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Oil

Beyond Algiers, weakening oil fundamentals

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Oil prices have remained range bound ahead of the OPEC consultation in Algiers this week and as production disruptions have yet to meaningfully ramp up. Statements by participants suggest potentially greater collaboration between OPEC members than in previous attempts, although the outcome of this advisory meeting remains uncertain. Our production forecast continues to reflect a seasonal Saudi production decline into year-end and no growth elsewhere (the equivalent of a deal) with OPEC exc. Libya/Nigeria production growth only resuming in 1Q17.

Nonetheless, our 4Q16 oil supply-demand balance is weaker than previously expected given upside surprises to 3Q production and greater clarity on new project delivery into year-end. This leaves us expecting a global surplus of 400 kb/d in 4Q16 vs. a 300 kb/d draw previously. Importantly, this forecast only assumes a limited additional increase in Libya/Nigeria production of 90 kb/d vs. current estimated output. As a result, we are lowering our 4Q16 forecast to $43/bbl from $50/bbl previously. While a potential deal could support prices in the short term, we find that the potential for less disruptions and still relatively high net long speculative positioning leave risks skewed to the downside into year-end. Importantly, given the uncertainty on forward supply-demand balances, we reiterate our view that oil prices need to reflect near-term fundamentals – which are weaker – with a lower emphasis on the more uncertain longer-term fundamentals.

Despite a weaker 4Q16, our 2017 outlook is unchanged with demand and supply projected to remain in balance. We expect demand growth to remain resilient while greater than previously expected production declines in US/Mexico/Venezuela/Brazil/China are offset by greater visibility in the large 2017 new project ramp up in Canada/Russia/Kazakhstan/North Sea. While our price forecast remains unchanged at $52/bbl on average for next year with a 1H17 expected trading range of $45-$50/bbl, we continue to view low cost and disrupted supply as determining the path of an eventual price recovery with our forecasts conservative on both. As we wait for headlines from Algiers, it is worth pointing out that Iran, Iraq and Venezuela have each guided over the past month to a 250 kb/d rise in production next year.

Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html.

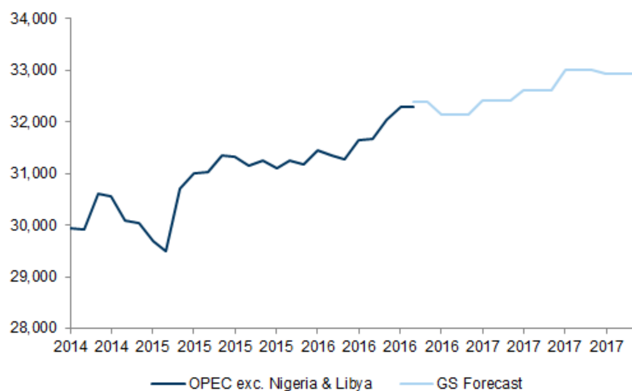
Given our outlook for a well supplied market and a crude curve in contango with limited spot upside, we continue to recommend being short the S&P GSCI Crude Oil index, especially paired with positive yielding oil-exposed assets such as HY E&P credit.

Uncertainty around OPEC meeting but our balance continues to feature a seasonal production decline in 4Q16

Oil prices have remained range bound ahead of the OPEC consultation in Algiers this week and as production disruptions have yet to meaningfully ramp up. Rhetoric from Saudi, Iran, Iraq and Russia suggests potentially greater collaboration than in the previous six attempts, with reports that Saudi is proposing to reduce output to its January level (10.2 mb/d) in exchange for Iran freezing output. As usual, uncertainty heading into the meeting remains high, with Saudi and Iran viewing this gathering as an advisory meeting only and Russia's participation uncertain. Further, most participants have pointed to future production growth recently: Iran reiterated its year-end growth target of 200 kb/d just last week, Venezuela announced on September 21 an ambitious drilling program that could add 250 kb/d over the next two years, the Iraq government announced on August 11 agreements with majors to increase output by 250-350 kb/d in 2017, and Russia is ramping up drilling activity (up 30% yoy) to deliver higher production in coming months.

Exhibit 1: We continue to forecast a seasonal decline in Saudi production and a stall in production growth elsewhere in coming months

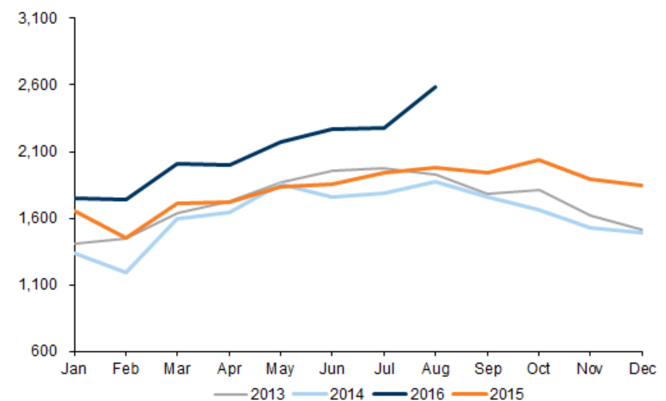
OPEC exc. Nigeria & Libya crude production (thousand barrels per day)



Source: IEA, Goldman Sachs Global Investment Research

Exhibit 2: Russia's production is however set to grow into year-end as new fields come online

Russia development drilling - thousand meters drilled per month

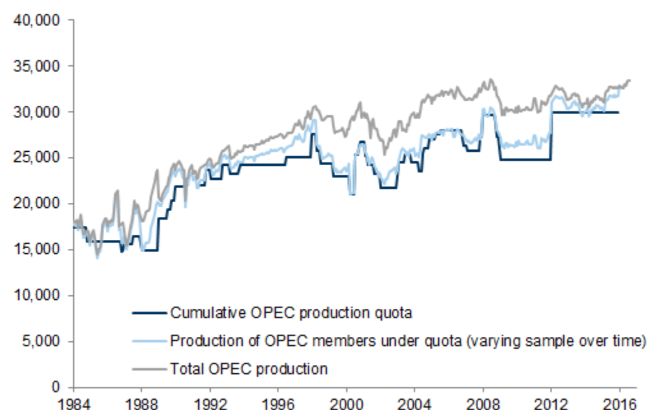


Source: Company data

A deal for a decline in Saudi production and a freeze elsewhere could support prices near term but from a physical barrel perspective would be (1) in line with our base case forecast given Saudi's seasonal production pattern and the recent lack of growth in Iran output, and (2) would still be dependent on potential disruption reversals in Libya and Nigeria. A greater cut than our balance already reflects is unlikely in our view given the current Saudi/Iran stance and its self-defeating nature given the short-cycle shale, the already 33% recovery in the US rig count and the wave of new projects coming online next year. Further, history suggests that cuts

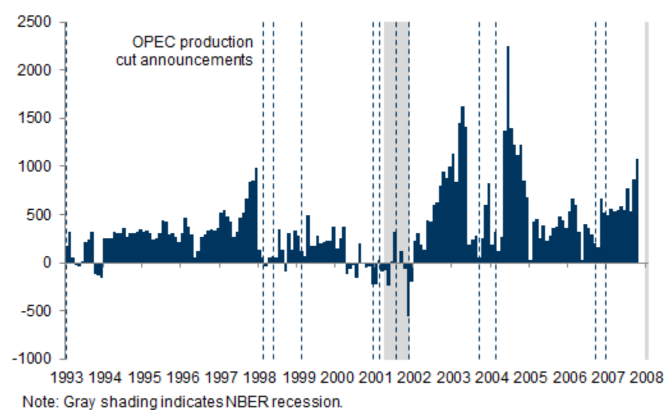
are only poorly enforced, even by core OPEC members such as Saudi, Kuwait and the UAE, unless they are demand driven as in that case, weak refinery demand enforces compliance.

