Energy Watch

Backwardation is the solution (redux)

We are reintroducing our Energy Watch which presents our oil market Outlook, Opportunities for corporates and investors and our Supply-Demand forecasts.

- Brent prices have finally reached $70/bbl, following a fundamentally led rally reflective of a deficit larger than even we had forecast. We expect the drivers of this deficit to persist through 2Q19: the "shock and awe" implementation of the OPEC cuts, global activity sequentially accelerating, further tightening of US oil sanctions and an only moderate increase in shale production for now.
- With lower projected inventories, we expect further backwardation and modest upside to spot prices with our 2Q19 forecast now at $72.5/bbl (from $65/bbl previously), effectively base casing the upside risks that we had been highlighting. While the macro risk-on environment and the threat of disruptions may drive spot prices even higher, we still expect that prices will decline gradually from this summer as shale and OPEC production increases. We therefore find more compelling opportunities for corporates and investors in timespreads, differentials and product cracks. With large spare capacity in OPEC and the Permian basin and a wave of long-cycle projects still expected to come online in 2020, we maintain our $60/bbl forecast for next year.
- Beyond disruptions, the key to further spot price upside in coming months and years will be how OPEC manages its exit from the current cuts. Should long-dated prices rally and become unanchored once again, our conviction in lower prices next year would increase given the likely shale supply response. Conversely, guidance for higher output in coming months would likely weight on long-dated prices, maintain backwardation and lead to persistent shale restraint, creating upside risks to our 2020 spot price forecast.
- We believe that such an outcome would resemble the oil market of the 1990s, characterized by tight spot markets but well supplied forward balances and reflected in steady backwardation with an anchored back-end. We view this as the most compelling outcome for OPEC and the market structure most likely to be sustainable. But having been waiting for this shift since 2016, we are not yet ready to base case it, even though the maturing shale producer landscape should eventually help achieve it.

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Outlook

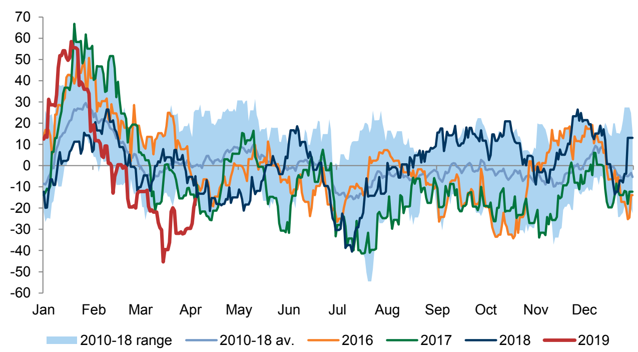
A fundamentally driven rally

Oil prices have ground higher over the past month, with Brent now trading above $70/bbl and at its highest level since November. We view current prices and the 28% Brent rally this year as fundamentally driven and justified: reflecting a global market deficit that has been larger than even we had expected, achieved through backwardation and despite only modest speculative sponsorship.

The drivers of this deficit have been Saudi's implementation of a "shock and awe" approach to the production cuts, Venezuela and Iranian sanctions tightening supply and demand growth – especially adjusted for weather – remaining supportive. Even North America contributed with restraint by US producers and the large Canadian production cuts.

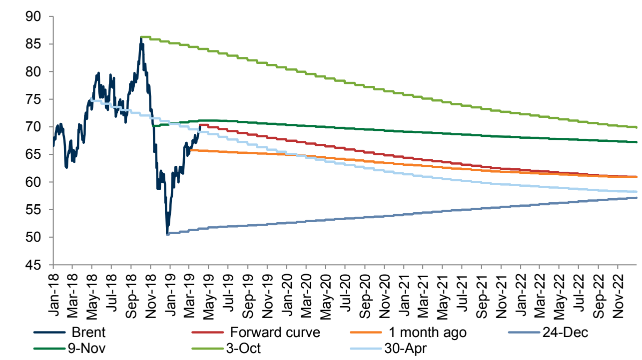
The nature of the rally, led by physical crude prices and backwardation, is reflective of this deficit. Periods of high fundamental uncertainty - as experienced late last year - typically require physical crude markers to lead financial benchmarks, with the outperformance of cash over futures prices this year consistent with a tightening market. This implies that the rally had to be driven by the forward curve moving into backwardation, with the front-month to long-dated level of Brent backwardation back to being aligned with the current level of global inventories from its (il)liquidity driven contango of late December.

Exhibit 1: Large production losses and resilient demand growth have put the global oil market in a large deficit in 1Q...
Rolling 4-week change in global high frequency oil stocks (mb)



Source: Goldman Sachs Global Investment Research, EIA, PJK, PAJ, IE Singapore

Exhibit 2: ... bringing the Brent forward curve back into backwardation
$/bbl



Source: Goldman Sachs Global Investment Research, ICE

A tighter market through the summer

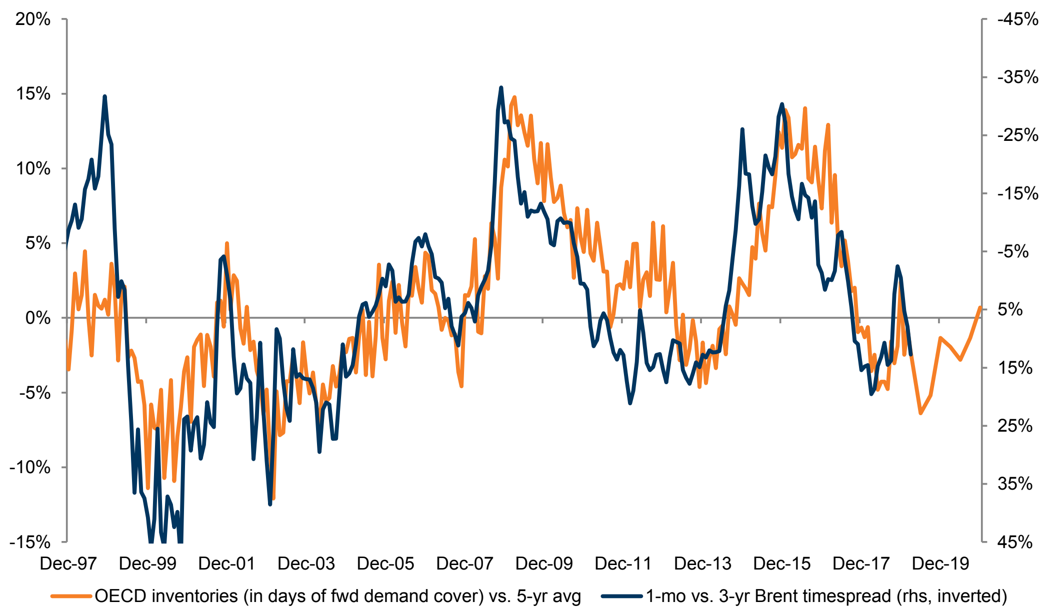
Our updated supply-demand forecasts point to the global oil market remaining in a deficit of 0.5 mb/d in 2Q, with the OPEC+ cut now set to continue, global activity sequentially accelerating, further tightening of sanctions and an only moderate increase in shale production for now. This leads us to expect OECD industry stocks will fall 6%

below 5-year average levels by the end of June from 2% currently (measured in days of demand).

While swings in production remain once again the key drivers to this supply-demand deficit, demand will also help. The headwind of a mild winter that has weighed on OECD demand will fade in 2Q with EM demand also set to benefit from accelerating activity, the Chinese stimulus and EM restocking amidst still low retail fuel prices. More broadly, our 2019 global demand growth forecast remains above consensus expectations at 1.4 mb/d, supported by accelerating activity and a slowdown in EM power oil displacement (with our higher 2018 demand also supporting 2019 demand levels).

This tighter fundamental outlook is leading us to forecast a further steepening of the Brent forward curve into backwardation and to raise our 2Q Brent price forecast to $72.5/bbl vs. $65/bbl previously. We are effectively adopting the upside risks to our prior peak forecast of $67.5/bbl that we had been highlighting recently. Our new forecasts are above the forward curve and consensus expectations for both WTI and Brent in the short term.

Exhibit 3: The 2Q deficit that we expect will drive prices higher through steeper backwardation
OECD commercial stocks in days of OECD demand coverage vs. 5-yr avg (lhs) vs. 1-mo to 3-yr Brent timespreads (%, rhs, inverted)



Source: IEA, ICE, Goldman Sachs Global Investment Research, Kayrros, JODI, National Sources, Kpler

The current set-up suggests prices could run even further as (1) risky assets are finding a new bid, (2) supply risks appear clearly skewed to the downside between US oil sanctions and political instability in Libya and Algeria and (3) with speculative length having significant room to rise. We caution however that any further large upside would likely prove short-lived and still expect prices to decline gradually from this summer onward as shale and OPEC production increases. The tighter starting level of inventories is nonetheless also leading us to raise our 3Q and 4Q19 Brent forecasts to $65.5 and 62/bbl respectively.

Exhibit 4: We expect prices to rise higher than before over the next quarter before gradually declining into 2020
$/bbl. Italics is realized

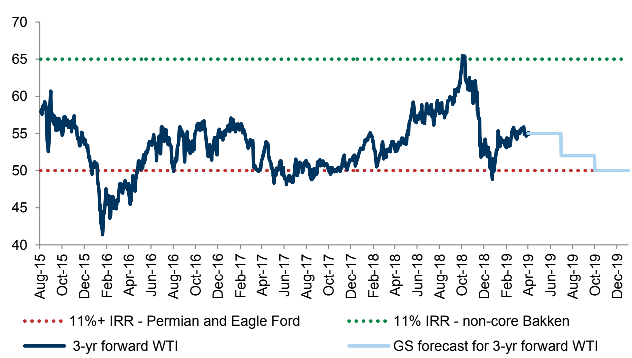
	WTI				Brent				Brent-WTI				3-yr Forwards			
	Forecast	Previous	Consensus	Forwards	Forecast	Previous	Consensus	Forwards	Forecast	Previous	Consensus	Forwards	WTI	Previous	Brent	Previous
1Q19	*54.9*	53.5	*54.9*	*54.9*	*63.9*	62.0	*63.9*	*63.9*	*9.0*	8.5	*9.0*	*9.0*	*54.4*	54.5	*61.2*	60.0
Current	*63.1*				*70.3*				*7.3*				*55.0*		*61.8*	
2Q19	65.5	56.5	60.0	62.6	72.5	65.0	70.0	69.0	7.0	8.5	10.0	6.4	55.0	50.0	60.0	55.5
3Q19	60.0	57.5	62.5	62.4	65.5	63.0	70.0	68.0	5.5	5.5	7.5	5.7	52.0	50.0	56.0	55.5
4Q19	57.5	54.5	62.8	61.7	62.0	60.0	70.0	67.3	4.5	5.5	7.3	5.6	50.0	50.0	54.0	55.5
2019	**59.5**	**55.5**	**60.0**	**60.4**	**66.0**	**62.5**	**68.5**	**67.0**	**6.5**	**7.0**	**8.4**	**6.7**	**52.9**	**51.1**	**57.8**	**56.6**
1Q20	55.5	54.5	64.0	60.7	60.0	60.0	70.0	66.7	4.5	5.5	6.0	6.0	50.0	50.0	54.0	55.5
2Q20	55.5	54.5	65.0	59.8	60.0	60.0	70.0	66.0	4.5	5.5	5.0	6.2	50.0	50.0	54.0	55.5
3Q20	55.5	54.5	66.0	58.9	60.0	60.0	70.0	65.3	4.5	5.5	4.0	6.4	50.0	50.0	54.0	55.5
4Q20	55.5	54.5	65.0	58.2	60.0	60.0	70.0	64.6	4.5	5.5	5.0	6.3	50.0	50.0	54.0	55.5
2020	**55.5**	**54.5**	**65.0**	**59.4**	**60.0**	**60.0**	**70.0**	**65.6**	**4.5**	**5.5**	**5.0**	**6.2**	**50.0**	**50.0**	**54.0**	**55.5**

Source: Goldman Sachs Global Investment Research, CME, ICE

Can OPEC finally manage a successful end to its cuts?

