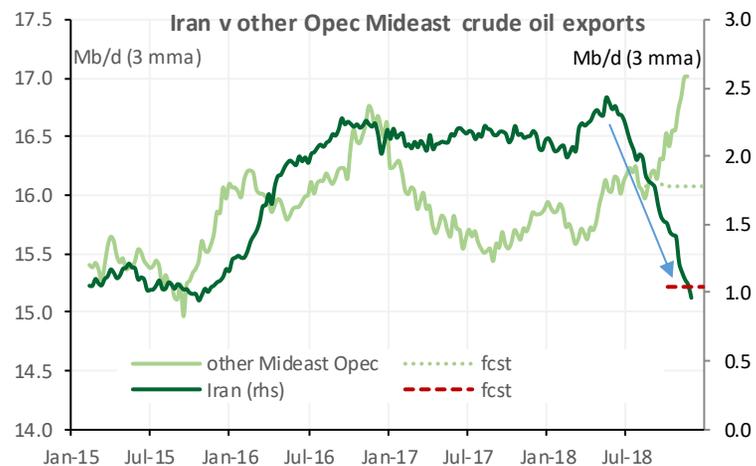
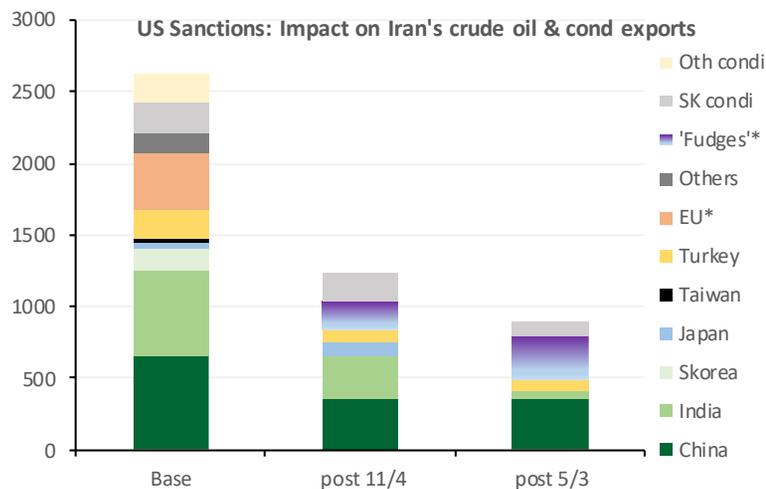
## OIL DEMAND GROWTH THIS YEAR AND NEXT: BELOW TREND AND BELOW PAR

We are out of consensus, but if Nancy is right, and global economic growth hits ~3.5%, we'd be low



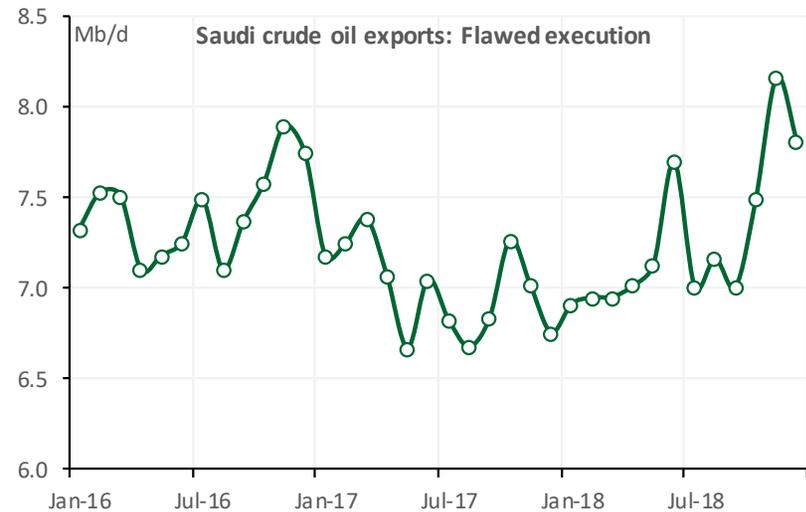
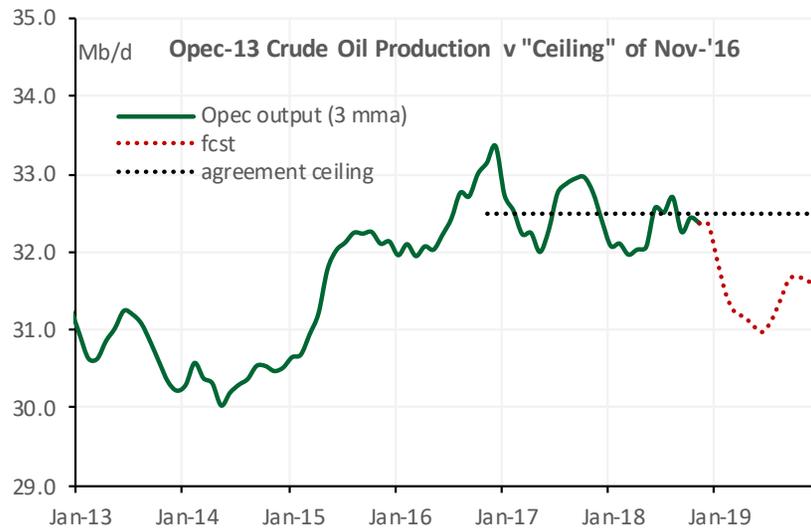
## THE NEXT SUPPLY-SIDE SHOE TO DROP: US SANCTIONS ON IRAN ALREADY BITE

The data already show a big impact. We think the US administration will stick to its guns on this one.