Exhibit 3: Compliance to OPEC production quotas has been poor historically
OPEC crude oil production (thousand barrels per day)



Source: OPEC, IEA, JODI, Goldman Sachs Global Investment Research

Exhibit 4: It has historically taken recessions and lower refinery demand to enforce OPEC quota compliance
OPEC production of members under quota vs. their quota; vertical lines indicate OPEC production cut announcements; Grey shading indicates NBER US recessions



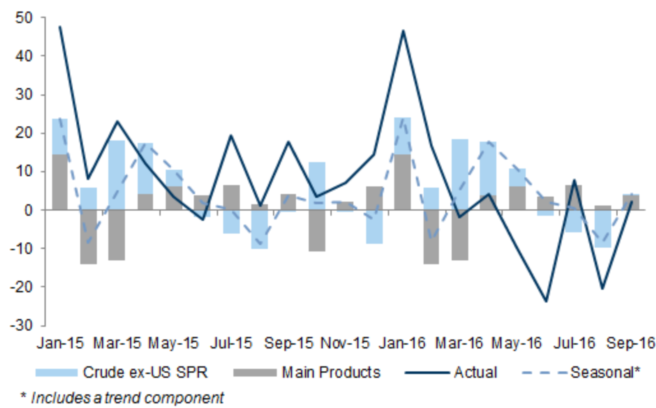
Source: IEA, JODI, OPEC, NBER, Goldman Sachs Global Investment Research

Net, our base case forecast continues to reflect a combined decline in OPEC production (exc. Libya and Nigeria) of 340 kb/d in 4Q16, with growth of only 140 kb/d in 1Q17. Despite this forecasted help from OPEC, we find that the improvement in oil fundamentals has stalled in 3Q and that the inventory build is set to resume in 4Q, a weaker outlook than we had previously expected.

After a sharp halt in stock builds in 2Q driven by supply disruptions, high-cost production declines and a strong Chinese pull, the improvement in oil fundamentals is stalling in 3Q despite short-term production disruptions averaging 945 kb/d from July to last week, when they stood at 650 kb/d.

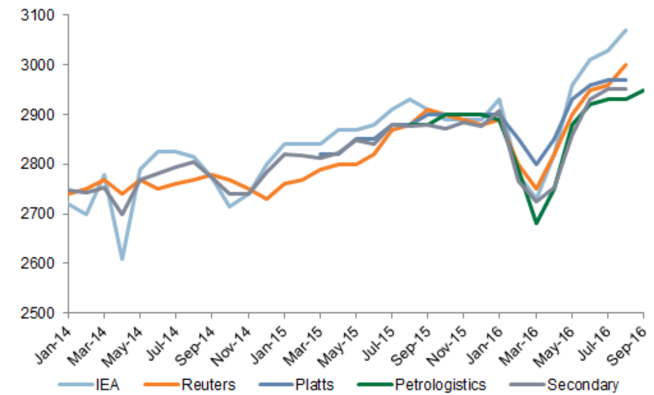
- Global weekly data points to inventories drawing 10 mb from July to last week, only 6 mb below seasonals vs. a 60 mb larger decline than seasonal during 2Q. This is consistent with our updated supply-demand balance which features a global market deficit in 3Q of only 0.1 mb/d vs. 0.2 mb/d previously.
- Low-cost producers have continued to surprise to the upside, with the beats driven by Saudi which averaged 10.65 mb/d in 3Q, a large ramp up in the UAE to record high levels and a less dire outcome in Nigeria than we had cautiously assumed.

Exhibit 5: The large 2Q decline in high frequency oil stocks has stalled in 3Q
Weekly stock changes (mb) aggregated monthly (US, ARA, Singapore, Japan)



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

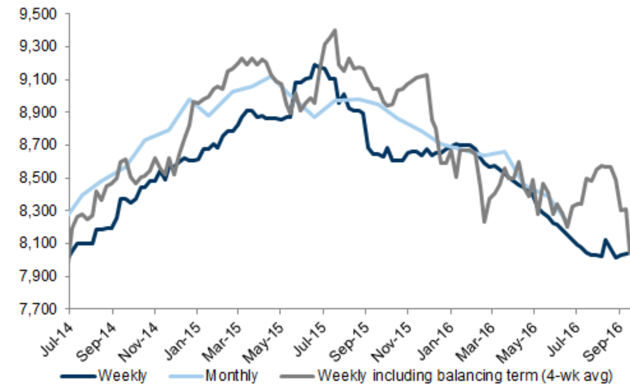
Exhibit 6: Saudi Arabia and the UAE have set new production records during 3Q16
UAE crude oil production (thousand barrels per day)



Source: IEA, Platts, Reuters, Petrologistics, OPEC

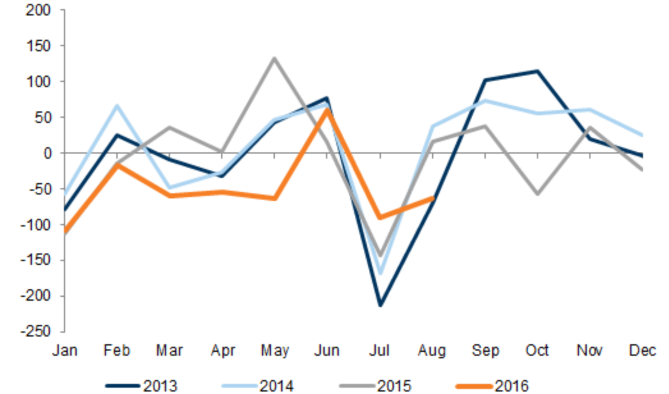
- Data available so far suggests that the sharp production declines observed in 2Q slowed in 3Q in Mexico, Venezuela and the US Lower 48 with Brazil and Norway rebounding strongly from maintenance. And while China production continues to fall, this decline is still in line with seasonal maintenance patterns.

Exhibit 7: Recent data and our own production modeling point to a slowing of US production declines in 3Q vs. 2Q
US Lower 48 oil production including GoM (kb/d)



Source: EIA

Exhibit 8: Even the large decline in Chinese output is seasonal
China month-on-month change in crude oil production (thousand barrels per day)

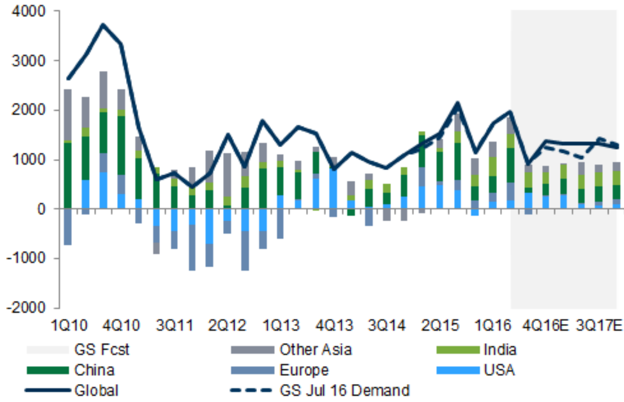


Source: IEA

- July and August data point to demand growth slowing in line with our expectation, in particular in China. We forecast demand growth to average 0.9 mb/d yoy in 3Q, down from its torrid 1H16 pace of 1.8 mb/d. Our expectation for moderating demand growth in 2H16 is driven by strong base effects, a slowdown in growth and continued switching of power generation away from oil in Japan, Brazil and Mexico. Note that our demand estimate remains higher than the IEA's

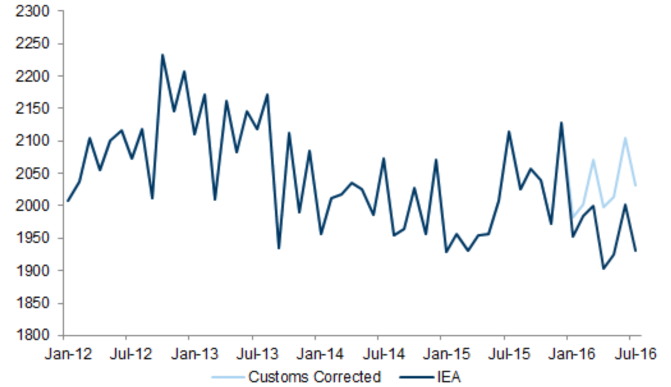
however given our corrected measure of Mexican demand[1] and our expanded accounting of Chinese demand (*Crouching headlines, hidden demand*, July 18, 2016).