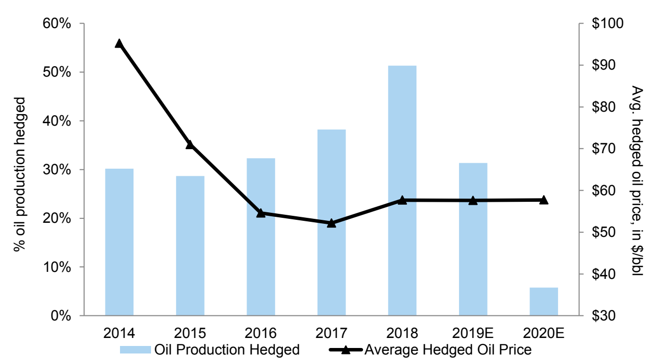
Unlike last summer, there is well identified global spare production capacity. Core-OPEC and Russia combined production was down 1.6 mb/d in March from their 2018 peaks. Further, new pipeline and export capacity will connect the Permian - the cheapest and largest shale basin - to the global market by this fall. This leads us to reiterate our view that the global marginal cost of production will decline this year. This stands in stark contrast to 2018, when long-dated prices rallied to reach the highest non-constrained shale breakeven (non-core Bakken) in anticipation of large losses from Iran.

Exhibit 5: The marginal cost of production will decline this year as low-cost OPEC and Permian shale producers grow into their large spare capacity
$/bbl



Source: Goldman Sachs Global Investment Research, CME

Exhibit 6: US producers catching up on their low 2020 hedge coverage will put pressure on long-dated prices
% of oil production hedged for US E&Ps by production year (excludes basis hedges)



Source: Goldman Sachs Global Investment Research, Company data

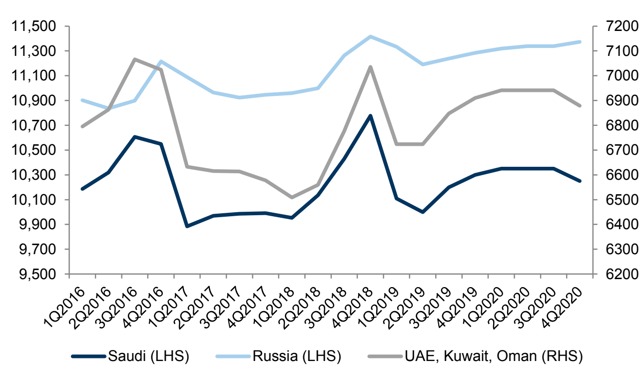
This supply outlook supports our expectation of further backwardation, and in fact, we forecast that long-dated prices are likely to decline from current levels as US producers ramp up 2020 hedging. Such a combination of strengthening timespreads and declining long-dated prices is not unprecedented, having occurred in 14% of trading weeks since 1995. Importantly, our outlook for a better supplied market in 2020 does not require both shale and core-OPEC/Russia to ramp-up production aggressively as we also expect large price-insensitive growth of 0.9 mb/d from long-cycle projects in Brazil, Norway, Guyana, Canada and Iraq.

Such a 2020 supply outlook is important to our assessment of the OPEC production path, even before potential pressure for lower prices by the US administration ahead of next year's presidential election. While continued production cuts could raise prices close to Saudi's fiscal breakeven of $80-85/bbl, this will likely incentivize US producers to ramp up production aggressively. That, in turn, could require further cuts in 2020 to support prices, ultimately driving OPEC revenues lower anyway.

This is the OPEC dilemma in the New Oil Order that we have been writing about since 2014. Given the flatness of the global cost curve, we believe that it is instead rising core-OPEC production that can drive fiscal revenues higher over time. Key to a successful implementation of the OPEC cut will therefore be a shift over the coming months to a coordinated exit strategy of rising production, a shift that Russia appears to already be pushing for given its limited benefit from the cuts.

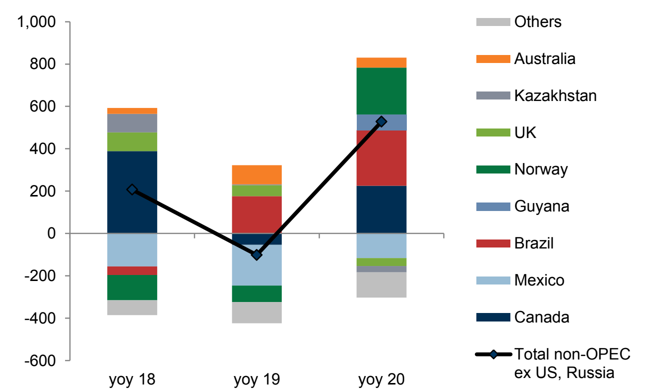
Such signals of rising output should in turn drive further hedging by higher cost producers, both weighing on deferred prices and rationalizing their growth, the reason why we view backwardation as a sustainable solution, just like it was for a decade in the 1990s. Net, we forecast core-OPEC and Russia production will increase sequentially by 300 kb/d (vs. 1H19) in 2H19 and again by 200 kb/d (vs. 2H19) in 2020. This maintains inventories below 5-year average levels, and hence backwardation, through 2020 albeit by a gradually diminishing level relative to 2Q19.

Exhibit 7: We expect core-OPEC and Russia production to gradually grow from 2H19 (with an agreement to cooperate likely to remain in place)
Crude oil production (kb/d)



Source: Goldman Sachs Global Investment Research, IEA

Exhibit 8: This increase in OPEC production will remain moderate given our simultaneous expected growth in non-OPEC production
Non-OPEC exc. US, Russia yoy supply growth (kb/d, exc. biofuels/processing gains)



Source: Goldman Sachs Global Investment Research, IEA, EIA

Our forecast for core-OPEC and Russia production growth reflects: (1) a ramp-up of Saudi, UAE, Kuwait and Russia production in proportion to the relative size of the cuts, (2) allowing for a similar increase in Russia and Saudi production over the 2017-2020 period, and (3) maintaining OECD inventories just below 5-year average levels *given* our other-OPEC, non-OPEC and shale production and demand forecasts. Higher production without inventories rising more would require either greater disruptions than we base case or more shale restraint (likely through lower long-dated prices)

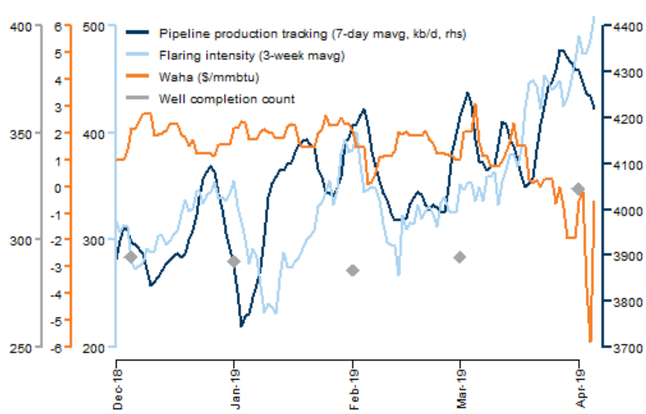
Given how volatile OPEC's production management has been since 2014, we are not yet comfortable base casing persistent steep backwardation for 2020, even though we see this as both the most compelling outcome for OPEC and the market structure most likely to be sustainable. Our hesitation to raise our 2020 spot price forecast from $60/bbl to a $65-70/bbl range also stems from the visibility of large long cycle production growth from Canada, Norway, Brazil and the majors in the Permian. These projects will start to slow by 2021-22, however, potentially delaying until then a return to an oil market similar to that of the 1990s, characterized by a tight spot market but well supplied forward balances and reflected in steady backwardation with an anchored back-end, a shift likely also facilitated by a maturing shale producer landscape.

The anchoring of long-dated crude prices is key

The anchoring of long-dated prices will be a key metric to assess whether the current cuts have overshot and backwardation is sustainable. Any meaningful rally in 3-year forward prices - which so far have been anchored at $55/bbl for WTI - would provide an opportunity for more aggressive shale growth without sacrificing returning cash to shareholders. Consequently, while such a drift higher would give spot prices room to rally above our updated forecasts, it would end-up being self-defeating, increasing our confidence that spot prices will decline sharply by 2020.

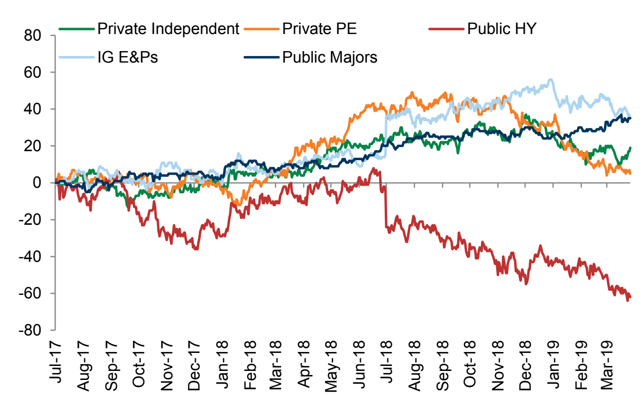
In fact, there are already signs that shale activity is ramping up again after slowing completions and drilling pushed Permian production lower through 1Q. By 2020, the aggressive ramp-up of the US majors will further support low-cost and short-cycle shale production growth (an important threat for OPEC's market share).

Exhibit 9: We estimate that Permian shale production is back to rising
High frequency indicators of Permian production



Source: Goldman Sachs Global Investment Research, NASA, NOAA, FracFocus, Genscape, Platts

Exhibit 10: While higher cost of capital producers are retrenching, the majors are accelerating their Permian developments
Change in horizontal oil rig count since Jul-17 by capital structure



Source: Goldman Sachs Global Investment Research, DrillingInfo, Company data

Opportunities

We expect further modest price upside, although, also expect that volatility is likely to return after a period of surprising calmness in oil markets. This outlook points to more compelling relative value opportunities in timespreads, differentials, margins and cracks.

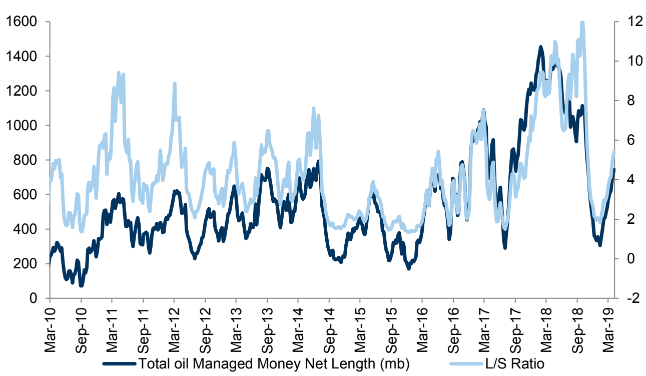
Hedging

Despite our higher spot price forecast, we continue to recommend that producers hedge forward earnings. This recommendation stems from our forecast for lower prices next year but also from the historical pattern of energy equity investors shunning large earnings swings driven by - what is likely to remain - high oil price volatility (due to supply disruptions, the growing footprint of systematic trading and an aging business cycle).

This producer hedging flow is important to our outlook for backwardation and modestly declining long-dated prices. Further, such flows would be consistent with the only moderate spot price upside that we forecast as it would offset another inflow of speculative buying, as was the case in late 2016 for example.

Exhibit 11: Speculative length has room to increase significantly from current low levels...