## IT WOULD HELP IF OPEC+ STOPPED MUCKING THINGS UP

Opec (or Opec +, or Saudi) is just not that great at managing supply or reading demand. Sure they cut history making supply deals in late 2016 and again late last year, but today they still have zero credibility



## US OIL PRODUCTION: HUGE AND HUGELY PRICE SENSITIVE POTENTIAL

US crude oil production grew at a steady clip for 50+ years and famously “peaked” in 1972

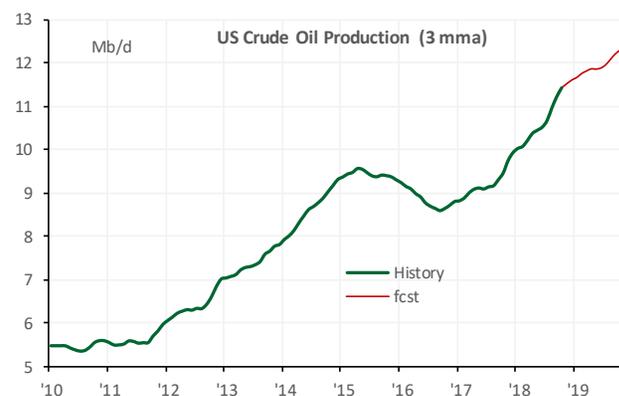
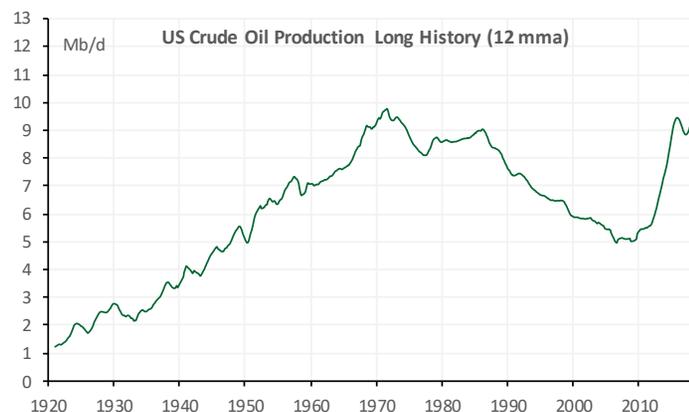
- That ‘peak’ spawned the fallacious peak oil theories that rose to infamy last decade
- crude oil production flatlined– suspended if you will by Alaska and then the deepwater.

Then came the “inexorable” decline ...

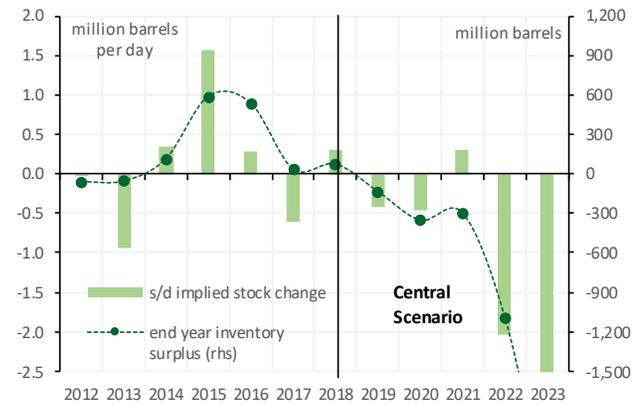
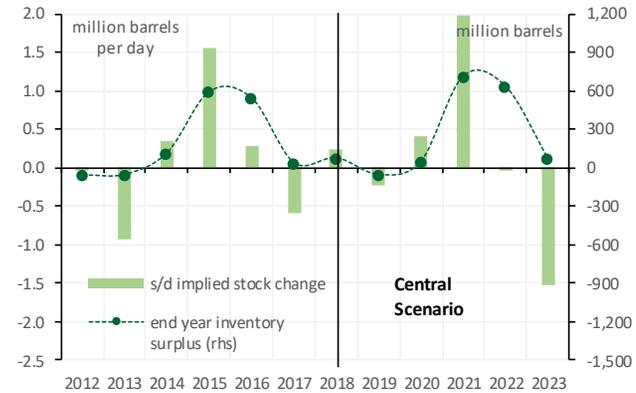
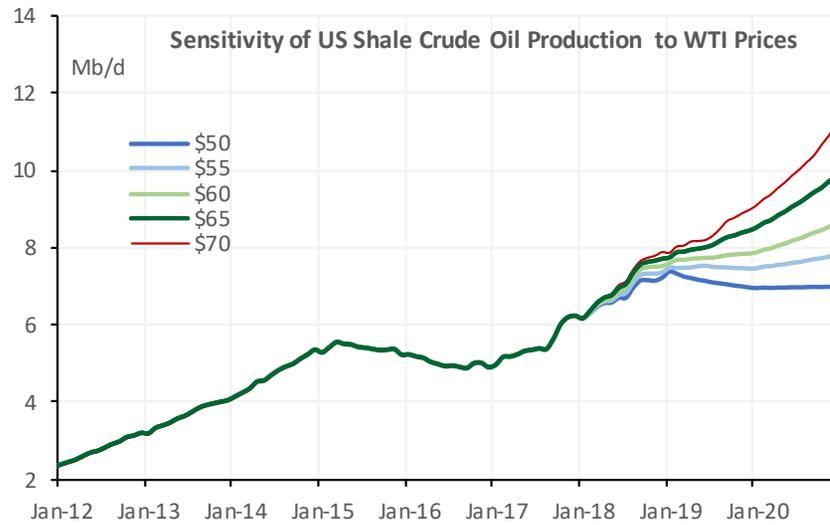
... the US Shale industry has turned all this around