Exhibit 9: We expect global demand growth to slow in 3Q16
Global oil demand growth (thousand barrels per day)



Source: IEA, NBS, EIA, Goldman Sachs Global Investment Research

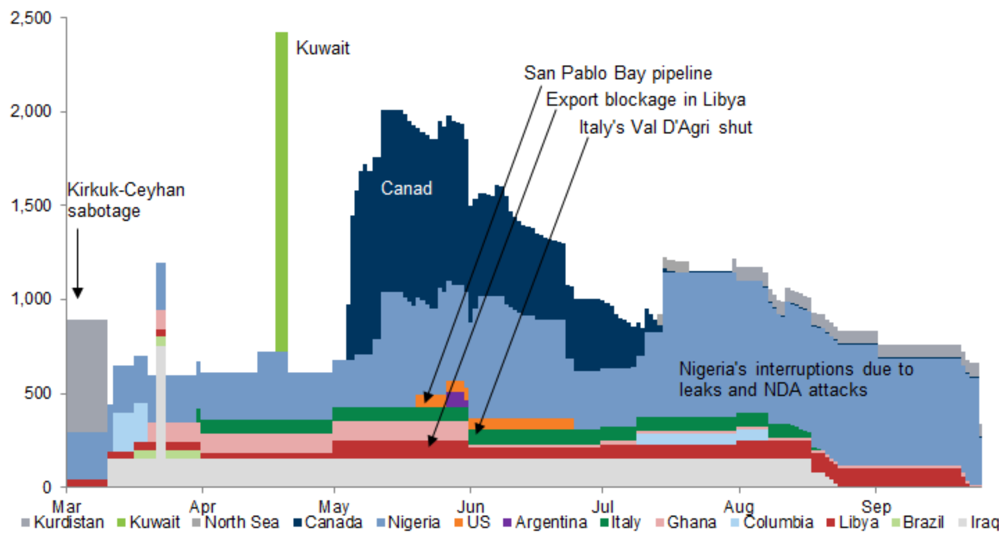
Exhibit 10: Our measurement of oil demand is greater than the IEA's driven by different measurements of Chinese and Mexican demand
Mexico oil demand (thousand barrels per day)



Source: IEA, GTT, Goldman Sachs Global Investment Research

Importantly, this lackluster 3Q oil balance is occurring without much reversal of production disruptions. Libya production has only increased 100 kb/d so far to 360 kb/d, while in Nigeria only Bonny Light force majeure has been lifted, implying a 75 kb/d increase in production in September. And finally, the ramp up in Iraqi exports through the KRG pipeline to Ceyhan has been offset by the attack on the Bai Hassan field in late July (with the end of the fire only on Sunday suggesting a 2017 ramp up).

Exhibit 11: Short-term production disruptions have only modestly declined through 3Q16
Short-term oil production disruptions (thousand barrels per day)



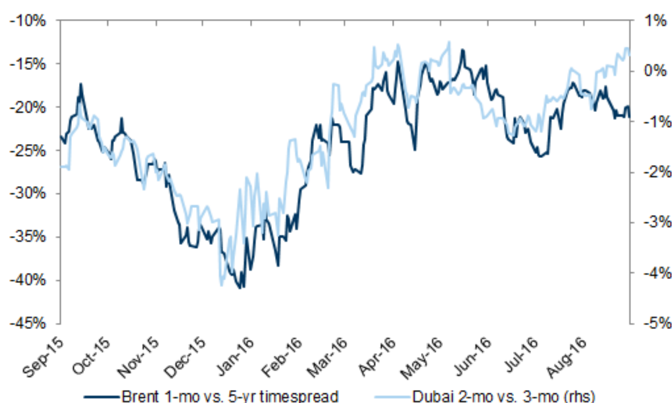
Source: Reuters, Platts, Goldman Sachs Global Investment Research

[1] We find that IEA and Pemex data understates Mexican demand on account of an incomplete accounting of LPG imports as Pemex no longer has exclusive rights to distribute the product. This is visible in the 100 kb/d divergence between the import data reported by the IEA and Pemex vs. customs data reported by Mexico.

The range-bound price action of oil spot prices and Brent 1-mo to 5-yr timespreads has been consistent with these lackluster fundamentals. Near-dated Brent and Dubai timespreads did strengthen as floating storage discharged, however we view this as likely driven by the combination of North Sea maintenance, the ongoing Nigeria disruption, Chinese port decongestion/rising imports and finally low Asian refinery turnarounds. Nonetheless, since March, this 15 mb discharge of floating storage, the 24 mb decline in OECD inventories (proxied with weekly data through September) and the 15 mb decline in Saudi inventories imply that available storage capacity has increased by 54 mb. Facilitated by the continued strong inventory pull from China, this storage draw strongly reduces the probability of trading below $30/bbl even should production disruptions reverse, which we discuss below.

Exhibit 12: Front month to 5-yr forward timespreads have remained range bound, consistent with our estimated lackluster 3Q16 oil fundamentals

Timespreads %

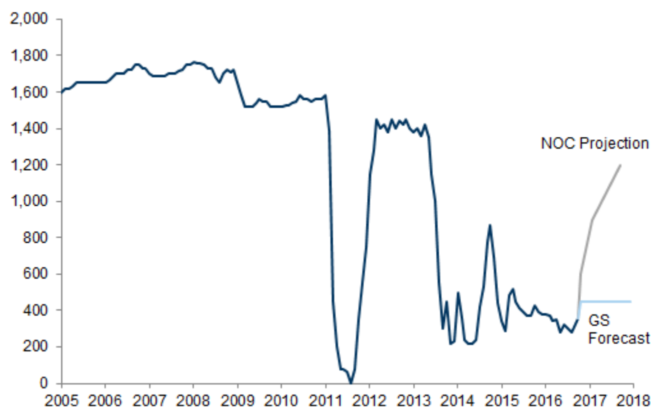


Source: Platts, ICE

A weaker 4Q16 outlook even assuming lower OPEC production and only modest disruption reversals

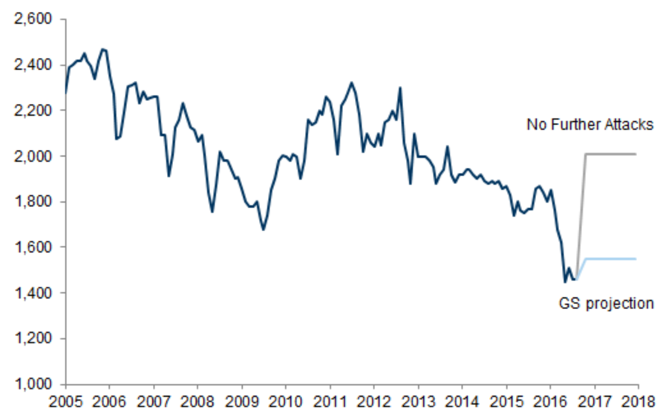
Looking forward, uncertainty on the forward production outlook for Libya and Nigeria remains high. In Nigeria, rebels announced an attack on the Bonny Light pipeline on Friday (September 23) that could offset the recent ramp up although so far no force majeure has been announced. In Libya, recent attacks delayed the ramp up in exports from the ports of Es Sider and Ras Lanuf. As a result, we only expect a 230 kb/d increase in production in 4Q vs. 3Q from both countries although that only represents a 90 kb/d increase from current estimated production levels. But the upside risk remains significant: a single entity, the Libyan National Army, is now in control of the both the three shuttered ports and fields in Libya with the National Oil Company guiding for a production ramp up to 900 kb/d by year-end while majors in Nigeria are guiding to a lift of force majeure on the Qua Iboe (300 kb/d) and Forcardos (250 kb/d) pipelines in the coming weeks.

Exhibit 13: The uncertain situation in Libya leaves our production forecast unchanged for now...
Libya oil production (thousand barrels per day)



Source: NOC, IEA, Platts

Exhibit 14: ... and in Nigeria as well
Nigeria oil production (thousand barrels per day)

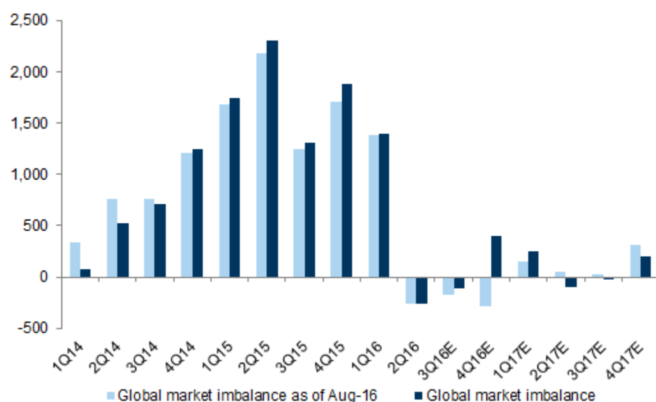


Source: NOC, IEA, Platts, Reuters

Despite this lack of meaningful disruption reversal, we are raising our 4Q production forecast given higher production in 3Q elsewhere and the greater supply visibility on the ramp up of several major projects. Specifically, (1) Kashagan in Kazakhstan (although we cautiously only embed half of the guided ramp-up), (2) Filanovsky in Russia, (3) higher pre-salt output from the new FPSO in Brazil, (4) Horizon and Foster Creek/Christina Lake in Canada and (5) Goliath in Norway.