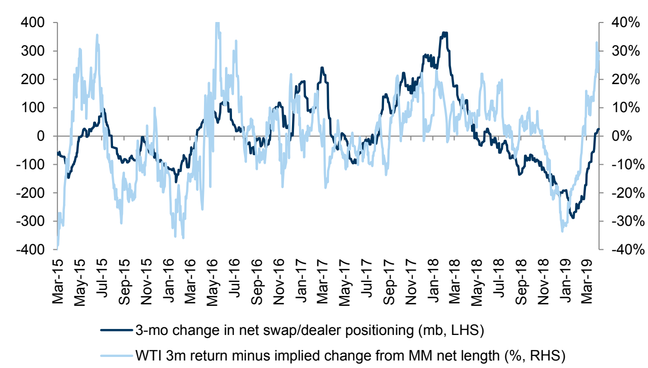
Total oil managed money net length (mb, LHS), long-short ratio (RHS)



Source: Goldman Sachs Global Investment Research, Reuters, CFTC, ICE, CME

Exhibit 12: ... however rising producer hedging is likely to limit the corresponding spot price rally

Change in WTI swap/dealer net positioning (mb, LHS) vs. residual of WTI returns modeled on changes in managed money net length (%, RHS).



This chart illustrates that WTI prices can significantly lag their historical beta to net speculative buying when producers are also hedging

Source: Goldman Sachs Global Investment Research, CFTC, CME

Beyond the appeal to investors that we discuss in our Commodity Watch, the outlook for backwardation is also a compelling opportunity for consumers such as airlines and transportation companies to hedge forward fuel costs at a discount. Such hedging is particularly compelling given the continued risk of supply disruptions and the 2020 upside risk to distillate cracks created by the IMO 2020 regulation.

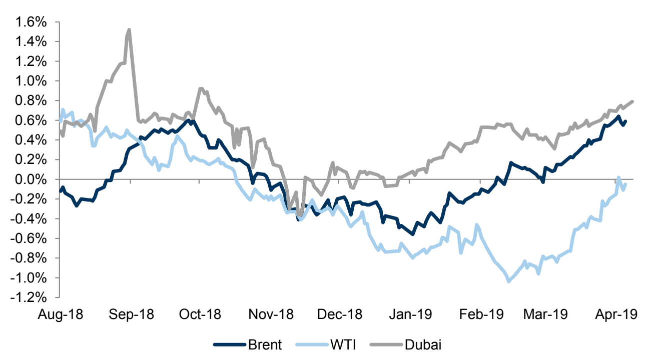
Backwardation

Our fundamental and financial flow outlooks point to further steepening of front month to 3-yr forward Brent backwardation to $12.5/bbl (21% backwardation on $60/bbl 3-year forward), above the current \$9/bbl level, which we continue to recommend as a trade for investors, first opened on 26-Nov-18.

We also expect shorter-dated crude timespreads to converge higher into expiration given a tight physical market. WTI, Brent and Dubai timespreads have already steadily strengthened this year despite seasonally high turnarounds, testament to the current crude deficit. Our supply-demand outlook suggests this trend will continue, with the pull on crude from refiners likely to be high from this summer onward as they run hard ahead of the expected demand pull from IMO.

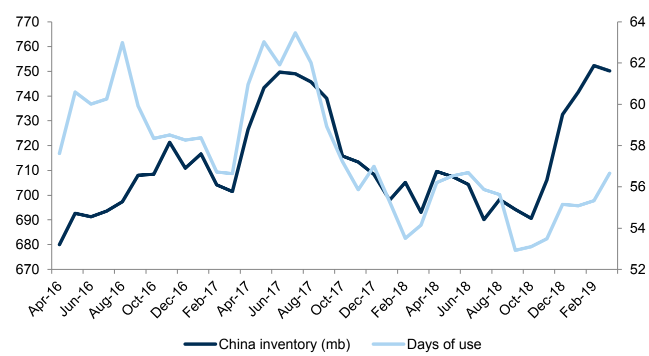
The short-term risk to this view would be high May/June turnarounds in Asia or a slowdown in Chinese crude buying after their recent significant restocking (and given higher spot prices). We however find that the recent large Chinese crude inventory builds appear a correction of last year's large counter-seasonal summer destocking rather than an accumulation of excess inventories, especially relative to expected refinery runs and new refineries coming online.

Exhibit 13: Prompt timespreads have strengthened significantly and we expect a similar roll-up for deferred timespreads
2-mo to 3-mo crude timespreads (%)



Source: Goldman Sachs Global Investment Research, ICE, CME, DME

Exhibit 14: While China has restocked recently, inventories are still far below their 2016-17 levels in days of demand cover given the increase in refinery runs
China crude inventories in mb (LHS) and days of use (RHS)



Source: Goldman Sachs Global Investment Research, Kayrros, NBS

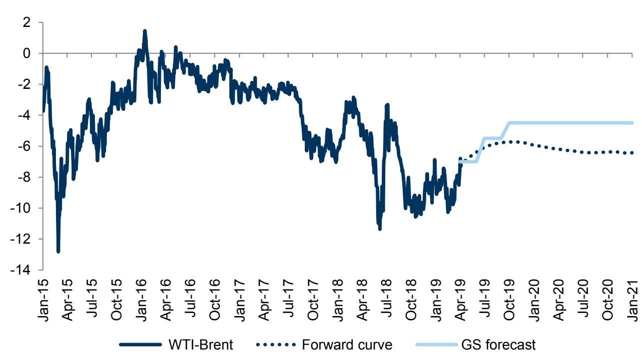
Nonetheless, to hedge such risk, which would likely weigh on Dubai timespreads, we reiterate our recommendation to take a portfolio approach to trading near-dated crude timespreads. With the surge in both US exports and Chinese imports, the global market has become increasingly connected, and the basket of WTI, Brent and Dubai timespreads has become more statistically reflective of the global supply-demand on average than each in isolation. Further, this portfolio approach helps offset local risks: Chinese buying for Dubai, Libya and Brexit for Brent and short-term infrastructure bottlenecks for WTI.

Crude differentials

We believe that new US infrastructure will lead to a tightening of the WTI-Brent spread to \$4.50/bbl from 4Q19 onward, tighter than our previous forecast and current market forwards. This reflects low committed tariffs on new Permian pipes as well as tightening quality specs on WTI. We recommend investors and corporate position for this 2H19 tightening in crude differentials, although we have limited conviction on 2Q spot differentials. First, Permian production likely started ramping up in late March and may precede new infrastructure out of the basin or lead to congestion in Corpus Christi. Second, the recent differentials tightening has been exacerbated by the short covering of bearish WTI timespreads positions that is likely running its course.

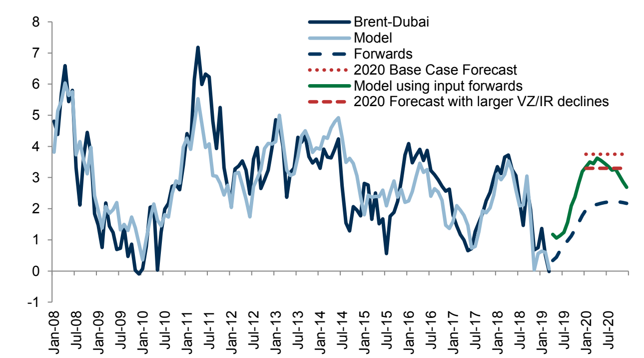
Globally, the recent strength in gasoline and light crudes as well as a weakening in fuel oil has led to a pull back in the Brent-Dubai spread. The expected impact of the Venezuelan and Iranian sanctions on global heavy crude output – and hence fuel oil supply – has been likely priced in for now and this leads us to find the most compelling Brent-Dubai opportunity in deferred differentials. At our forecast path of Venezuela production, we model that Dubai will trade at a $3.75/bbl discount to Brent in 2020, with a widening to $3.00/bbl vs. current forward of $2/bbl even if Iran and Venezuela production falls 250 kb/d below our current 2020 forecasts. Importantly, this 2020 opportunity is also clear when modeling the spreads on a basket of gasoline, HSFO, Brent and freight forwards.

Exhibit 15: We forecast a tightening WTI-Brent differential
$/bbl



Source: Goldman Sachs Global Investment Research, CME, ICE

Exhibit 16: Our models suggest 2020 Brent-Dubai is mispricing the IMO impact
Brent-Dubai vs forwards, GS fair value and other forwards(USD/bbl).



Source: Goldman Sachs Global Investment Research, CME, DME

Petroleum products & IMO

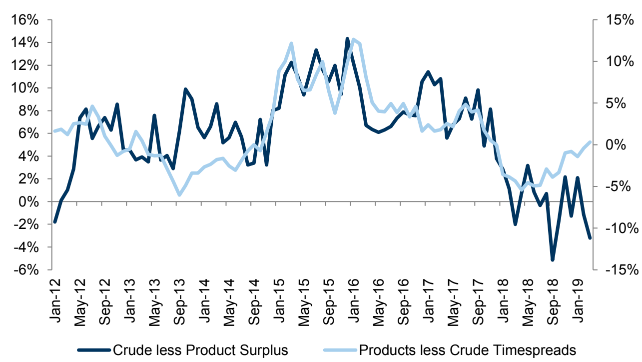
On the product side, the outlook over the next six months will be highly volatile and uncertain. Above-seasonal unplanned maintenance, especially for FCC units, has tightened product balances with gasoline outperforming. Yet the IMO support to deferred margins will incentivize refiners to increase utilisation in coming months, weighing on product spot value before the IMO demand shift finally materializes. We therefore expect that distillate and gasoline cracks will likely roll down in coming months, especially as anticipatory distillate inventories accumulate ahead of shippers switching fuels. Interestingly, despite crude inventories being lower vs. their 5-year average than products, product timespreads are strongest, pointing to crude timespreads as the better long opportunity currently. We view this disconnect as likely driven by IMO 2020 which is weighing sharply on HSFO forwards with gasoline forwards also too weak in our view.

While IMO is still a sizable challenge, we believe that the industry is on track to help meet it without requiring massive disconnect in product cracks. We therefore find the recent strength in deferred (2021+) HSFO cracks as justified. We believe that 2020 gasoline cracks remain too weak, however, given that a large source of compliant low-sulfur bunker fuel will come from VGO and tighten gasoline supply. Finally, we find that the contango in distillate cracks - while understandable in light of consumer/airline hedging flows - is inconsistent with 2020 being the most challenging year to meet the IMO spec change especially as shippers will likely initially chose MGO out of caution over new low sulfur bunker fuels. We therefore believe deferred (2021+) distillate cracks are overpriced relative to 2020.

This leads us to recommend refiners lock-in above average forward margins and distillate cracks. This is in particular the case for US refiners as tightening domestic crude differentials will increasingly leave product cracks driving their margin relative to prior years.

Exhibit 17: Product timespreads have been strengthening relative to crude in recent months while relative inventories have moved the opposite direction

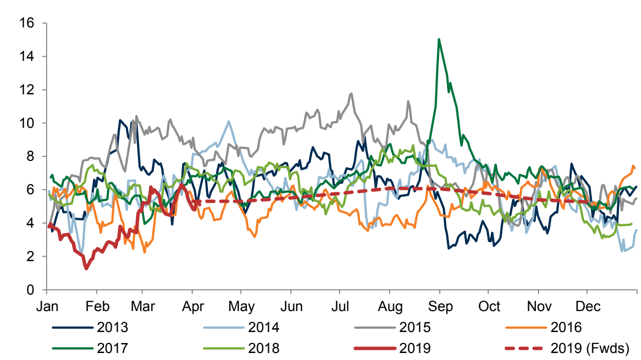
Crude less product surplus (vs. 5-yr rolling avg, LHS) against demand-weighted product less crude timespreads (1-mo vs. 1-yr, RHS)



Source: Goldman Sachs Global Investment Research, IEA, EIA, PAJ, PJK, IE Singapore, Platts, CME, ICE, DME

Exhibit 18: Refining margins have recovered back into the five-year range on solid demand and unplanned outages

Global refining margins weighted by geographies and demand shares (USD/bbl)



Source: Goldman Sachs Global Investment Research, Platts, CME, ICE, DME

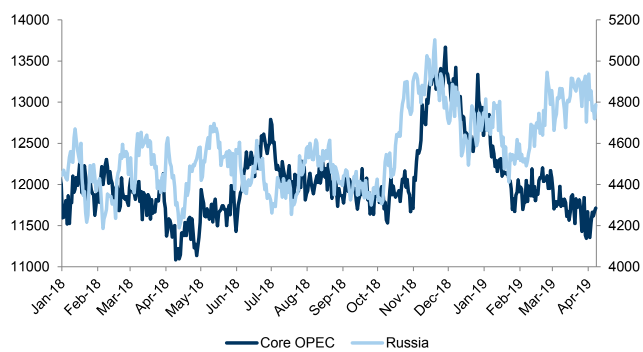
Supply

A core-OPEC 'shock and awe' implementation of the cuts

Vessel tracking and preliminary estimates indicate that core-OPEC pushed compliance in March to a new high of 191% even in the face of falling Venezuela output. As we discussed recently, we view this 'shock and awe' tactic led by Saudi Arabia as aimed at rebalancing the market swiftly to prevent shale producers from aggressively responding and instead be able to grow alongside them once inventories normalize.