Short cycle investments from tight rocks found all across North America had yielded gas for a few years before similar technology was brought to bear on oil layers. First from the Eagle Ford and Bakken plays, and then the Permian Basin plays of West Texas started. More may follow

The US is again the fastest growing oil exporter



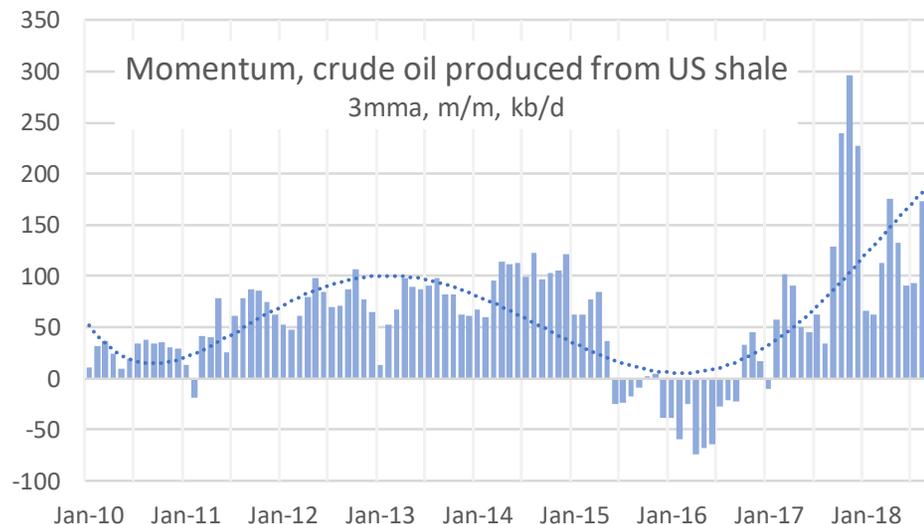
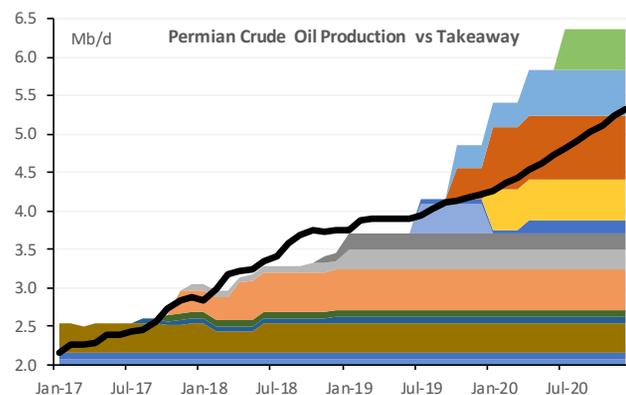
## US SHALE: \$50-\$55/B WTI IS TOO LITTLE; \$65/B IS PROBABLY TOO MUCH



Source: EIA, HPDI, Company Estimates, Rystad Energy, CSM Research

## SO, HAVE THE SHALE PRODUCERS LEARNED TO BEHAVE LIKE ADULTS ...

“Capital Discipline” was the new religion adopted by the shale industry in late 2017, or so they said; it still is touted by many as the new reality ... pardon us and pardon the market, please, for begging to remain skeptical. Last year, constraints mattered not much at all ... growth trumped everything. Credibility anyone?

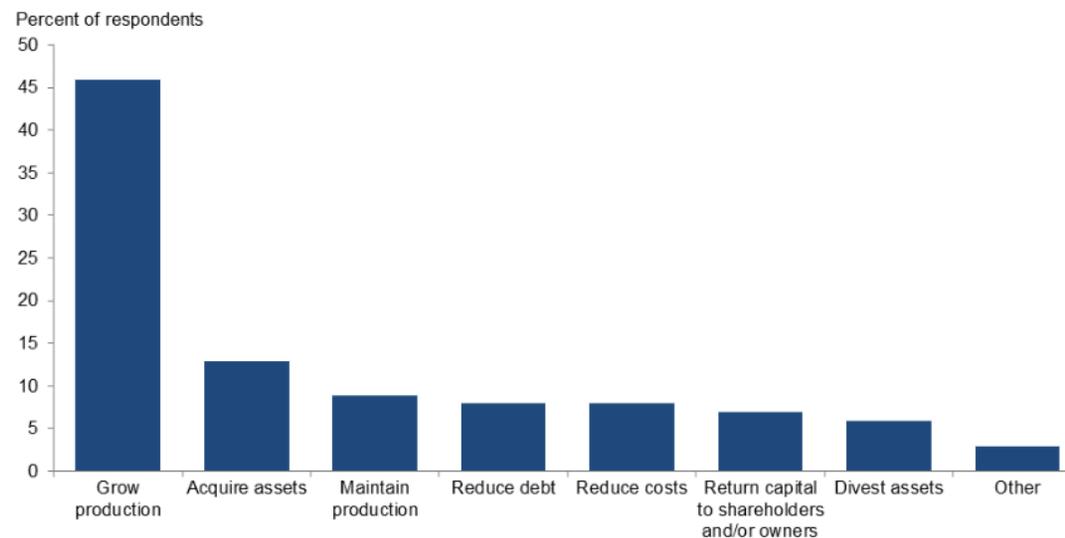


## SUB \$50-55/B THE INDUSTRY BURNS CASH: WHAT, PRAY IS THE PRIORITY IN 2019 ...

### Exploration and Production (E&P) Firms

#### Which of the following is your firm's primary goal in 2019?

Executives from E&P firms were presented with eight potential goals for 2019 and asked to select their firm's primary one from the list. Forty-six percent of executives selected "grow production" as the primary goal in 2019. A total of 13 percent said "acquire assets" and 9 percent indicated "maintain production."