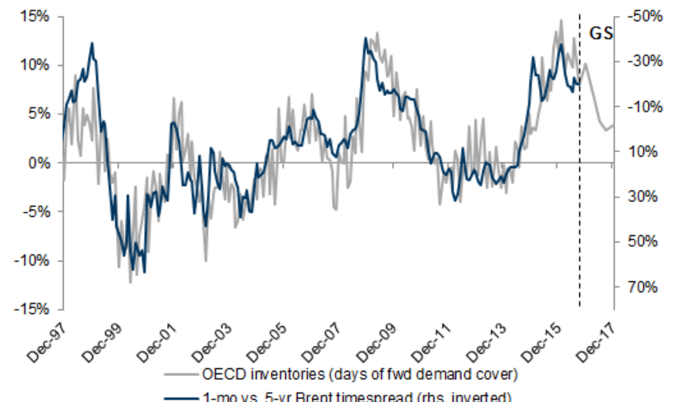
With our demand outlook unchanged, with year-on-year growth of 1.4 mb/d, this leaves us now forecasting that inventories will build in 4Q16 by 400 kb/d vs. our prior expectation for a 300 kb/d draw during the quarter. As a result, we are lowering our 4Q16 WTI price forecast to $43/bbl, below our previously expected $45-50/bbl trading range. Given our unchanged 2017 outlook, we expect this weakness to be reflected in weaker front month to 5-year forward timespreads.

Exhibit 15: We now forecast that the global oil market will be in a surplus in 4Q16
Global oil market imbalance (supply minus demand; thousand barrels per day)



Source: IEA, Goldman Sachs Global Investment Research

Exhibit 16: This will drive timespreads weaker and we are lowering our 4Q16 price forecast accordingly
OECD commercial stocks (exc. US NGLs) in days of OECD demand coverage vs. 3-yr average (lhs) vs. 1-mo to 5-yr Brent timespreads (%, rhs, inverted)



Source: IEA, ICE, Goldman Sachs Global Investment Research

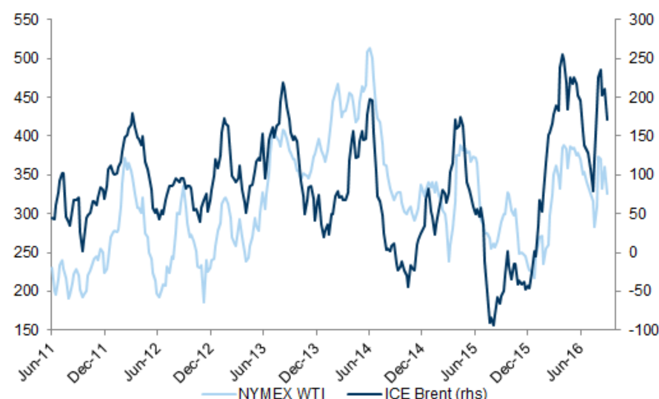
While an OPEC agreement could present near-term upside risk to this forecast, our base case supply forecast already accounts for the equivalent of a Saudi cut and

freeze elsewhere in coming months. Further, given the uncertainty on both future OPEC decisions and forward supply-demand balances, we reiterate our view that oil prices need to reflect near-term fundamentals – which are weaker – with a lower emphasis on the more uncertain longer-term fundamentals. And from a near-term supply perspective, we see risks as more skewed to the downside with the historical inventory to timespread relationship implying that an additional 200 kb/d increase in Libya or Nigeria above our 0.4 and 1.5 mb/d forecast during 4Q16 would push prices $3/bbl lower (at a stable long-term price).

Further, we find that net speculative positioning has remained relatively long and well above its early August level when oil was last trading near $40/bbl suggesting sufficient ammunition for a move lower. In fact, the large WTI put open interest at the $40/bbl strike and declining put skew over the past month suggests that a move through that level could precipitate a larger decline via negative gamma effects.

Exhibit 17: Net speculative positioning is still well above its early August level

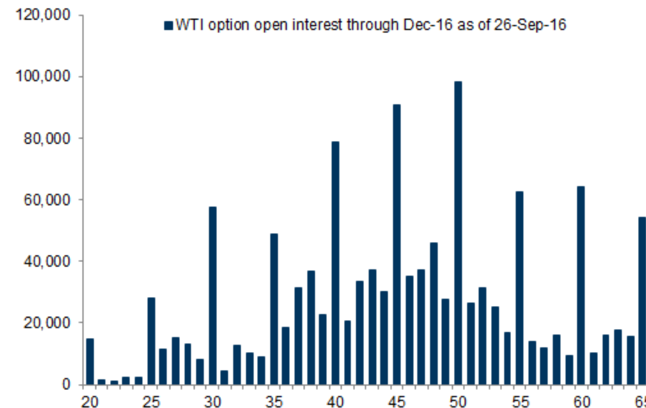
Net speculative length (with options, thousand contracts)



Source: CFTC, ICE

Exhibit 18: Large option open interest at $40/bbl could exacerbate downside volatility

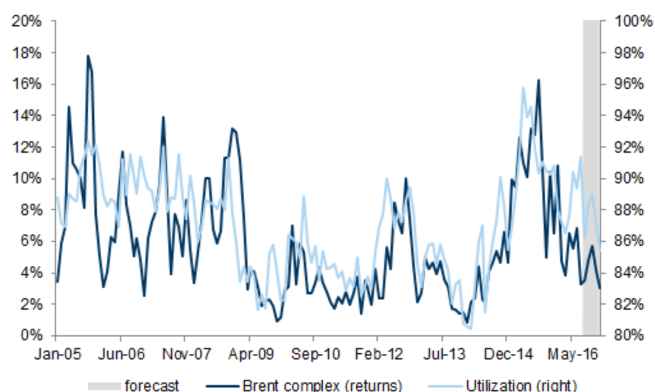
Open interest of remaing WTI 2016 expiration options by strike



Source: CME

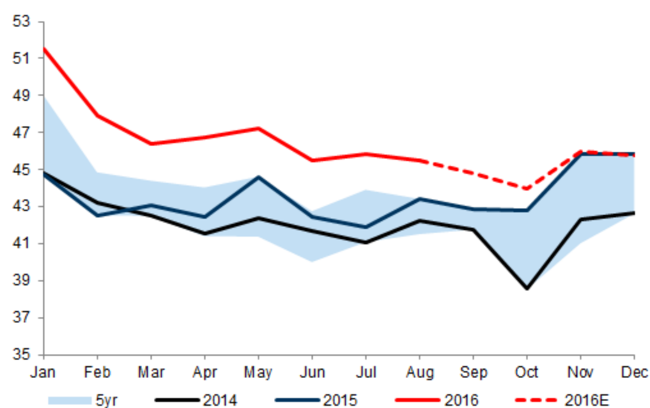
On the product side, while there have been signs of recent improvements, inventories remain elevated and sustained low refining margins are required in our view for cracks to recover further. Combined Atlantic Basin gasoline and distillate stocks are down 11 mb more than seasonal in July/August, driven by strong US exports to Latin America (where turnarounds this summer have been historically high), low-margin-induced European run cuts and strong US gasoline demand. Going forward, the strong refinery turnarounds in the US in October and in the Middle East in November-December will be offset by low turnarounds in India and East Asia. As a result, embedding forward prices for crude and products in margins, gas-heat and gas-naphtha and adjusting flows entering or exiting the region basis global turnarounds, we find the backwardation in margins is insufficient to materially clear the product inventory overhang, limiting the upside to margins and cracks relative to the current forwards. Higher crude supply than we expect would drive refining margins higher via weaker crude timespreads, incentivizing higher throughput and ultimately exacerbating the product inventory overhang.