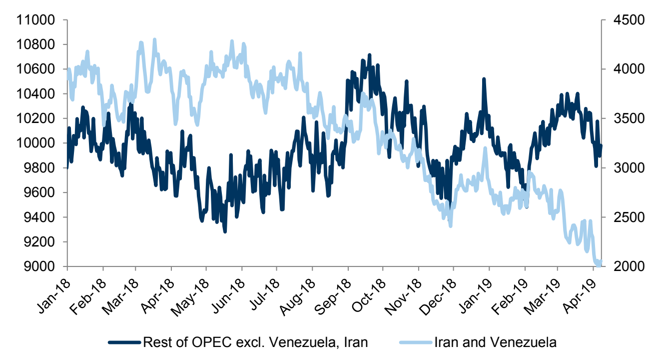
- Saudi Arabia's production declined to 9.9 mb/d in March, with the Kingdom signaling likely similar production levels through 2Q. We expect the Kingdom to ramp up crude output to 10.3 mb/d in 4Q19. The UAE and Kuwait averaged 130% compliance in March and we expect their production to continue to follow the path set by Saudi Arabia.
- Russia has instead gradually implemented its cut, in line with its guidance and the pattern of the 2017 cuts, with full compliance finally reached at the end of March. We continue to view their participation to the cuts as politically driven given the limited benefits for the Russian economy and the lost revenues for private producers. As a result, we expect Russia to be the most adamant in wanting to grow production later this year (in fact having already achieved greater production growth than Saudi since late 2014). We forecast Russian production to increase by c. 100 kb/d this year and next.

Exhibit 19: Core-OPEC is aggressively cutting production while Russia's exports shows a more restrained approach
Crude and condensate exports for core-OPEC (30dma, kb/d, LHS) and Russia (30dma, kb/d, RHS)



Source: Goldman Sachs Global Investment Research, Kpler

Exhibit 20: Iranian and Venezuelan exports are declining significantly while the rest of OPEC shows a modest increase
Crude and condensate exports for Iran and Venezuela (30dma, kb/d, RHS) and the rest of non-core OPEC (30dma, kb/d, LHS). Note recent weeks can be subject to significant revision.



Source: Goldman Sachs Global Investment Research, Kpler

Exhibit 21: Compliance to the cuts is already over 120% in March led by Saudi, with the decline for entire OPEC+ group now exceeding 2.1 mb/d since October

GS estimates of current OPEC+ compliance as of March 2019 (kb/d)

	Crude production volumes	Secondary Sources*					GSe				Mar-19	
		Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Baseline	Pledged cut	Quota	Cuts achieved	Compliance
Core	Saudi Arabia	10,637	11,021	10,586	10,172	10,087	9,907	10,633	322	10,311	726	225%
Core	UAE	3,177	3,274	3,238	3,075	3,072	3,052	3,168	96	3,072	116	121%
Core	Kuwait	2,753	2,772	2,800	2,723	2,709	2,689	2,809	85	2,724	120	141%
Other OPEC non-exempt	Ecuador	521	522	518	517	522	537	524	16	508	-13	-81%
Other OPEC non-exempt	Algeria	1,057	1,056	1,051	1,024	1,026	1,015	1,057	32	1,025	42	131%
Other OPEC non-exempt	Gabon	185	170	194	197	203	205	187	6	181	-18	-300%
Other OPEC non-exempt	Angola	1,515	1,498	1,484	1,435	1,457	1,475	1,528	47	1,481	53	113%
Other OPEC non-exempt	Nigeria	1,760	1,731	1,733	1,731	1,741	1,730	1,738	53	1,685	8	15%
Other OPEC non-exempt	Equatorial Guinea	124	121	103	112	126	118	127	4	123	9	225%
Other OPEC non-exempt	Congo	321	310	327	317	316	320	325	10	315	5	50%
Other OPEC non-exempt	Iraq	4,654	4,626	4,712	4,702	4,633	4,580	4,653	141	4,512	73	52%
Exempt	Libya	1,118	1,107	949	883	906	1,076					
Exempt	Iran	3,330	2,921	2,724	2,731	2,743	2,800					
Exempt	Venezuela	1,206	1,183	1,172	1,150	1,008	858					
	Russia	11,418	11,376	11,454	11,376	11,335	11,305	11,421	230	11,191	116	50%
	Other non-OPEC	6,455	6,657	6,631	6,522	6,571	6,446	6,649	153	6,746	203	133%
	OPEC non-exempt	26,704	27,101	26,746	26,005	25,892	25,628	26,749	812	25,937	1,121	138%
	non-OPEC	17,873	18,033	18,085	17,898	17,906	17,751	18,070	383	17,937	319**	83%
	OPEC+ non-exempt	44,577	45,134	44,831	43,903	43,798	43,379	44,819	1,195	43,874	1,440	121%
	Core OPEC + Russia	27,985	28,443	28,078	27,346	27,203	26,953	28,031	733	27,298	1,078	147%
	Other non-exempt	16,592	16,691	16,753	16,557	16,595	16,426	16,788	462	16,576	362	78%
	Exempt	5,654	5,211	4,845	4,764	4,657	4,734				920***	

** IEA crude oil production for non-OPEC*

*** We interpret Mexico reference level as IEA Oct-18 crude production estimate*

**** Cuts are involuntary, not part of the OPEC+ agreement and relative to the Oct-18 crude production level*

Source: Goldman Sachs Global Investment Research, IEA, OPEC

Disruptions & Sanctions set to rise further

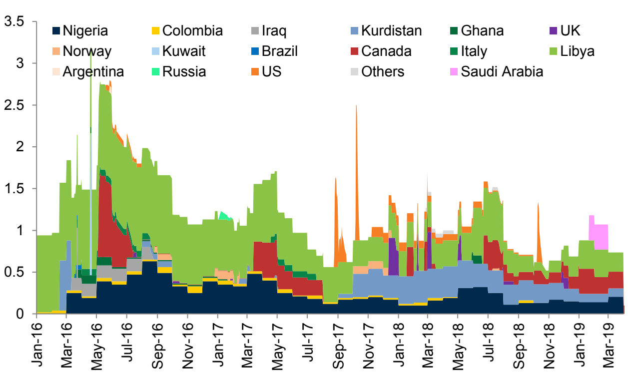
Short-term production disruptions (unexpected and of short duration), while low over the past month, are clearly skewed to the upside, once again due to Libya. Longer-term disruptions (persistent and typically sanction related) have already started to rise to new highs, with now 4.5 mb/d of production lost since the Arab Spring and Iran/Venezuela output set to decline further due to tightening US oil sanctions.

While the potential for short-term disruptions creates upside risk to our price forecast, we believe that the upcoming sanction-related production losses are likely already priced in. Further, the US administration has demonstrated a clear focus on limiting their impact on prices - either by limiting their scale or by incentivizing offsetting production. We view this price concern as likely implying that targeted declines from Iran and Venezuela should be thought of on aggregate, not in isolation. Nonetheless, the US pressure on core-OPEC has been more modest this year than last, suggesting prices may stay near current levels in coming months, with a likely much greater focus on lower prices closer to the US presidential election.

- **Iran:** We estimate that crude production increased to 2.8 mb/d in March as Japan and South Korea ramped up imports ahead of the expiration of their quotas in May. While the US administration has maintained its goal of reducing exports to zero, the introduction of oil sanctions on Venezuela likely implies a continued gradual approach to further reduction in quotas on May 4. Specifically, we expect a reduction of export quotas to Japan and Korea, while Taiwan and European countries, which haven't utilized their quotas, also likely to see their waivers removed. We therefore continue to base case a moderate further decline in production to below 2.6 mb/d by year-end then down to 2.3 mb/d by end-2020 as floating storage reaches its limits.

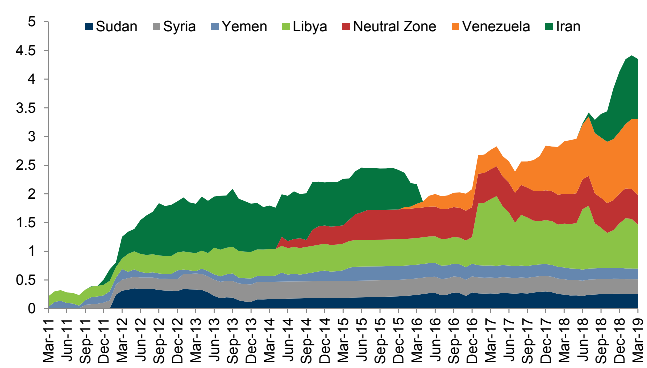
- **Venezuela:** Power blackouts have pushed production sharply lower even as China was ramping up imports to offset India's pull-back under US pressure. Production in March looks to be down to 900 kb/d, and the current political situation means production is likely to continue to decline as the US steadily widens the scope of its sanctions. With debt repayment not within the scope of US oil sanctions, production could fall to 700 kb/d (550 kb/d to China/Russia and the rest consumed domestically), although infrastructure issues could push output even lower. On the other hand, we believe a regime change could likely help production recover modestly, although damages will require years before any meaningful recovery occurs. Given all these moving parts, we cautiously assume that production will fall below 800 kb/d by year-end and to 700 kb/d by end-2020.
- **Libya**: Production recovered to 1.08 mb/d in March as the Sharara oil field came back online, albeit at slightly curtailed capacity. Despite recent reports from the UN indicating that the two rival governments were close to a power-sharing agreement, political instability near Tripoli has threatened domestic refineries and exports via the western Zawiya and Mellitah terminals (totaling c.300 kb/d in March). Absent new disruptions, we expect Libya's production to recover to average 1.2mb/d in 2020 with some remaining low-hanging fruit for production gains.