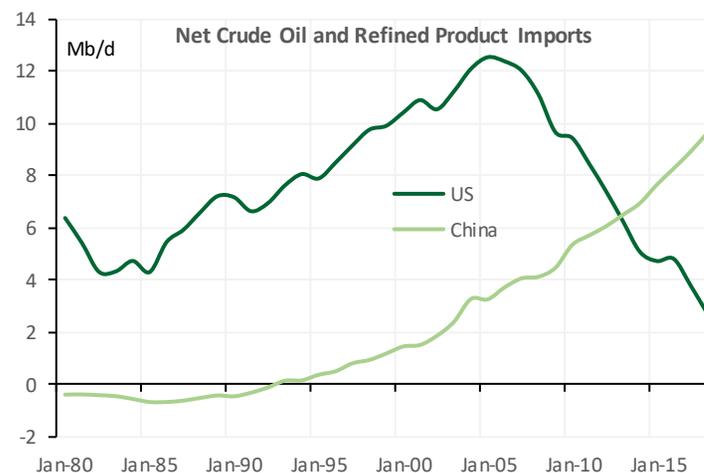
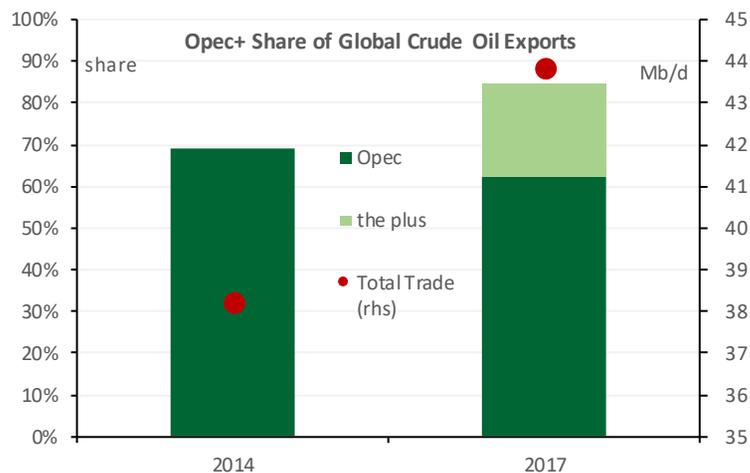


NOTE: Executives from 100 exploration and production firms answered this question during the survey collection period, Dec. 12–20, 2018.

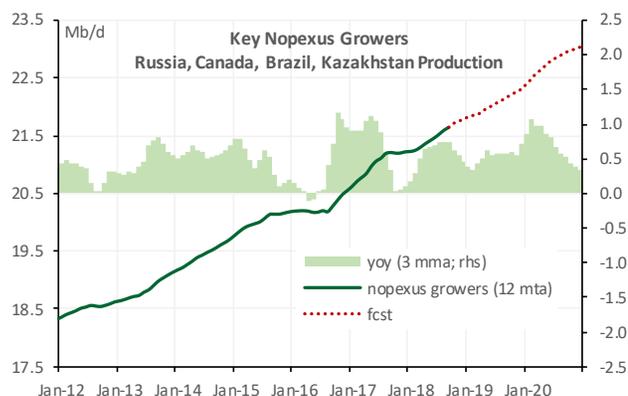
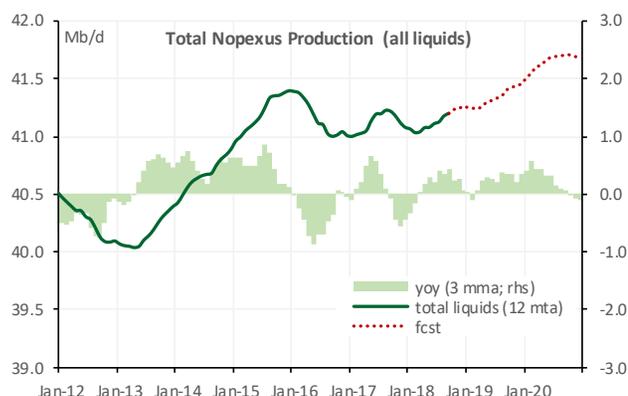
SOURCE: Federal Reserve Bank of Dallas.

## THE US NOW CARES LESS ABOUT OPEC +, BUT EUROPE AND ASIA SHOULD

We do not need the Herfindahl Hershman Index of market concentration to make the point that Opec + represents a historic increase in 'control' of the crude oil export industry. And it's obvious too that the US no longer cares as much ...