Exhibit 19: Sustained low margins are necessary in our view...
Brent complex refining margins vs. refinery utilization rate



Source: IEA, Euroil, Platts, IIR, Goldman Sachs Global Investment Research

Exhibit 20: ... to stabilize the Atlantic basin product overhang
US and EU product inventories (days of demand cover)



Source: IEA, EIA, Platts, IIR, Haver Analytics, Goldman Sachs Global Investment Research

Updated supply-demand forecasts leaves our 2017 outlook unchanged with market balanced...

Despite our weaker 4Q16 outlook, our updated 2017 supply-demand balance is roughly unchanged, with a projected average global surplus of 100 kb/d. Our demand growth outlook is slightly higher at 1.31 mb/d, driven by Asia and North America. This demand outlook is consistent with global GDP growth remaining a 3%, normal weather conditions and a gradual rise in oil prices to $55/bbl by year-end.

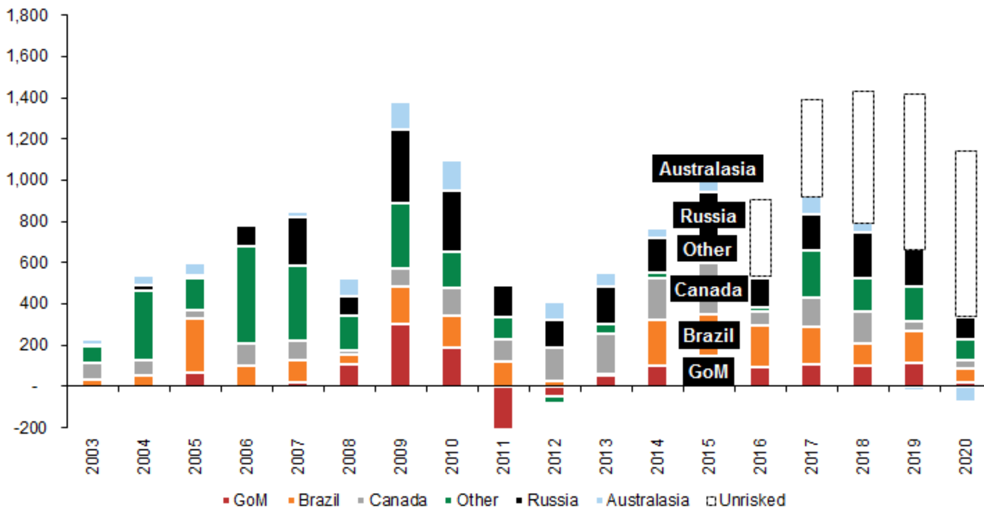
The supply changes that we are making in 2017 are offsetting on aggregate with OPEC expected to grow by 0.8 mb/d and non-OPEC by 0.2 mb/d, although we find ourselves erring on the side of caution in several countries.

- We expect greater production declines in the US Lower 48 given our lower 4Q16 price forecast and larger 2Q16 declines than previously expected. This is partly offset by a higher US NGL forecast, although still below the EIA's projection.
- We are lowering our Mexico and Brazil forecasts in line with recent provided guidance. In the case of Mexico, we adopt the guidance of another 165 kb/d decline, although it does not reflect the new 2017 PEMEX business plan, which has yet to be released.
- We are also lowering our Venezuela production forecast and expect additional declines of 200 kb/d as we do not embed the impact of the rig count increase announcement since the terms with the service companies have yet to be finalized.
- We are raising our Kazakhstan, Russia and Canada production forecast on greater visibility on project delivery although we assume that Kashagan will miss its guidance by a third.
- Finally, we are delaying the ramp-up of the Neutral Zone to 2H17 but are raising our Iraq forecast to account for greater flows through the KRG pipeline following the deal with Baghdad.

Importantly, the ramp up in new projects outside of US shale is greater in 2017 than in 2016 with our forecast still reflecting the usual 10% risking to account for potential

delays or misses. But spare service capacity is allowing for projects to come online close to guidance and on time and this represents 400 kb/d of potential additional production in 2017.

Exhibit 21: There is a large wave of new non-shale projects coming online in 2017
GS Top Projects annual incremental oil additions (thousand barrels per day)



Source: Company data, Goldman Sachs Global Investment Research

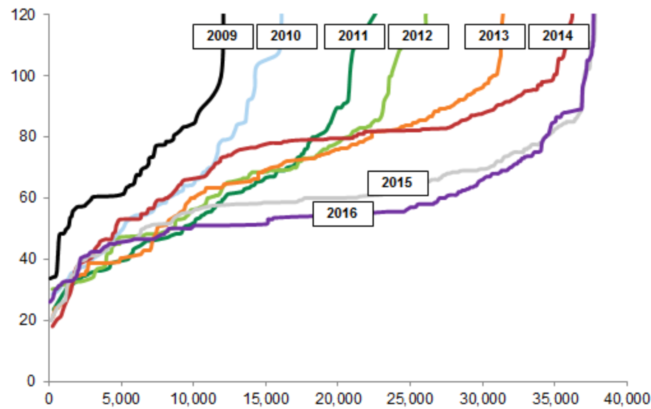
… but the 2017 recovery will still be driven by low-cost producers

We believe that the declines in drilling activity around the world are still setting the stage for an eventual recovery in prices. But the timing of this recovery will continue to be determined by disrupted and low-cost production through 2018. For low-cost producers, we have been consistently too conservative on output growth, and while momentum should be slowing, our forecast for 2017 remains well below the governments' production guidance in Iraq, Iran, Venezuela, Algeria.

Ultimately this drive to grow production reflects the core of our New Oil Order, where the flattening of the oil cost curve created by shale has led to a loss of pricing power by low-cost producers. Consistent with the economics of the "dominant firm/competitive fringe" market structure, the pricing dynamics in the oil market have moved away from the dominant low-cost producers, with higher production their only solution going forward to achieve revenue growth (see *The new oil order* - Appendix A, October 21, 2014 for more details).

Exhibit 22: A flattening cost curve shifts the production incentive of low-cost producers

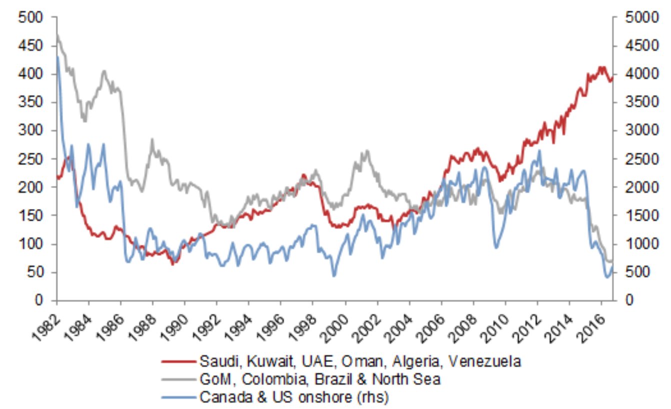
Breakeven of non plateau oil assets (cumulative production of identified projects vs. breakeven)



Source: Goldman Sachs Global Investment Research

Exhibit 23: This is similar to the 1990s when low-cost producers were the drivers of production growth and investment for ten years

Oil rig count

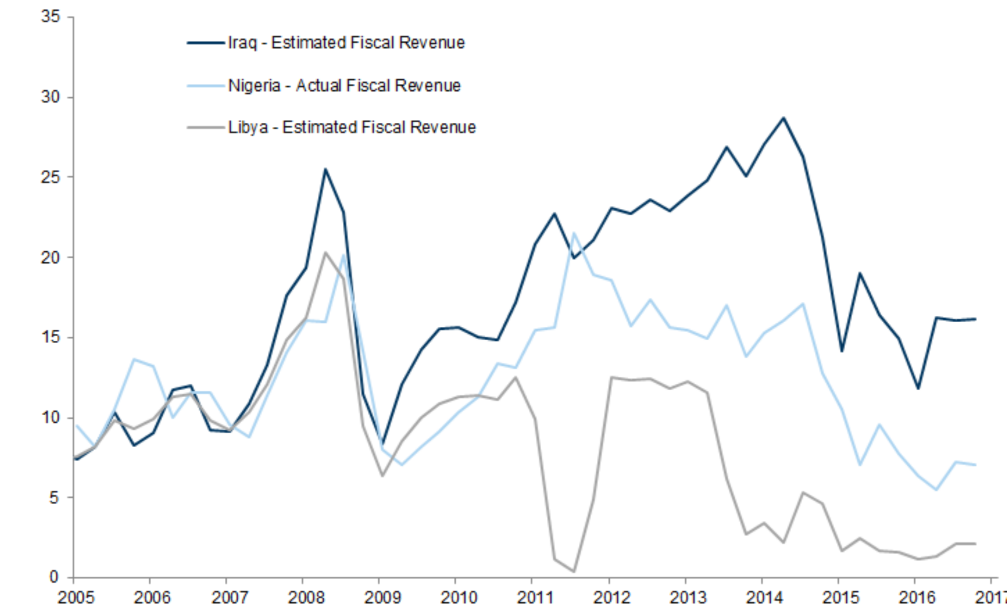


Source: BH

On the production disruption side, collapsed fiscal revenues are the key incentive to resume exports and are the likely catalyst behind last month's détente in Iraq and Nigeria. Lower revenues are also driving a gradual reduction in local taxation as countries fight to compete with US shale for capital and project sanctioning. In both cases, financial duress is gradually making governments more amenable to concessions to sustain oil revenues through volumes and leave risks to production as skewed to the upside.