Exhibit 22: Short-term production disruptions remain low....
Short-term production disruptions (mb/d)



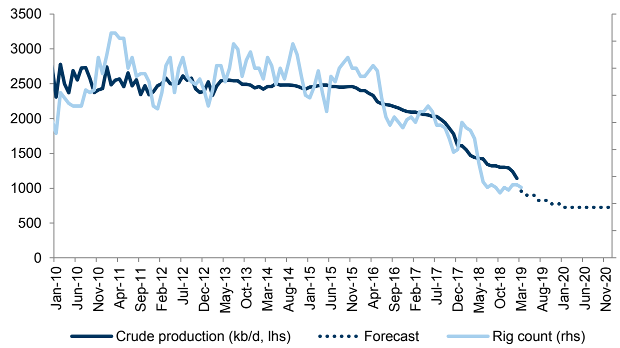
Source: Goldman Sachs Global Investment Research, IEA, EIA, Bloomberg, Reuters, Platts

Exhibit 23: ... while long-term disruptions are soaring to new heights
Long-term production disruptions (mb/d)



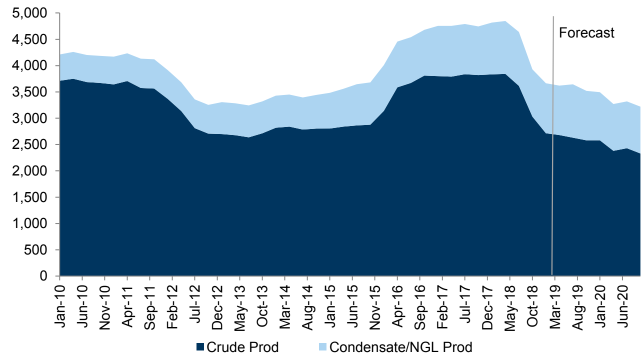
Source: Goldman Sachs Global Investment Research, IEA, EIA, Bloomberg, Reuters, Platts

Exhibit 24: We expect Venezuela production to continue to decline although the uncertainty around this path remains high
Venezuela crude production including our forecasts (kb/d, LHS) vs. oil rig count (RHS)



Source: Goldman Sachs Global Investment Research, IEA

Exhibit 25: The largest declines in Iran are likely behind us
Iran crude and condensate supply and GS forecasts (kb/d)



Source: Goldman Sachs Global Investment Research, IEA, JODI, Kpler, GTT

After a 1Q pause, signs of accelerating shale activity

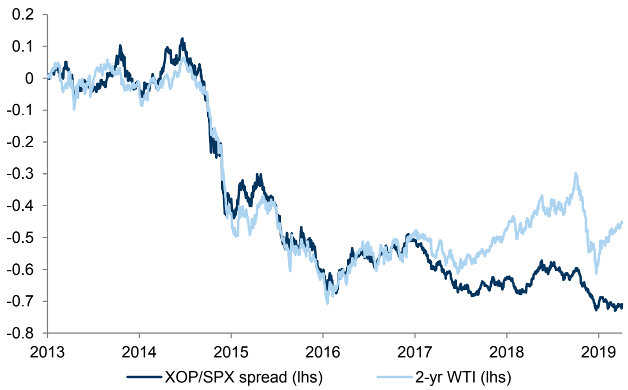
The sharp collapse in oil prices late last year and the accompanying increase in volatility have left investors avoiding shale producers, with their share price significantly lagging the sharp rally in oil prices. This has been particularly visible for higher cost of capital producers (HY and PE backed) which have in response cut drilling activity. Alongside a broader slowdown in completion activity, we estimate that US onshore production was likely flat to down during 1Q, the first such instance since late 2016.

Our high frequency tracking of activity in the Permian - through flaring, pipe scrapes and completions - suggests however that production has picked up over the past couple weeks with the horizontal rig count rebounding last week as well. Further, the US majors have guided to strong increases in activity while we estimate that the current well backlog could account for as much as 250 kb/d of production.

So while the prudence of US producers left 1Q production growth coming slightly below our expectations, we still expect onshore Lower-48 crude production to grow by 1.16 mb/d yoy in 2019 and 0.98 mb/d yoy in 2020. We would view a rally in long-dated prices as creating an upside risk to this estimate, allowing producers to both increase capex and return cash to their shareholders.

Exhibit 26: E&Ps have underperformed the S&P500 further despite the rebound in oil prices

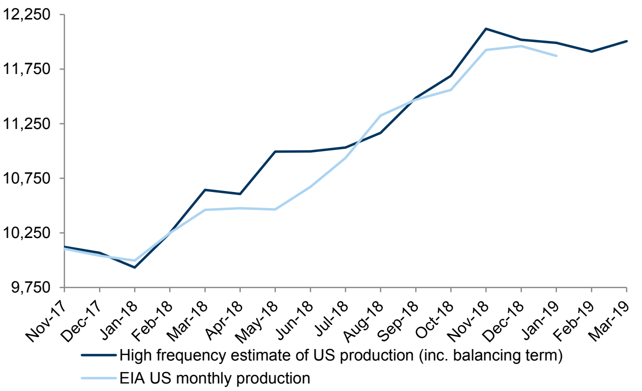
Relative equity performance (lhs); $/bbl (rhs)



Source: S&P, CME, Goldman Sachs Global Investment Research

Exhibit 27: High frequency data show flat US production in 1Q although we see signs of accelerating activity in April

US crude oil production (kb/d) EIA monthly vs. pipeline scrape and EIA weekly estimate



Source: Goldman Sachs Global Investment Research, SpringRock, EIA

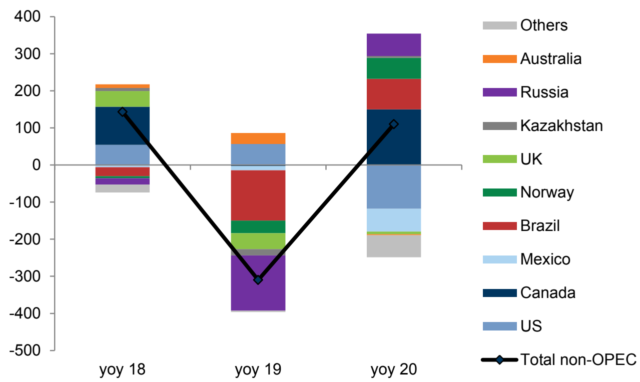
Long-cycle production growth once again delayed

The rebalancing of the oil market will be helped this year by the lack of production growth outside of OPEC and the US. We now expect 2019 non-OPEC ex-US supply to come in flat yoy - almost 400 kb/d below what we had expected six months ago - in large part due to the Canadian and Russian cuts. While this is the second consecutive year that the arrival of long-cycle projects is delayed, there remains a clear line-up of sources of production growth for 2020, with expected non-OPEC ex-US, Russia yoy growth of 0.53 mb/d (up 170 kb/d from our prior assessment). Any further delays would nonetheless help 2020 balances while providing more clarity on the 2021 non-shale production outlook. Such a pattern would be consistent with the persistent delays of long-cycle project during the 1990s, although in itself this is not bullish for prices as long as there is enough short-cycle resources in OPEC and shale, as witnessed the last few years.

- Brazil production fell sharply in February by 130 kb/d (-5%) YoY, although the four FPSOs coming online this year will still drive output sequentially higher. Accounting for this slow start and assuming higher legacy decline rates, we now forecast YoY growth of 180 kb/d in 2019 and 260 kb/d in 2020.
- Canadian output - a key source of growth in 2018 - is forecast to decline 54 kb/d YoY on the implementation of the production cuts in Alberta. While these cuts have been reduced to 175 kb/d in June from 325 kb/d in January, both parties have suggested ahead of the elections that they will remain in place through year-end. The completion of Line 3 in mid-2020 will finally allow production to increase meaningfully, expected up 225 kb/d YoY next year.
- Elsewhere, we expect only moderate swings in production, with growth in Australia then Guyana. Kazakhstan output will decline over the next couple of months as Kashagan goes offline for maintenance and, with few other fields increasing production, we expect production to decline by 30 kb/d in 2020.

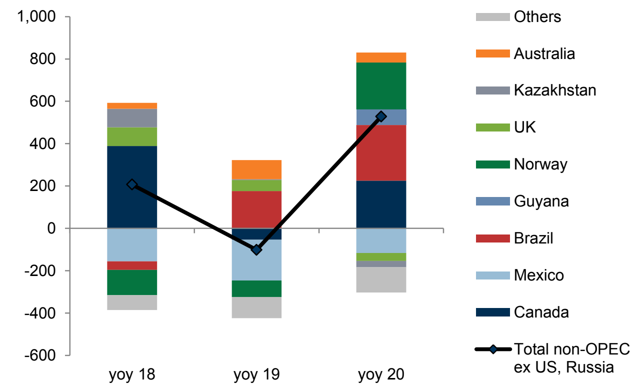
- Mexico's lack of new projects delivery has left production falling sharply, in line with our expectations. We tentatively see moderating declines next year as Pemex is poised to develop its first new areas. We expect Mexican production to decline by nearly 200 kb/d YoY in 2019 and then 116 kb/d in 2020.
- Lastly, the response to higher prices last year is not just a shale phenomenon, with a clear ramp-up in global drilling activity for both short-cycle onshore wells (Colombia, China) as well as greenfield and maintenance offshore wells over the past six months.

Exhibit 28: Non-OPEC supply growth will again disappoint...
Non-OPEC yoy supply revisions (kb/d, exc. biofuels/processing gains)



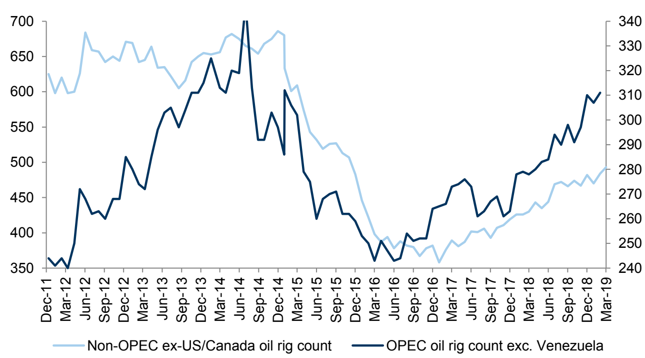
Source: Goldman Sachs Global Investment Research, IEA, EIA, National sources

Exhibit 29: ...with output growth now slated for 2020
Non-OPEC exc. US, Russia yoy supply growth (kb/d, exc. biofuels/processing gains)



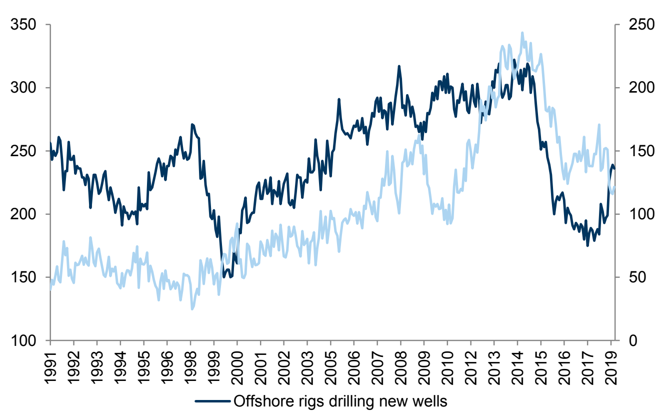
Source: Goldman Sachs Global Investment Research, IEA, EIA, National sources

Exhibit 30: Drilling activity continues to recover globally
Non-OPEC exc. US/Canada rig count (LHS) vs. OPEC exc. Venezuela rig count (RHS)



Source: Goldman Sachs Global Investment Research, Baker Hughes

Exhibit 31: Offshore drilling has seen a significant uptick as well recently
Offshore rigs: new wells (LHS) vs. implied maintenance rig count (RHS)



Source: Goldman Sachs Global Investment Research, Baker Hughes, IHS

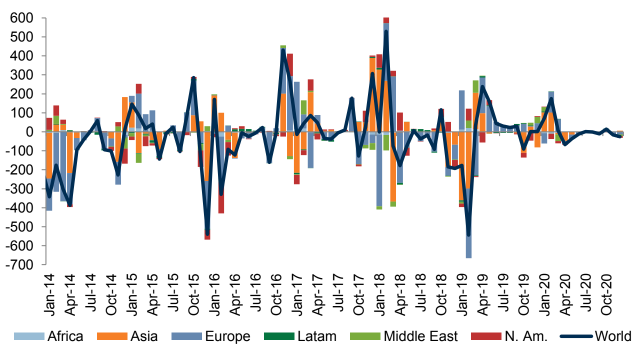
Demand

Warm weather likely to have offset accelerating global growth in February

Oil demand started off the year by beating low expectations in January despite a tough base last year and even after a downward revision to US gasoline demand. Currently available February oil demand data points however to weak yoy demand growth of only 0.9 mb/d in our monthly sample. We view this miss as likely weather driven with our modeling showing that above average temperatures in both Asia and Europe and a cold February last year likely weakened yoy demand growth by up to 550 kb/d.

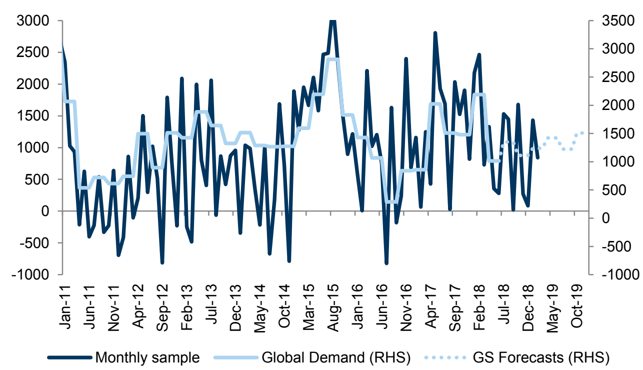
Combined with January data, we now estimate 1Q19 global demand growth is on track to reach 1.45 mb/d yoy. Accelerating economic growth, which appears to have bottomed, and a return to normal seasonal temperatures should support yoy demand growth of 1.45 mb/d in 2Q too (with 150 kb/d due to weather).