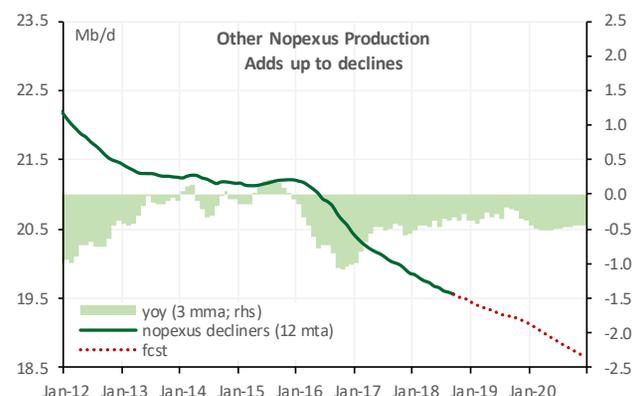


## NON-OPEC EX US: NOT QUITE TAPPED OUT, BUT STARVED FOR CAPITAL



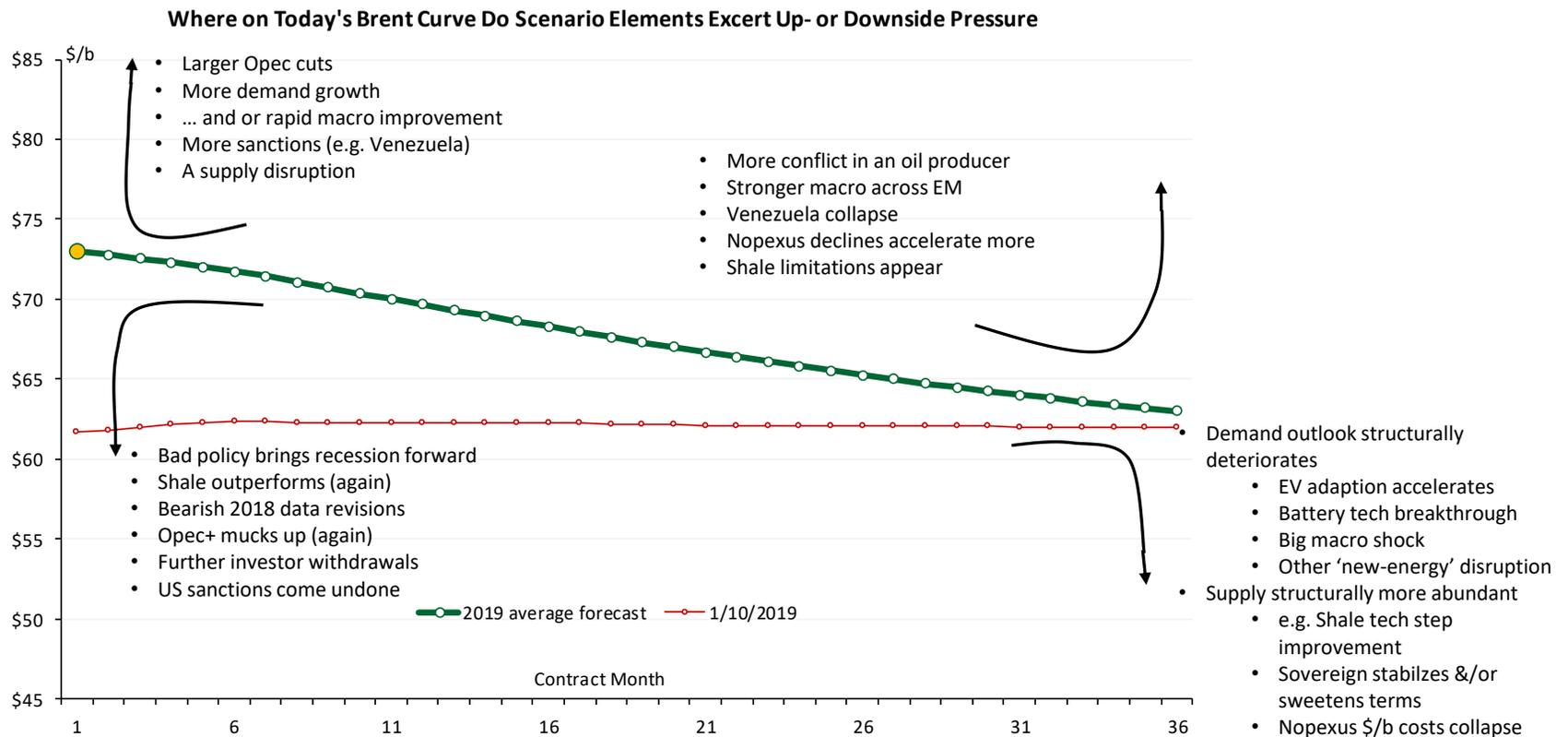
Outside the shale, industry driven oil production hinges on big projects with long, very long, lead-times, which require higher prices and sustained demand

- Most of Nopexus is already declining. The decline has been mitigated by a slew of new projects that were FID'ed in the high price era.
- Only Russia and Brazil keep on growing
- Higher prices fund smaller, incremental projects that can/should mitigate declines in producing basins