Exhibit 24: The collapse in fiscal revenues will likely force governments to ease tax burdens and try to reverse production disruptions

Estimated quarterly government fiscal revenues (US$ bn)



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

So while we reiterate our $52/bbl forecast for next year (starting the year at $45/bbl and rallying to $55/bbl), we see risks skewed to the downside. Exhibit 25 quantifies the expected average Brent spot price in 2017 under various scenarios of higher low-

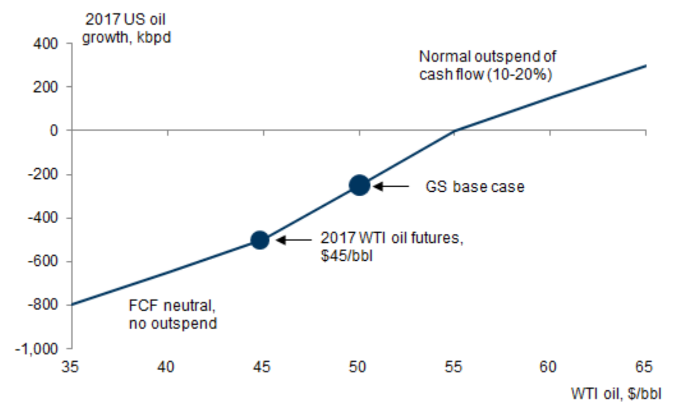
cost production (while we illustrate this with Libya/Nigeria, the conclusion would be the same for other low-cost origins). While this model accounts for the estimated resulting shift in OECD demand, the price impact is likely be greater than presented as this model only quantifies the impact on timespreads with long dated prices likely to move as well. Some 400 kb/d of additional low-cost production than we assume would bring prices down to $42/bbl vs. our base case forecast of $52/bbl. This result is slightly larger but of similar magnitude than the price decline to $45/bbl required to generate a US shale drilling decline that would offset this amount of production according to our US E&P analysts' models.

Exhibit 25: Our timespread model points to a $42/bbl oil price next year to offset an additional 400 kb/d of production
Estimate 2017 average Brent spot price at various production levels (based on timespread to inventory relationship - see Exhibit 16; inclusive of estimated demand response to price changes)

2017 Brent avg. spot		Libya		
		250	450	650
Nigeria	1,350	62	57	52
	1,550	57	52	47
	1,750	52	47	42

Source: Goldman Sachs Global Investment Research

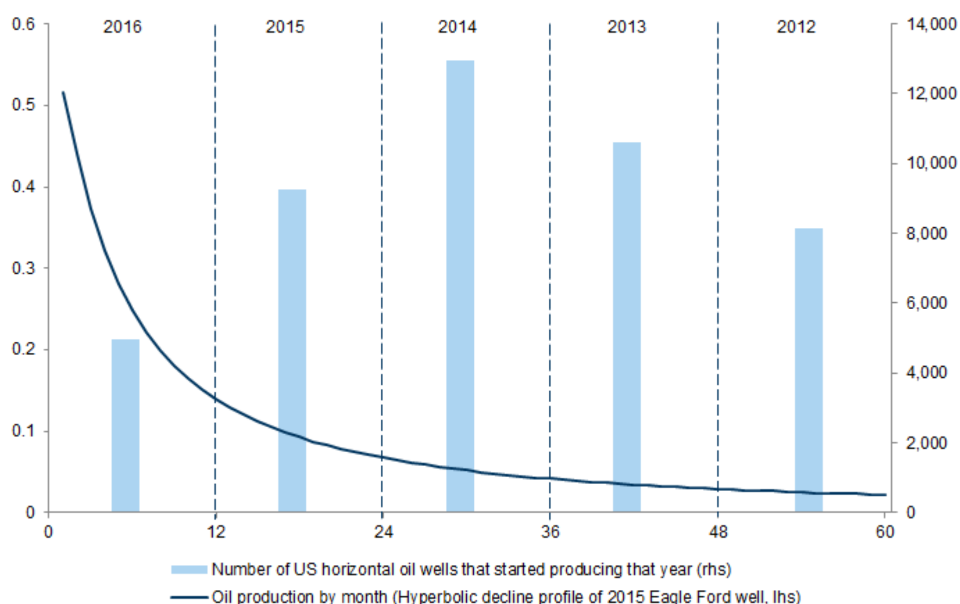
Exhibit 26: Our E&P analysts models also point to a $45/bbl oil price required next year to offset an additional 375 kb/d of production
2017 US oil production growth at various 2017 WTI oil prices



Source: Company data, Goldman Sachs Global Investment Research

Importantly though, larger production declines in the US become more difficult to achieve in 2017, as (1) most of the fat has been cut out of the system with a rig count since oil reached $45/bbl that sequentially stabilizes US production from 1Q17 onwards, (2) legacy decline rates that are falling with a maturing legacy well profile.

Exhibit 27: As the aggregate US well profile ages, decline rates will moderate
Well production (lhs, thousand barrels per day); Well count (US oil horizontal wells, rhs)



Source: IHS, BH, Goldman Sachs Global Investment Research

Beyond the risk of lower prices in 2017, we see risks that our projected recovery to our forecast greenfield marginal cost of $55/bbl will take longer to materialize. So far this year, the limited number of new project sanctioning outside of the US suggests that this remains the incentive price, until further evidence of cost deflation. But the longer it will take to have to stimulate activity, the lower the industry's cost curve.

Given this outlook for a well supplied market and a crude curve in contango with limited spot upside, we continue to recommend being short the S&P GSCI Crude Oil index, especially paired with positive yielding oil-exposed assets (see *Global Markets Daily - Go long the HY Oil & Gas iBoxx TRS vs. the S&P GSCI Crude Oil Index*, September 15, 2016 for more details).

Oil supply-demand fundamentals

Exhibit 28: Global supply-demand balance
Thousand barrels per day

	1Q14	2Q14	3Q14	4Q14	1Q15	2Q15	3Q15	4Q15	1Q16	2Q16	3Q16E	4Q16E	1Q17E	2Q17E	3Q17E	4Q17E
Supply	92,247	93,154	94,347	95,554	95,239	96,461	97,092	97,324	96,626	95,886	96,598	97,214	96,813	97,382	97,993	98,254
Demand	92,165	92,627	93,641	94,303	93,493	94,161	95,787	95,442	95,227	96,143	96,703	96,810	96,564	97,474	98,018	98,056
Global market imbalance	82	527	706	1,252	1,746	2,300	1,305	1,881	1,399	-257	-105	404	249	-92	-25	198
OECD commercial stocks	247	754	750	-120	864	1,018	822	362	353	329	-145	-176	9	-132	-25	-142
OECD commercial exc. US NGLs	161	612	672	34	856	865	716	483	359	226	-227	-11	-24	-206	-54	52
OECD gvt stocks	-2	-40	-20	12	12	31	-64	70	57	9	10	0	-30	-30	-30	-30
OECD stocks	245	714	730	-108	876	1,049	758	433	410	338	-135	-176	-21	-162	-55	-172
Non-OECD stocks exc. China	416	236	328	451	296	320	448	147	-179	160	-100	100	-100	-100	-100	200
China	740	491	162	192	658	483	475	474	1,183	775	480	380	420	170	130	70
Identified stocks	1,401	1,441	1,219	535	1,830	1,852	1,681	1,054	1,415	1,273	245	304	299	-92	-25	98
Floating Storage/Oil in Transit	211	-324	272	-174	412	436	-151	479	204	340	-350	100	-50	0	0	100
GS Miscellaneous to balance	-1,530	-589	-785	891	-496	12	-225	348	-220	-1,870	0	0	0	0	0	0