Exhibit 32: February demand growth will be weighed down by large adverse weather effects
yoy demand impact of weather (HDDs) on monthly oil demand (kb/d); forecasts assume return to six-year average temperatures.



Source: Goldman Sachs Global Investment Research, Bloomberg, IEA

Exhibit 33: We expect global oil demand growth of X kb/d in 1Q19
yoy demand growth (kb/d); 'monthly sample' data through February based on countries covering 56% of global demand



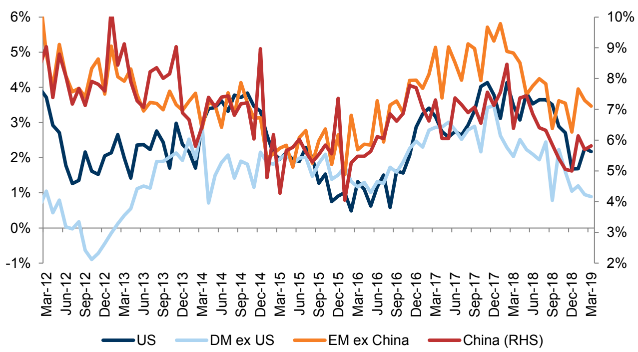
Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, Customs, National Sources

Despite a weaker 1Q than previously expected, we continue to forecast resilient global demand growth of 1.40 mb/d yoy in 2019, albeit revised down 50 kb/d. This forecast remains above consensus expectations and reflects our economists' expectations that growth will continue to accelerate alongside our expectations for a reversal of last year's EM and German oil destocking and a slowdown in power fuel displacement in the Middle East.

Importantly, we believe that such a global oil demand growth forecast remains cautious. Removing the impacts of weather and power demand destruction, we estimate that this oil demand growth remains well below the 1.65 mb/d achieved in 2017-18, and is further consistent with global growth weakening this year.

Exhibit 34: Our activity indicators suggest that global growth is on the rebound outside of Europe

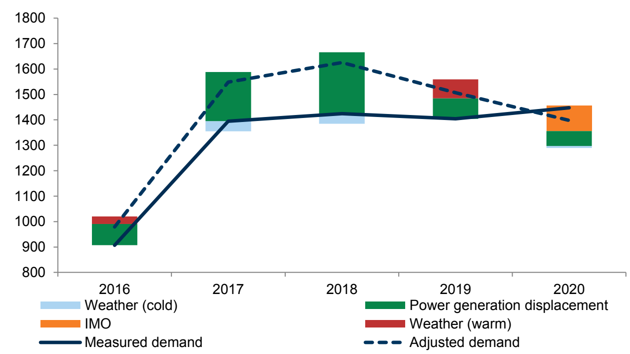
Current Activity Indicators for various regions (%QoQ annualised trackers of regional economic activity)



Source: Goldman Sachs Global Investment Research

Exhibit 35: When accounting for weather and power distortions, our 2019-20 demand growth forecasts appear cautious

yoy global demand forecasts with adjustments for 'non-macro' factors (mb/d)



Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, Bloomberg

EM oil demand growth set to re-accelerate this year

We expect DM oil demand growth to continue to decelerate from its lofty growth in 2017-18. First, weaker European economic growth (alongside warm weather) is leading us to downgrade European demand to a 60 kb/d yoy decline this year (revised down by 75 kb/d). We still expect US growth this year to remain robust at 340 kb/d YoY as the price-insensitive additions of USGC ethane crackers pulls up demand in the region. This growth however will come at the expense of Asian naphtha crackers especially in Korea and we have revised down our demand path for 2019 for Japan and Korea by a combined 40 kb/d to -130 kb/d YoY.

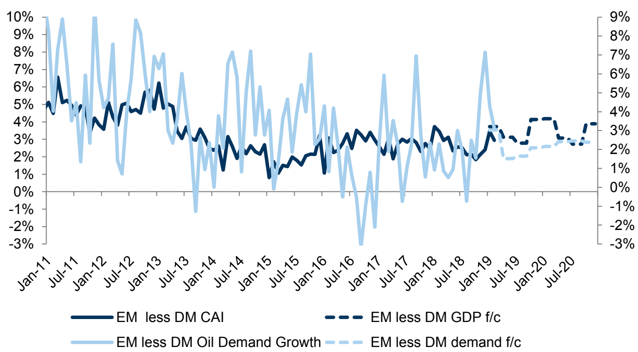
In turn, we expect EM oil demand growth to finally rebound from a moribund 2018. Indian demand growth remains quite strong, averaging +320 kb/d YoY the last 3 months (on a similar growth rate this time last year) and we conservatively expect growth of +275 kb/d this year and 250 kb/d in 2020 (revised up by 30 kb/d). Brazil's liquids demand has also been increasing at a healthy clip, reaching +131 kb/d YoY in February and we expect demand growth of 50 kb/d YoY this year and next, slightly higher than previously.

Our modeling of EM demand for countries with limited data availability suggests that lower retail prices this year will also help demand growth. This effect is also visible in countries which cut subsidies, with Saudi demand better than expected a year after the retail price hikes were implemented. We further believe that Middle East demand will be buttressed by a slowdown in oil displacement in power generation as well as a likely increase in Iran demand, as was the case in 2012, as domestic refinery capacity ramps up and the country puts more of its oil output to use domestically.

Finally, resilient consumer spending alongside lower retail prices since last fall are supporting gasoline demand growth while slowing manufacturing and shale growth and warm weather are weighing on distillate demand. Such shifts helped the strengthening this year of gasoline vs. distillate cracks and should persist through this summer.

Exhibit 36: EM oil demand growth is expected to gradually accelerate after disappointing since 2016

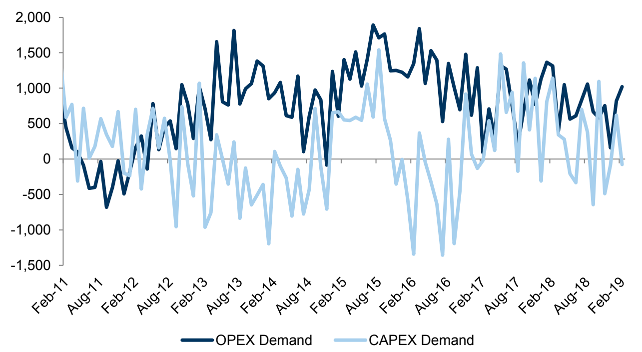
Emerging Market less Developed Market Current Activity Indicators (QoQ, annualised) vs. difference in yoy oil demand growth. GDP forecast also QoQ, annualised.



Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, Customs, National Sources

Exhibit 37: Global OPEX demand has surged ahead of CAPEX demand in February consistent with warm weather and the price elasticity of gasoline demand

yoy demand growth (kb/d) based on countries with data available through January; February estimated from high frequency sample.

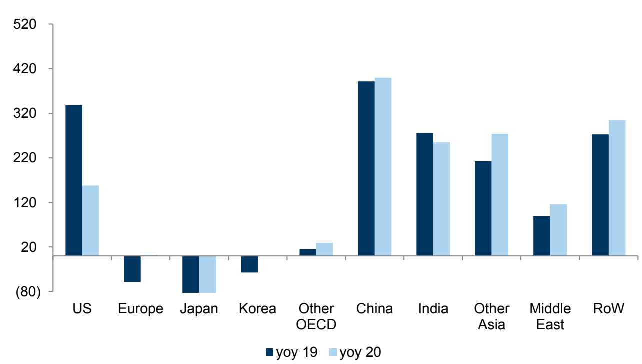


Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, Customs, National Sources

We currently estimate China's demand increased 260 kb/d YoY across Jan-Feb, with this slowdown consistent with the slowdown in activity earlier this year as well as the timing of the Chinese New Year. This sets the stage for March data to surprise to the upside, especially as our economists believe that the Chinese economy appears to be reaccelerating after adjusting for seasonal distortions. While the ongoing stimulus package will help demand growth this year, its goal remains modest given the lower GDP target that Beijing wants to achieve. We therefore conservatively forecast YoY demand growth just shy of 400 kb/d for both this year and next.

Exhibit 38: We expect demand growth to be driven by EM over next two years with US ethane-cracker related demand contributing in 2019

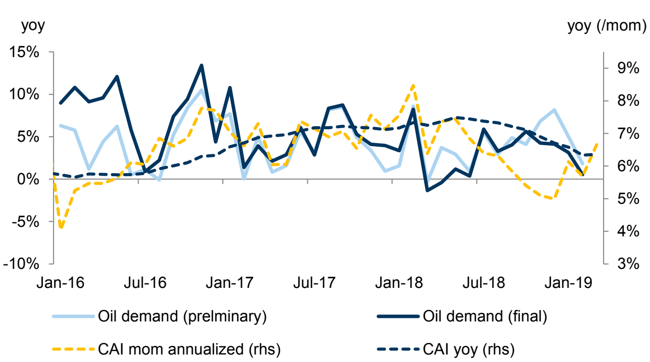
yoy oil demand growth split by region (kb/d)



Source: Goldman Sachs Global Investment Research

Exhibit 39: Chinese economy appears to be reaccelerating as per CAI MoM

China yoy demand growth vs CAI yoy and annualized mom



Source: Goldman Sachs Global Investment Research, ICIS, SCI, GTT, CEIC

2020 oil demand to benefit modestly from IMO

Finally, we introduce our 2020 demand growth forecast of 1.45 mb/d driven almost entirely by emerging markets (1.35 mb/d YoY) as their economic growth continues to reaccelerate. This forecast also reflects a 100 kb/d boost to demand from the tighter IMO marine sulphur regulations due to (1) increased petroleum product trade flows and changing crude routes as the global refining system re-optimises and (2) higher HSFO power burn in Saudi, Africa and Russia. Importantly, our modeling continues to show that the gap between HSFO demand and supply will not be so yawning as to force HSFO to price to displace gas and coal in power generation.

Inventories

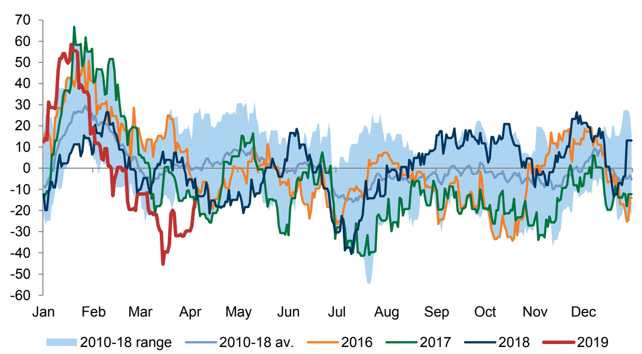
Finally, a tight physical crude market

High-frequency data available across the US, Japan, Europe, and Singapore show total oil inventories drawing well above seasonal patterns. While distillate is now building just above seasonals on warm OECD winter weather, crude oil inventories have drawn near a 10-year high seasonal pace despite significant refinery outages in the US. Given the high gasoline yields of the US refining system, these turnarounds have also tightened the gasoline market since late January.

The expected 2Q deficit will drive further inventory declines before higher shale and OPEC output leads to a sequential partial recovery in global inventories in 2H19. Given our expectation that EM economies, including China, will reverse their 2018 stock draws (driven by the trifecta of rising rates, dollar and oil prices), we nonetheless expect OECD industry stocks to remain below 5-year average levels, albeit by a gradually shrinking margin.