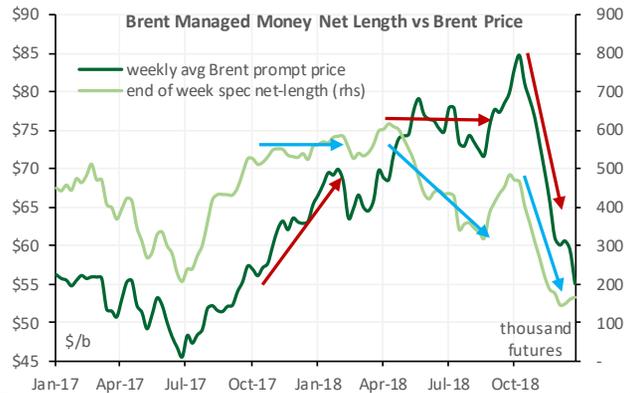
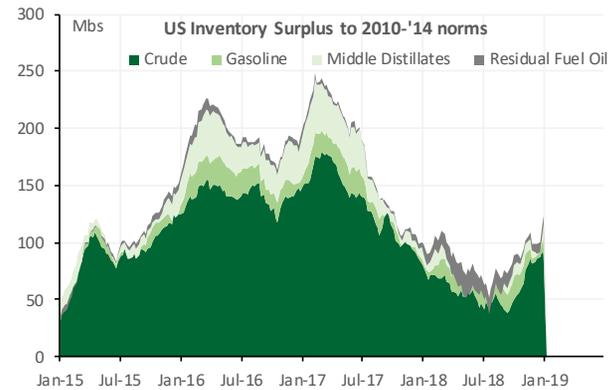
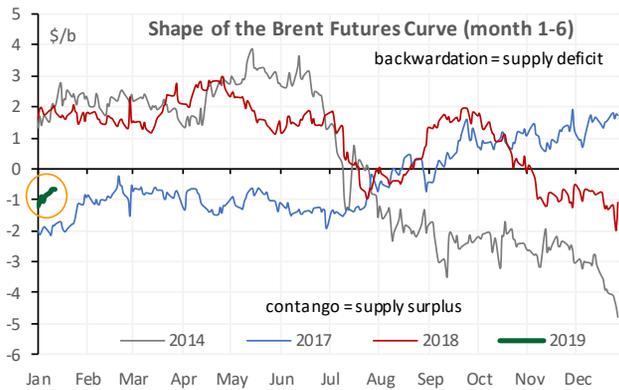
Source: IEA, JODI, BP, Rystad Energy, Country Data, The BLOOMBERG PROFESSIONAL™ Service, CSM Research

## RISKS AROUND OUR FORECAST AND WHERE THEY FIT ON THE CURVE



Source: The BLOOMBERG PROFESSIONAL™ Service, CSM Research

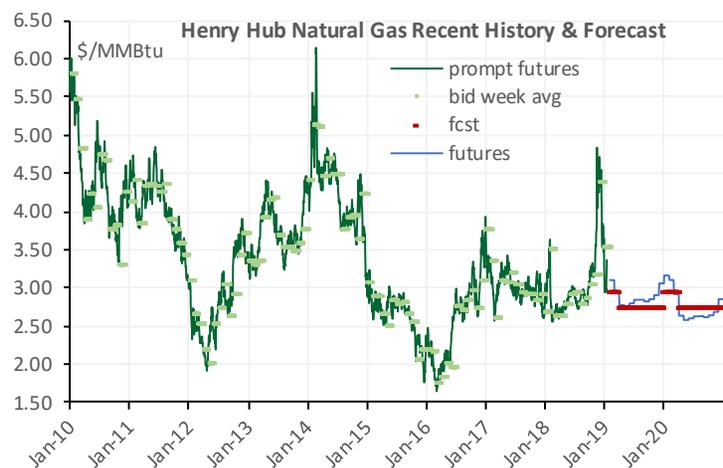
## WHAT WE WILL BE WATCHING: CURVE STRUCTURE, US DATA, MACRO-RISK & POSITIONING



Source: The BLOOMBERG PROFESSIONAL™ Service, CSM Research

## US NATURAL GAS: THE NEATER MORE QUANTIFIABLE ONE – BE BEARISH

## \$2.80 AT HENRY HUB UNLOCKS PLENTY OF SUPPLY (IN 2019-'20)

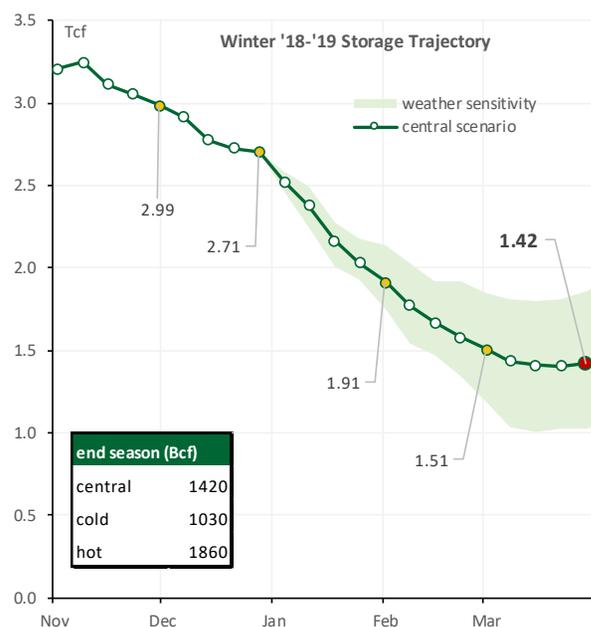


**LNG exports and pipeline exports to Mexico provide lots of room for supply growth, but that supply growth should come relatively cheap.** Upside surprises to demand/exports won't mean much given shale dry gas producers are more leveraged to commodity prices than shale crude oil producers.

For a spell it looked as if the US natural gas story – aka the epic of shale – would get at least a few chapters featuring demand/export driven suspense. Turns out that an interlude of above-normal-prices came and went already – **we use \$2.80/MMBtu as our new benchmark.**

\$/MMBtu	Q1-'18	Q2-'18	Q3-'18	Q4-'18	2018	Q1-'19E	Q2-'19E	Q3-'19E	Q4-'19E	2019E	Q1-'20E	Q2-'20E	Q3-'20E	Q4-'20E	2020E
<b>Henry Hub</b>	<b>2.95</b>	<b>2.78</b>	<b>2.87</b>	<b>3.55</b>	<b>3.04</b>	<b>2.95</b>	<b>2.75</b>	<b>2.75</b>	<b>2.75</b>	<b>2.80</b>	<b>2.95</b>	<b>2.75</b>	<b>2.75</b>	<b>2.75</b>	<b>2.80</b>
Low						2.55	2.40	2.60	2.35	2.48	2.55	2.40	2.60	2.35	2.48
High						3.35	3.10	2.90	3.15	3.13	3.35	3.10	2.90	3.15	3.13
<b>Futures</b>						<b>3.35</b>	<b>2.87</b>	<b>2.91</b>	<b>3.01</b>	<b>3.03</b>	<b>3.11</b>	<b>2.61</b>	<b>2.62</b>	<b>2.73</b>	<b>2.77</b>
Upside						-12%	-4%	-6%	-9%	-8%	-5%	5%	5%	1%	1%
Low						-24%	-16%	-11%	-22%	-18%	-18%	-8%	-1%	-14%	-11%
High						0%	8%	0%	5%	3%	8%	19%	11%	16%	13%