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

Exhibit 29: Global oil demand

Thousand barrels per day

Global Demand	1Q2015	2Q2015	3Q2015	4Q2015	1Q2016E	2Q2016E	3Q2016E	4Q2016E	1Q2017E	2Q2017E	3Q2017E	4Q2017E	2015	2016	2017	yoy 15	yoy 16	yoy 17
USA	19,618	19,537	19,978	19,682	19,775	19,722	20,317	19,929	20,060	19,818	20,400	20,022	19,704	19,936	20,075	294	232	139
Canada	2,434	2,332	2,453	2,405	2,390	2,370	2,457	2,433	2,442	2,392	2,482	2,450	2,406	2,412	2,441	(1)	7	29
Mexico	1,938	1,973	2,066	2,048	2,019	2,038	2,038	2,088	2,057	2,043	2,067	2,098	2,006	2,046	2,066	(33)	40	21
North America	**23,990**	**23,841**	**24,496**	**24,135**	**24,184**	**24,131**	**24,811**	**24,449**	**24,560**	**24,253**	**24,950**	**24,570**	**24,116**	**24,394**	**24,583**	**259**	**278**	**189**
Brazil	3,169	3,173	3,225	3,202	3,024	3,074	3,125	3,199	3,080	3,122	3,144	3,212	3,192	3,105	3,139	(51)	(87)	34
Chile	350	349	332	335	337	351	342	334	324	357	334	335	341	341	338	5	(1)	(3)
LatAm ex. Mexico, Brazil, Chile	3,438	3,575	3,612	3,569	3,483	3,616	3,629	3,586	3,503	3,636	3,649	3,606	3,549	3,579	3,599	(32)	30	20
LatAm ex. Mexico	**6,957**	**7,097**	**7,169**	**7,106**	**6,844**	**7,041**	**7,096**	**7,119**	**6,907**	**7,115**	**7,128**	**7,153**	**7,082**	**7,025**	**7,076**	**(78)**	**(57)**	**51**
OECD Europe	13,458	13,572	14,162	13,706	13,635	13,918	14,066	13,736	13,663	13,935	14,141	13,833	13,724	13,839	13,893	214	114	54
Non-OECD Europe	653	672	688	688	675	704	701	701	695	724	721	721	675	695	715	29	20	20
Total Europe	**14,111**	**14,244**	**14,850**	**14,394**	**14,310**	**14,622**	**14,767**	**14,437**	**14,358**	**14,659**	**14,862**	**14,554**	**14,400**	**14,534**	**14,608**	**243**	**134**	**74**
Japan	4,701	3,802	3,850	4,136	4,431	3,660	3,831	4,028	4,194	3,656	3,736	3,934	4,122	3,987	3,880	(148)	(135)	(107)
South Korea	2,457	2,293	2,362	2,516	2,593	2,481	2,452	2,563	2,618	2,520	2,479	2,616	2,407	2,522	2,558	59	115	36
Australia & New Zealand	1,299	1,260	1,269	1,300	1,288	1,276	1,283	1,319	1,310	1,301	1,308	1,345	1,282	1,291	1,316	8	10	24
Israel	222	223	229	225	233	227	241	237	243	237	251	247	225	234	244	4	10	10
OECD Asia Pacific	**8,679**	**7,577**	**7,710**	**8,177**	**8,544**	**7,645**	**7,806**	**8,147**	**8,365**	**7,713**	**7,773**	**8,141**	**8,036**	**8,035**	**7,998**	**(76)**	**(1)**	**(37)**
China	10,954	11,386	11,476	11,483	11,293	12,083	11,576	11,707	11,593	12,383	11,876	12,007	11,325	11,665	11,965	570	340	300
India	3,970	4,038	3,866	4,104	4,360	4,319	4,159	4,340	4,635	4,594	4,435	4,615	3,995	4,295	4,570	158	300	275
Other non-OECD Asia	8,283	8,494	8,390	8,672	8,706	8,770	8,455	8,837	8,906	8,970	8,655	9,037	8,460	8,692	8,892	276	232	200
Total Asia	**23,207**	**23,918**	**23,732**	**24,259**	**24,359**	**25,172**	**24,190**	**24,883**	**25,134**	**25,948**	**24,965**	**25,659**	**23,779**	**24,651**	**25,426**	**1,004**	**872**	**775**
FSU	**4,674**	**4,920**	**5,083**	**4,982**	**4,935**	**4,926**	**5,062**	**5,060**	**5,004**	**4,995**	**5,183**	**5,080**	**4,915**	**4,996**	**5,065**	**(9)**	**81**	**70**
Total Middle East	**7,784**	**8,485**	**8,752**	**8,239**	**7,841**	**8,353**	**8,876**	**8,463**	**7,901**	**8,413**	**8,936**	**8,523**	**8,315**	**8,383**	**8,443**	**(57)**	**68**	**60**
Total Africa	**4,091**	**4,078**	**3,995**	**4,151**	**4,210**	**4,254**	**4,097**	**4,253**	**4,335**	**4,379**	**4,222**	**4,378**	**4,079**	**4,203**	**4,328**	**250**	**125**	**125**
OECD demand	**46,477**	**45,340**	**46,700**	**46,353**	**46,701**	**46,044**	**47,025**	**46,666**	**46,912**	**46,258**	**47,199**	**46,879**	**46,217**	**46,609**	**46,812**	**402**	**391**	**203**
Non-OECD demand	**47,016**	**48,821**	**49,087**	**49,090**	**48,527**	**50,099**	**49,678**	**50,144**	**49,652**	**51,216**	**50,819**	**51,178**	**48,503**	**49,612**	**50,716**	**1,135**	**1,109**	**1,104**
World Demand	**93,493**	**94,161**	**95,787**	**95,442**	**95,227**	**96,143**	**96,703**	**96,810**	**96,564**	**97,474**	**98,018**	**98,056**	**94,721**	**96,221**	**97,528**	**1,537**	**1,500**	**1,307**