Exhibit 40: The large production cuts have led to a fast draw in inventories

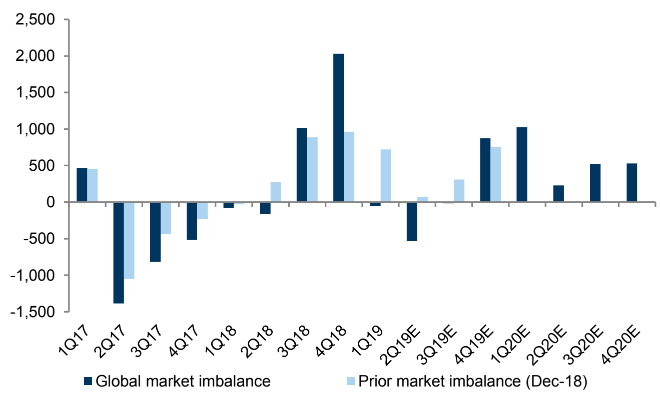
Rolling 4-week change in global high-frequency oil stocks (mb)



Source: Goldman Sachs Global Investment Research, EIA, PJK, PAJ, IE Singapore

Exhibit 41: We expect continued draws through 3Q19 before a restocking later this year

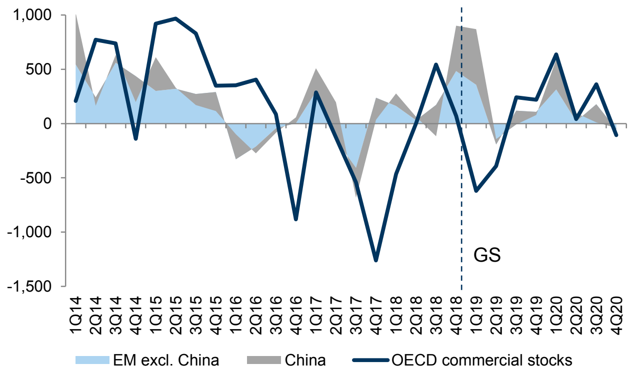
Global oil supply vs. demand (kb/d)



Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, National Sources, Customs

Exhibit 42: An expected increase in EM inventories will keep OECD inventories tighter than the global imbalance would otherwise suggest

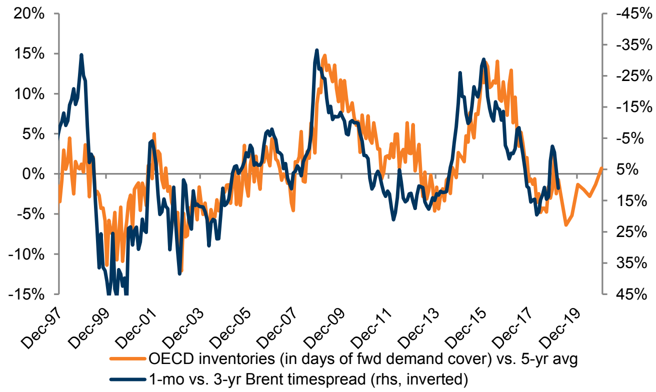
Quarterly stock changes (kb/d). EM excl. China excludes Iran as well as floating storage/oil in transit.



Source: Goldman Sachs Global Investment Research, IEA, EIA, National Sources, JODI, Customs

Exhibit 43: We expect timespreads to strengthen sequentially through to 3Q19

OECD commercial stocks in days of OECD demand coverage vs. 5-yr avg (lhs) vs. 1-mo to 3-yr Brent timespreads (%, rhs, inverted)



Source: Goldman Sachs Global Investment Research, IEA, EIA, PAJ, PJK, Kayrros, JODI, National Sources, Customs

Supply and Demand balance

Exhibit 44: Summary (kb/d)

	1Q18	2Q18	3Q18	4Q18	1Q19E	2Q19E	3Q19E	4Q19E	1Q20E	2Q20E	3Q20E	4Q20E	2017	2018	2019E	2020E	yoy 17	yoy 18	yoy 19 E	yoy 20 E
Supply	98,301	99,155	100,987	101,918	99,797	100,209	101,320	102,118	102,328	102,436	103,272	103,237	97,401	100,090	100,861	102,818	508	2,689	771	1,958
Demand	98,382	99,315	99,972	99,889	99,852	100,742	101,336	101,243	101,300	102,208	102,748	102,709	97,965	99,389	100,794	102,241	1,395	1,425	1,404	1,448
Global market imbalance	-81	-160	1,015	2,029	-55	-533	-17	874	1,027	229	524	529	-563	701	67	577	-887	1,264	-634	510
OECD commercial stocks	-465	3	544	69	-619	-391	242	219	638	42	363	-107	-411	38	-137	234	-402	449	-175	371
OECD gvt stocks	79	-57	-47	-193	21	-50	-50	-50	-50	-50	-50	-50	-88	-54	-32	-50	-119	33	22	-18
OECD stocks	-386	-54	497	-123	-599	-441	192	169	588	-8	313	-157	-499	-17	-170	184	-521	482	-153	353
EM exc. China	163	31	172	484	357	-193	119	108	314	21	179	-53	-7	212	98	115	138	219	-114	17
China	115	31	-289	418	513	50	-127	-29	277	75	-167	13	21	69	102	49	-24	48	33	-52
Iran	-24	-9	221	262	-125	150	0	50	50	0	0	0	-27	113	19	13	47	140	-94	-6
Non-OECD stocks	254	53	104	1,164	745	7	-8	129	641	96	11	-40	-13	394	218	177	161	407	-175	-41
Non-OECD stocks ex. China SPR, Iran	277	62	-117	902	870	-143	-8	79	591	96	11	-40	14	281	200	165	114	267	-82	-35
Floating Storage (ex-Iran)	65	-43	-143	272	-105	-30	-70	95	28	-7	50	114	-113	37	-27	46	-245	151	-65	74
Oil in Transit	-435	254	304	299	-572	-70	-130	480	-230	148	150	611	44	106	-73	170	-212	62	-178	243
Global marketable stocks*	-582	267	809	1,804	-551	-483	33	924	1,077	279	574	579	-494	575	-19	627	-698	1,068	-594	646
GS Miscellaneous to balance	422	-370	253	417	475	0	0	0	0	0	0	0	18	181	119	0	-69	163	-62	-119

* OECD Commercial, EM Stocks & In Transit/Floating exc. China SPR & Iran

Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, GTT, National Sources

Exhibit 45: Non-OPEC supply (kb/d)

	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019E	2Q2019E	3Q2019E	4Q2019E	1Q2020E	2Q2020E	3Q2020E	4Q2020E	2018	2019 E	2020 E	yoy 18	yoy 19 E	yoy 20 E
Lower 48 crude	8,052	8,474	8,962	**9460**	**9550**	**9700**	**10000**	**10350**	**10600**	**10800**	**10975**	**11150**	8,737	9,900	10,881	1,562	1,163	981
Gulf of Mexico crude	1,671	1,581	1,848	**1860**	**1880**	**1925**	**1875**	**1950**	**2000**	**1950**	**2000**	**2035**	1,740	1,908	1,996	61	168	89
Alaska crude	511	481	431	**490**	**495**	**480**	**435**	**500**	**500**	**475**	**435**	**495**	478	478	476	-17	-1	-1
US crude	10,234	10,536	11,241	11,810	11,925	12,105	12,310	12,800	13,100	13,225	13,410	13,680	*10,955*	*12,285*	*13,354*	*1,606*	*1,330*	*1,069*
US NGL	4006	4303	4536	**4540**	**4650**	**4710**	**4820**	**4900**	**5000**	**5070**	**5140**	**5200**	4,346	4,770	5,103	565	424	333
Lower 48 other	**142**	**218**	**197**	**166**	**142**	**218**	**197**	**166**	137	213	192	161	181	181	176	47	0	-5
US ethanol	1,046	1,040	1,064	1,040	1,005	1,015	1,045	1,045	1,025	1,045	1,045	1,045	1,048	1,028	1,040	8	-20	13
Total US	15,428	16,097	17,038	17,556	17,722	18,048	18,372	18,911	19,262	19,553	19,787	20,086	16,530	18,263	19,672	2,226	1,733	1,409
Canada	5,190	4,972	5,233	5,421	5,100	5,000	5,200	5,300	5,425	5,075	5,450	5,550	5,204	5,150	5,375	389	-54	225
Mexico	2,158	2,124	2,075	1,953	1,915	1,900	1,875	1,850	1,825	1,775	1,750	1,725	2,077	1,885	1,769	-156	-192	-116
Total North America	**22,775.8**	**23,193**	**24,346**	**24,930**	**24,737**	**24,948**	**25,447**	**26,061**	**26,512**	**26,403**	**26,987**	**27,361**	**23,811**	**25,298**	**26,816**	**2,459**	**1,487**	**1,518**
Argentina	574	576	582	588	590	590	595	595	600	600	610	615	580	593	606	10	12	14
Brazil	2,714	2,719	2,632	2,728	2,650	2,850	2,950	3,050	3,100	3,125	3,150	3,175	2,698	2,875	3,138	-41	177	263
Colombia	854	872	872	889	890	890	890	890	885	885	885	885	872	890	885	11	18	-5
Guyana	0	0	0	0	0	0	0	0	28	50	100	120	0	0	75	0	0	75
Other Latam	356	365	333	347	340	336	332	328	324	320	316	312	350	334	318	-19	-16	-16
Non-OPEC LatAm	**4,499.0**	**4,533**	**4,420**	**4,553**	**4,470**	**4,666**	**4,767**	**4,863**	**4,937**	**4,980**	**5,061**	**5,107**	**4,501**	**4,692**	**5,021**	**-38**	**190**	**330**
Norway	1,958	1,791	1,790	1,862	1,820	1,690	1,680	1,900	1,925	1,990	2,035	2,025	1,850	1,773	1,994	-119	-78	221
UK	1,103	1,110	1,041	1,160	1,200	1,170	1,075	1,175	1,175	1,125	1,045	1,125	1,103	1,155	1,118	89	52	-38
Other Europe	638	635	614	638	635	633	631	629	627	625	623	621	631	632	624	1	1	-8
Total Europe	**3,700.0**	**3,537**	**3,445**	**3,659**	**3,655**	**3,493**	**3,386**	**3,704**	**3,727**	**3,740**	**3,703**	**3,771**	**3,585**	**3,560**	**3,735**	**-28**	**-26**	**176**
Azerbaijan	806	794	782	792	800	800	790	795	810	810	800	810	794	796	808	11	3	11
Kazakhstan	1,937	1,947	1,878	1,948	2,000	1,800	1,925	2,000	1,950	1,905	1,845	1,905	1,927	1,931	1,901	87	4	-30
Russia	11,302	11,329	11,594	11,745	11,663	11,520	11,568	11,615	11,648	11,668	11,668	11,703	11,492	11,592	11,672	171	99	80
Other FSU	347	346	343	341	338	336	333	331	328	326	323	321	344	335	325	-15	-10	-10
Total FSU	**14,392.0**	**14,416**	**14,596**	**14,826**	**14,802**	**14,456**	**14,616**	**14,741**	**14,737**	**14,709**	**14,637**	**14,739**	**14,558**	**14,654**	**14,705**	**253**	**96**	**52**
China	3,793	3,865	3,808	3,891	3,860	3,890	3,815	3,830	3,820	3,850	3,795	3,815	3,839	3,849	3,820	-33	9	-29
India	854	848	834	825	825	815	815	810	815	810	810	810	840	816	811	-17	-24	-5
Indonesia	812	812	797	792	770	770	760	750	730	730	715	705	803	763	720	-33	-41	-43
Malaysia	739	715	694	713	705	685	670	685	665	655	645	660	715	686	656	-3	-29	-30
Australia	335	314	346	374	410	415	445	460	475	465	490	490	342	433	480	27	90	48
Vietnam	262	248	240	239	225	220	215	210	210	205	200	195	247	218	203	-30	-30	-15
Rest of Asia-Pacific	819	790	804	815	805	795	785	775	765	755	745	735	807	790	750	-43	-17	-40
Non-OPEC Asia	**7,614.0**	**7,592**	**7,523**	**7,648**	**7,600**	**7,590**	**7,505**	**7,520**	**7,480**	**7,470**	**7,400**	**7,410**	**7,594**	**7,554**	**7,440**	**-131**	**-41**	**-114**
Oman	975	978	988	1,004	970	970	985	992	996	996	996	988	986	979	994	8	-7	15
Qatar	2,003	2,013	2,010	2,010	2,000	2,010	2,010	2,010	2,010	2,010	2,020	2,020	2,009	2,008	2,015	36	-1	8
Other Middle East	240	283	286	281	280	285	285	285	290	290	290	290	273	284	290	4	11	6
Non-OPEC Middle East	**3,218.0**	**3,274**	**3,283**	**3,295**	**3,250**	**3,265**	**3,280**	**3,287**	**3,296**	**3,296**	**3,306**	**3,298**	**3,268**	**3,270**	**3,299**	**48**	**3**	**28**
Egypt	647	653	649	649	645	645	640	640	635	630	625	625	650	643	629	10	-7	-14
Ghana	174	180	212	192	205	210	225	225	235	240	245	245	190	216	241	23	27	25
Other Africa	607	639	610	584	600	610	615	620	625	625	630	630	610	611	628	8	1	16
Non-OPEC Africa	**1,428.0**	**1,471**	**1,471**	**1,426**	**1,450**	**1,465**	**1,480**	**1,485**	**1,495**	**1,495**	**1,500**	**1,500**	**1,449**	**1,470**	**1,498**	**41**	**21**	**28**
Processing gains	2,322	2,322	2,322	2,322	2,349	2,349	2,355	2,355	2,382	2,382	2,387	2,387	2,322	2,352	2,385	28	30	33
Biofuels exc. US ethanol	1,091	1,729	1,991	1,473	1,256	1,799	2,048	1,630	1,325	1,793	2,063	1,710	1,571	1,683	1,723	146	112	39
Total non-OPEC supply	**61,040**	**62,067**	**63,397**	**64,132**	**63,569**	**64,031**	**64,883**	**65,646**	**65,890**	**66,268**	**67,044**	**67,284**	**62,659**	**64,532**	**66,621**	**2,777**	**1,873**	**2,089**
Non-OPEC ex. US Lower 48 & NG	**48,840**	**49,072**	**49,702**	**49,966**	**49,227**	**49,403**	**49,866**	**50,230**	**50,153**	**50,185**	**50,737**	**50,773**	**49,395**	**49,681**	**50,462**	**604**	**286**	**780**