## WINTER 2018-'19 ON TRACK FOR BELOW AVERAGE INVENTORIES



**Given we began winter with only ~3.3 Tcf in working storage, a weather neutral end-March storage level of ~1.4 Tcf is not particularly eye popping** With the Marcellus/Utica debottlenecked, risks of running out of inventory are much lower than in seasons past. Temporary dislocations, like the rally during last year’s “bomb cyclone”, are about as exciting as markets can get, we think.

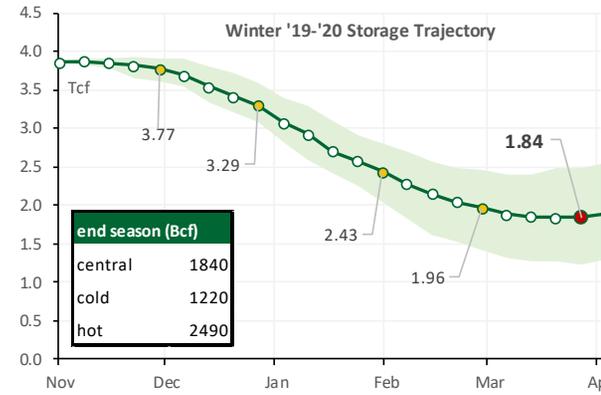
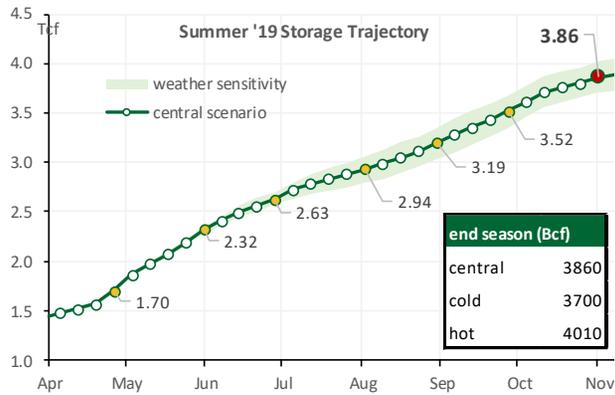
**Summer 2019 looks balanced, although forecast errors compound further out.** By end summer ‘19 our models point to ~3.86 Tcf of storage, about average. Of course, much depends on weather.

Bcf/d	18-'19 vs '17-'18 balance changes ex-weather					avg
	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	
<b>Total</b>	<b>1.09</b>	<b>3.43</b>	<b>5.60</b>	<b>5.76</b>	<b>4.13</b>	<b>3.99</b>
<b>Demand</b>	<b>4.1</b>	<b>1.6</b>	<b>2.0</b>	<b>0.8</b>	<b>0.8</b>	<b>1.9</b>
Electric Power	2.2	0.3	0.1	-0.4	-0.5	0.3
Industrial	1.3	0.7	1.0	0.5	0.6	0.8
Other	0.6	0.6	0.8	0.7	0.7	0.7
<b>Net Exports</b>	<b>2.4</b>	<b>2.5</b>	<b>2.5</b>	<b>2.4</b>	<b>3.3</b>	<b>2.6</b>
LNG Net Exports	1.1	1.5	2.0	1.6	1.3	1.5
Mexico Net Exports	0.5	0.6	0.8	1.0	1.4	0.9
Canada Net Imports	-0.7	-0.5	0.3	0.3	-0.5	-0.3
<b>Production (Dry Gas)</b>	<b>7.5</b>	<b>7.6</b>	<b>10.1</b>	<b>8.9</b>	<b>8.2</b>	<b>8.5</b>

# CORNERSTONE MACRO

Economics, Policy, Strategy & Technicals

## '19-20 MARKET LOOKS BALANCED, BUT THAT CAN STILL CHANGE

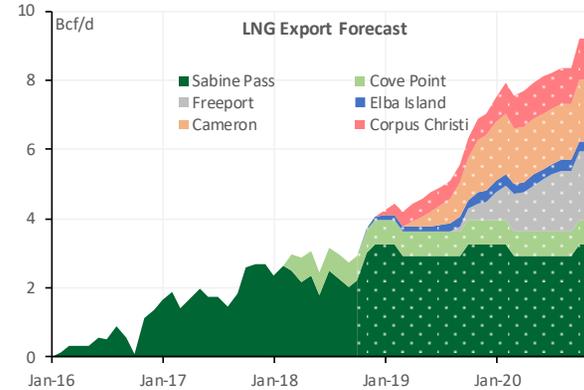
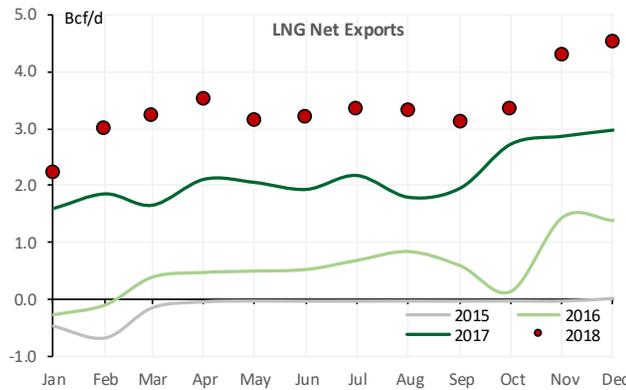
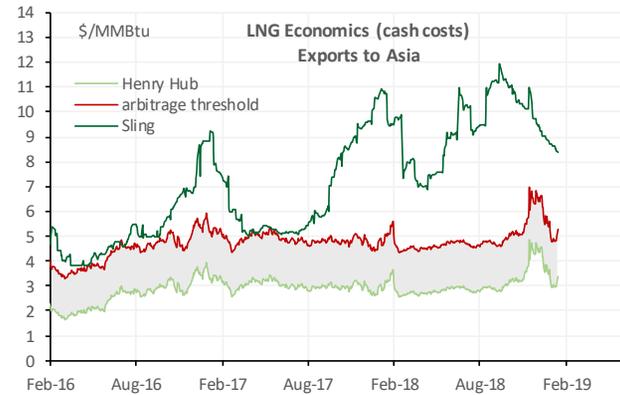
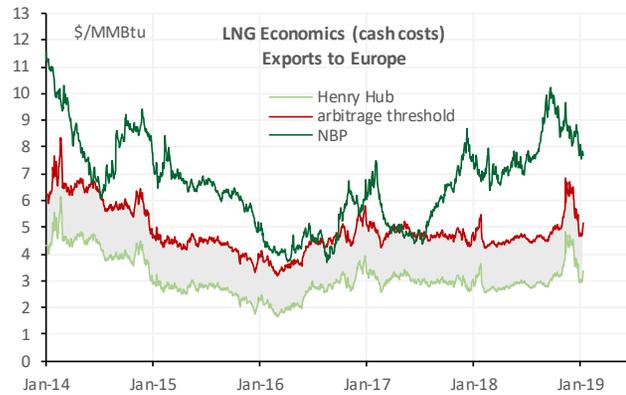


'19 vs '18 balance changes ex-weather								
Bcf/d	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	avg
<b>Total</b>	<b>11.22</b>	<b>0.98</b>	<b>-1.89</b>	<b>1.78</b>	<b>0.04</b>	<b>-1.39</b>	<b>-0.95</b>	<b>1.38</b>
<b>Demand</b>	<b>-6.8</b>	<b>2.9</b>	<b>4.4</b>	<b>-0.2</b>	<b>0.1</b>	<b>0.3</b>	<b>0.1</b>	<b>0.1</b>
electric power baseload	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
coal/gas switching	-0.7	-0.3	0.1	0.4	0.4	0.1	0.3	0.0
electric power model error	0.0	-0.1	1.8	-2.4	-2.4	-2.0	0.0	-0.7
Res/Comm	-7.6	0.9	0.1	0.1	0.0	0.0	-2.3	-1.2
Industrial	0.4	0.8	0.7	0.3	0.6	1.0	1.4	0.7
Other	0.4	0.8	0.9	0.8	0.8	0.6	0.1	0.6
<b>Net Exports</b>	<b>3.6</b>	<b>3.5</b>	<b>4.7</b>	<b>4.3</b>	<b>4.3</b>	<b>4.6</b>	<b>4.9</b>	<b>4.3</b>
LNG Net Exports	1.5	1.4	2.2	1.8	2.1	2.9	3.6	2.2
Mexico Net Exports	1.6	1.8	1.5	1.3	1.2	1.2	1.4	1.4
Canada Net Imports	-0.5	-0.3	-1.1	-1.3	-1.0	-0.6	0.0	-0.7
<b>Production (Dry Gas)</b>	<b>8.1</b>	<b>7.4</b>	<b>7.2</b>	<b>5.9</b>	<b>4.5</b>	<b>3.6</b>	<b>4.1</b>	<b>5.8</b>

19-'20 vs '17-'18 balance changes ex-weather						
Bcf/d	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	avg
<b>Total</b>	<b>-0.18</b>	<b>1.69</b>	<b>3.46</b>	<b>4.52</b>	<b>3.61</b>	<b>2.61</b>
<b>Demand</b>	<b>5.6</b>	<b>4.0</b>	<b>3.4</b>	<b>2.3</b>	<b>2.2</b>	<b>3.5</b>
Electric Power	3.0	1.3	0.1	-0.4	-0.5	0.7
Industrial	1.7	1.8	2.2	1.6	1.7	1.8
Other	0.9	0.9	1.1	1.0	1.0	1.0
<b>Net Exports</b>	<b>6.9</b>	<b>6.9</b>	<b>7.8</b>	<b>7.5</b>	<b>7.9</b>	<b>7.4</b>
LNG Net Exports	4.2	4.4	5.3	5.2	4.6	4.7
Mexico Net Exports	1.8	1.9	2.1	2.0	2.2	2.0
Canada Net Imports	-0.9	-0.6	-0.4	-0.3	-1.1	-0.7
<b>Production (Dry Gas)</b>	<b>12.4</b>	<b>12.5</b>	<b>14.6</b>	<b>14.3</b>	<b>13.7</b>	<b>13.5</b>

Source: The BLOOMBERG PROFESSIONAL™ Service, NOAA, EIA, HPDI, Company Estimates, CSM Research

## LNG EXPORTS: ARBS ARE WIDE OPEN THIS WINTER



Source: The BLOOMBERG PROFESSIONAL™ Service, EIA, CSM Research