Source: Goldman Sachs Global Investment Research, IEA, EIA

Exhibit 46: OPEC supply (kb/d)

	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019E	2Q2019E	3Q2019E	4Q2019E	1Q2020E	2Q2020E	3Q2020E	4Q2020E	2018	2019 E	2020 E	yoy 18	yoy 19 E	yoy 20 E
Ecuador	517	527	530	517	523	520	515	505	490	490	490	480	523	516	488	-8	-7	-28
Venezuela	1,543	1,430	1,327	1,297	1,113	900	825	775	725	725	725	725	1,399	903	725	-568	-496	-178
Algeria	1,013	1,027	1,063	1,067	1,027	1,040	1,045	1,030	1,010	1,015	1,025	1,010	1,043	1,035	1,015	-5	-7	-20
Congo	309	328	330	330	338	340	330	330	320	320	320	320	324	335	320	66	10	-15
Gabon	200	187	190	183	207	205	200	200	195	195	190	185	190	203	191	-10	13	-12
Angola	1,553	1,487	1,480	1,447	1,472	1,510	1,500	1,490	1,450	1,425	1,410	1,390	1,492	1,493	1,419	-151	1	-74
Nigeria	1,660	1,507	1,617	1,630	1,637	1,700	1,700	1,650	1,675	1,650	1,625	1,625	1,603	1,672	1,644	77	68	-28
Equatorial Guinea	133	123	117	113	123	113	107	103	113	103	97	93	122	112	102	-4	-10	-10
Libya	1,010	890	903	1,083	955	1,150	1,175	1,200	1,200	1,200	1,200	1,200	972	1,120	1,200	146	148	80
Iran	3,833	3,843	3,613	3,030	2,714	2,680	2,630	2,580	2,580	2,380	2,430	2,330	3,580	2,651	2,430	-232	-929	-221
Iraq	4,453	4,480	4,647	4,673	4,690	4,700	4,780	4,825	4,885	4,925	4,985	5,000	4,563	4,749	4,949	90	185	200
Kuwait	2,700	2,710	2,793	2,777	2,703	2,703	2,753	2,778	2,790	2,790	2,790	2,765	2,745	2,734	2,784	38	-11	49
Neutral Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	9,953	10,137	10,430	10,780	10,110	10,000	10,200	10,300	10,350	10,350	10,350	10,250	10,325	10,153	10,325	367	-173	173
UAE	2,840	2,880	3,003	3,263	3,050	3,050	3,110	3,141	3,156	3,156	3,156	3,126	2,997	3,088	3,148	64	91	60
Total OPEC Crude	**31,719**	**31,555**	**32,044**	**32,190**	**30,663**	**30,611**	**30,870**	**30,906**	**30,939**	**30,724**	**30,793**	**30,499**	**31,877**	**30,763**	**30,738**	**-130**	**-1,114**	**-24**
Total OPEC NGL	**5,542**	**5,533**	**5,546**	**5,597**	**5,566**	**5,566**	**5,566**	**5,566**	**5,499**	**5,445**	**5,436**	**5,454**	**5,555**	**5,566**	**5,459**	**42**	**12**	**-107**
Total OPEC supply	**37,261**	**37,088**	**37,590**	**37,787**	**36,229**	**36,177**	**36,436**	**36,472**	**36,438**	**36,168**	**36,229**	**35,953**	**37,431**	**36,329**	**36,197**	**-89**	**-1,103**	**-132**
World supply	**98,301**	**99,155**	**100,987**	**101,918**	**99,797**	**100,209**	**101,320**	**102,118**	**102,328**	**102,436**	**103,272**	**103,237**	**100,090**	**100,861**	**102,818**	**2,689**	**771**	**1,958**

Source: Goldman Sachs Global Investment Research, IEA

Exhibit 47: Global demand (kb/d)

	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019E	2Q2019E	3Q2019E	4Q2019E	1Q2020E	2Q2020E	3Q2020E	4Q2020E	2018	2019E	2020E	yoy 18	yoy 19E	yoy 20E
USA	20,576	20,632	20,940	20,928	20,909	21,152	21,275	21,092	21,117	21,292	21,409	21,242	20,769	21,107	21,265	498	338	158
Canada	2,323	2,345	2,558	2,485	2,356	2,297	2,480	2,446	2,313	2,269	2,450	2,413	2,428	2,395	2,361	-17	-33	-33
Mexico	2,011	2,042	1,972	1,917	2,024	2,067	1,994	1,941	2,038	2,111	2,046	1,976	1,985	2,006	2,043	-7	21	36
North America	**24,909**	**25,018**	**25,470**	**25,331**	**25,288**	**25,515**	**25,749**	**25,479**	**25,469**	**25,672**	**25,904**	**25,630**	**25,182**	**25,508**	**25,669**	**474**	**326**	**161**
Brazil	2,946	2,914	3,068	3,088	3,048	2,960	3,054	3,146	3,101	3,016	3,110	3,196	3,004	3,052	3,106	2	48	54
Chile	367	370	364	366	374	384	379	370	371	382	378	367	367	377	374	12	10	-2
LatAm ex. Mexico, Brazil, Chile	3,387	3,445	3,419	3,356	3,350	3,415	3,428	3,377	3,361	3,422	3,441	3,395	3,402	3,392	3,405	-15	-9	12
LatAm ex. Mexico	**6,700**	**6,729**	**6,851**	**6,810**	**6,772**	**6,758**	**6,860**	**6,893**	**6,833**	**6,820**	**6,928**	**6,958**	**6,772**	**6,821**	**6,885**	**0**	**49**	**64**
OECD Europe	14,082	14,261	14,740	14,105	13,853	14,226	14,713	14,163	13,867	14,232	14,716	14,148	14,297	14,239	14,241	2	-59	2
Non-OECD Europe	735	736	786	757	806	753	802	773	821	768	818	790	754	784	799	-3	30	16
Total Europe	**14,818**	**14,998**	**15,526**	**14,863**	**14,659**	**14,979**	**15,515**	**14,937**	**14,688**	**15,001**	**15,534**	**14,938**	**15,051**	**15,022**	**15,040**	**-1**	**-29**	**18**
Japan	4,272	3,426	3,533	3,895	4,102	3,353	3,515	3,781	4,029	3,253	3,387	3,718	3,782	3,688	3,597	-114	-94	-91
South Korea	2,629	2,547	2,484	2,431	2,602	2,434	2,464	2,441	2,609	2,433	2,464	2,437	2,522	2,485	2,485	-61	-37	0
Australia & New Zealand	1,377	1,387	1,365	1,402	1,381	1,398	1,380	1,418	1,404	1,420	1,402	1,441	1,383	1,394	1,417	40	11	23
Israel	234	242	237	232	240	248	243	238	246	254	249	244	236	242	248	-6	6	6
OECD Asia Pacific	**8,512**	**7,602**	**7,620**	**7,960**	**8,325**	**7,432**	**7,602**	**7,878**	**8,288**	**7,360**	**7,502**	**7,839**	**7,923**	**7,809**	**7,747**	**-142**	**-114**	**-62**
China	12,510	13,290	13,112	13,371	12,950	13,715	13,412	13,771	13,348	14,115	13,812	14,171	13,071	13,462	13,862	497	391	399
India	4,820	4,919	4,606	4,904	5,128	5,145	4,887	5,191	5,331	5,424	5,148	5,467	4,812	5,088	5,343	245	276	255
Other non-OECD Asia	9,145	9,186	9,042	9,191	9,378	9,380	9,252	9,404	9,645	9,651	9,526	9,689	9,141	9,353	9,628	215	212	274
Total Asia	**26,475**	**27,396**	**26,760**	**27,466**	**27,457**	**28,239**	**27,551**	**28,367**	**28,324**	**29,191**	**28,486**	**29,327**	**27,024**	**27,903**	**28,832**	**957**	**879**	**929**
FSU	**4,481**	**4,636**	**4,906**	**4,830**	**4,603**	**4,775**	**5,015**	**4,957**	**4,727**	**4,896**	**5,126**	**5,061**	**4,713**	**4,837**	**4,953**	**180**	**124**	**115**
Total Middle East	**8,085**	**8,519**	**8,578**	**8,273**	**8,281**	**8,548**	**8,698**	**8,283**	**8,397**	**8,663**	**8,816**	**8,398**	**8,364**	**8,453**	**8,568**	**-83**	**89**	**116**
Total Africa	**4,402**	**4,417**	**4,261**	**4,358**	**4,467**	**4,494**	**4,346**	**4,451**	**4,576**	**4,606**	**4,450**	**4,558**	**4,360**	**4,439**	**4,547**	**40**	**80**	**108**
OECD demand	**47,871**	**47,251**	**48,194**	**47,761**	**47,841**	**47,557**	**48,443**	**47,890**	**47,994**	**47,646**	**48,500**	**47,985**	**47,769**	**47,933**	**48,031**	**347**	**163**	**98**
Non-OECD demand	**50,511**	**52,064**	**51,778**	**52,128**	**52,012**	**53,185**	**52,893**	**53,353**	**53,306**	**54,562**	**54,248**	**54,724**	**51,620**	**52,861**	**54,210**	**1,078**	**1,241**	**1,349**
World Demand	**98,382**	**99,315**	**99,972**	**99,889**	**99,852**	**100,742**	**101,336**	**101,243**	**101,300**	**102,208**	**102,748**	**102,709**	**99,389**	**100,794**	**102,241**	**1,425**	**1,404**	**1,448**

Source: Goldman Sachs Global Investment Research, IEA, EIA, JODI, GTT, National Sources

Disclosure Appendix

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