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

Exhibit 30: Global oil supply

Thousand barrels per day

	1Q2015	2Q2015	3Q2015	4Q2015	1Q2016	2Q2016E	3Q2016E	4Q2016E	1Q2017E	2Q2017E	3Q2017E	4Q2017E	2015	2016	2017	yoy 15	yoy 16	yoy 17
Non-OPEC Supply																		
Lower 48 crude	7,559	7,556	7,347	7,213	7,053	6,778	6,555	6,460	6,435	6,435	6,460	6,510	7,419	6,711	6,460	554	-707	-251
Gulf of Mexico crude	1,429	1,440	1,618	1,569	1,608	1,583	1,550	1,660	1,720	1,745	1,690	1,745	1,514	1,600	1,725	117	86	125
Alaska crude	498	477	443	514	511	488	420	480	480	460	420	480	483	475	460	-14	-8	-15
US crude	*9,486*	*9,473*	*9,408*	*9,296*	*9,173*	*8,849*	*8,525*	*8,600*	*8,635*	*8,640*	*8,570*	*8,735*	*9,416*	*8,787*	*8,645*	*657*	*-629*	*-142*
US NGL	3,087	3,273	3,315	3,413	3,381	3,572	3,550	3,600	3,540	3,650	3,700	3,750	3,272	3,526	3,660	259	254	134
Lower 48 other	191	231	263	254	178	190	185	185	180	180	180	180	235	185	180	13	-50	-5
US ethanol	956	959	961	987	987	973	1,008	980	1,000	990	990	970	966	987	988	32	21	1
Total US	13,720	13,936	13,947	13,949	13,719	13,584	13,268	13,365	13,355	13,460	13,440	13,635	13,888	13,484	13,473	962	-404	-11
Canada	4,563	4,040	4,436	4,503	4,608	3,820	4,315	4,575	4,610	4,360	4,585	4,600	4,385	4,330	4,539	108	-56	209
Mexico	2,657	2,557	2,597	2,588	2,540	2,489	2,460	2,400	2,365	2,325	2,285	2,255	2,600	2,472	2,308	-206	-127	-165
Total North America	**20,940**	**20,533**	**20,981**	**21,040**	**20,868**	**19,893**	**20,043**	**20,340**	**20,330**	**20,145**	**20,310**	**20,490**	**20,874**	**20,286**	**20,319**	**864**	**-588**	**33**
Argentina	631	634	630	634	622	621	620	625	630	635	645	655	632	622	641	2	-10	19
Brazil	2,539	2,495	2,561	2,531	2,401	2,548	2,645	2,665	2,575	2,570	2,540	2,515	2,531	2,565	2,550	181	33	-15
Colombia	1,033	1,026	978	1,002	957	907	870	890	885	885	890	895	1,010	906	889	16	-104	-17
Other Latam	438	413	402	413	380	385	380	375	360	355	350	345	417	380	353	-31	-37	-28
Non-OPEC LatAm	**4,641**	**4,568**	**4,572**	**4,579**	**4,360**	**4,460**	**4,515**	**4,555**	**4,450**	**4,445**	**4,425**	**4,410**	**4,590**	**4,473**	**4,433**	**167**	**-117**	**-40**
Norway	1,930	1,929	1,913	2,019	2,034	1,936	1,980	2,040	2,045	1,980	2,010	2,025	1,948	1,998	2,015	59	50	17
UK	920	1,020	896	1,042	1,088	1,053	930	1,025	1,095	1,065	955	1,070	970	1,024	1,046	104	54	22
Other Europe	715	696	696	693	650	592	615	635	635	620	615	605	700	623	619	-12	-77	-4
Total Europe	**3,565**	**3,646**	**3,505**	**3,754**	**3,772**	**3,581**	**3,525**	**3,700**	**3,775**	**3,665**	**3,580**	**3,700**	**3,618**	**3,645**	**3,680**	**151**	**27**	**35**
Azerbaijan	874	832	852	839	863	863	822	830	845	835	825	815	849	845	830	-12	-5	-15
Kazakhstan	1,733	1,680	1,609	1,669	1,694	1,583	1,590	1,650	1,710	1,715	1,755	1,770	1,673	1,629	1,738	-19	-43	108
Russia	11,024	11,035	11,040	11,128	11,241	11,176	11,155	11,250	11,300	11,350	11,350	11,485	11,057	11,206	11,371	146	149	166
Other FSU	414	423	416	425	413	392	385	380	380	375	375	370	419	392	375	13	-27	-17
Total FSU	**14,045**	**13,969**	**13,917**	**14,060**	**14,211**	**14,014**	**13,952**	**14,110**	**14,235**	**14,275**	**14,305**	**14,440**	**13,998**	**14,072**	**14,314**	**128**	**74**	**242**
China	4,285	4,401	4,335	4,327	4,185	4,064	3,925	4,025	3,965	3,975	3,850	3,915	4,337	4,050	3,926	90	-287	-124
India	872	860	865	874	854	846	835	835	825	820	820	820	868	843	821	-8	-25	-21
Malaysia	742	715	665	702	730	712	710	715	720	730	710	740	706	717	725	59	11	8
Rest of Asia-Pacific	1,602	1,618	1,677	1,662	1,623	1,561	1,545	1,545	1,530	1,515	1,525	1,535	1,640	1,568	1,526	0	-71	-42
Non-OPEC Asia	**7,500**	**7,595**	**7,543**	**7,565**	**7,392**	**7,183**	**7,015**	**7,120**	**7,040**	**7,040**	**6,905**	**7,010**	**7,551**	**7,177**	**6,999**	**141**	**-373**	**-179**
Non-OPEC Middle East	**1,319**	**1,271**	**1,243**	**1,240**	**1,241**	**1,244**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,268**	**1,254**	**1,265**	**-77**	**-14**	**11**
Non-OPEC Africa	**2,075**	**2,064**	**2,043**	**2,031**	**2,014**	**1,934**	**1,995**	**2,005**	**2,020**	**2,035**	**2,050**	**2,065**	**2,053**	**1,987**	**2,043**	**-15**	**-66**	**56**
Processing gains	2,240	2,240	2,240	2,240	2,267	2,267	2,315	2,285	2,315	2,295	2,345	2,320	2,240	2,283	2,319	26	43	35
Biofuels exc. US ethanol	826	1,395	1,596	1,363	902	1,444	1,675	1,465	920	1,525	1,685	1,460	1,295	1,372	1,398	-14	77	26
Total non-OPEC supply	**57,152**	**57,280**	**57,639**	**57,872**	**57,027**	**56,021**	**56,300**	**56,845**	**56,350**	**56,690**	**56,870**	**57,160**	**57,486**	**56,548**	**56,768**	**1,370**	**-938**	**219**
Non-OPEC ex. US Lower 48 & NGL	**46,315**	**46,219**	**46,714**	**46,992**	**46,414**	**45,481**	**46,010**	**46,600**	**46,195**	**46,425**	**46,530**	**46,720**	**46,560**	**46,126**	**46,468**	**544**	**-434**	**341**
OPEC Supply																		
Ecuador	546	547	533	537	543	547	550	550	555	555	555	555	541	547	555	-11	7	8
Venezuela	2,394	2,433	2,400	2,383	2,343	2,223	2,135	2,075	2,025	2,000	1,975	1,975	2,403	2,194	1,994	-59	-209	-200
Indonesia	695	704	688	691	713	737	740	745	750	745	745	740	695	734	745	-3	39	11
Algeria	1,107	1,110	1,120	1,110	1,103	1,093	1,100	1,100	1,100	1,100	1,100	1,100	1,112	1,099	1,100	-9	-13	1
Gabon	230	227	225	222	220	217	215	210	205	205	205	205	226	216	205	-6	-10	-11
Angola	1,766	1,760	1,773	1,757	1,770	1,736	1,735	1,750	1,740	1,710	1,730	1,710	1,764	1,748	1,723	103	-16	-25
Nigeria	1,813	1,770	1,799	1,837	1,763	1,526	1,400	1,525	1,550	1,550	1,550	1,550	1,805	1,554	1,550	-98	-251	-4
Libya	373	460	377	400	363	316	295	400	450	450	450	450	402	344	450	-56	-59	106
Iran	2,816	2,850	2,873	2,887	3,152	3,587	3,645	3,675	3,705	3,735	3,765	3,795	2,856	3,515	3,750	45	658	235
Iraq	3,495	3,938	4,246	4,279	4,281	4,290	4,345	4,365	4,436	4,485	4,509	4,533	3,990	4,320	4,491	659	331	171
Kuwait	2,700	2,723	2,783	2,780	2,830	2,817	2,870	2,890	2,920	2,950	2,980	3,010	2,747	2,852	2,965	139	105	113
Neutral Zone	200	86	0	0	0	0	10	0	0	0	100	200	72	3	75	-312	-69	73
Saudi Arabia	9,768	10,290	10,288	10,180	10,206	10,323	10,670	10,300	10,350	10,500	10,700	10,450	10,131	10,375	10,500	604	243	125
UAE	2,840	2,873	2,917	2,890	2,814	2,930	3,010	3,010	3,030	3,050	3,070	3,090	2,880	2,941	3,060	122	61	119
Qatar	673	663	640	663	660	660	630	645	640	635	630	625	660	649	633	-46	-11	-16
Total OPEC Crude	**31,415**	**32,435**	**32,662**	**32,615**	**32,764**	**33,002**	**33,350**	**33,240**	**33,456**	**33,670**	**34,064**	**33,988**	**32,282**	**33,089**	**33,795**	**1,071**	**807**	**706**
Total OPEC NGL	**6,672**	**6,746**	**6,791**	**6,836**	**6,836**	**6,864**	**6,949**	**7,129**	**7,007**	**7,022**	**7,059**	**7,106**	**6,761**	**6,944**	**7,048**	**262**	**183**	**104**
Total OPEC supply	**38,087**	**39,181**	**39,453**	**39,451**	**39,599**	**39,866**	**40,299**	**40,369**	**40,463**	**40,692**	**41,123**	**41,094**	**39,043**	**40,033**	**40,843**	**1,333**	**990**	**810**
World supply	**95,239**	**96,461**	**97,092**	**97,324**	**96,626**	**95,886**	**96,598**	**97,214**	**96,813**	**97,382**	**97,993**	**98,254**	**96,529**	**96,581**	**97,610**	**2,703**	**52**	**1,029**

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

Disclosure Appendix

Reg AC

We, Damien Courvalin, Jeffrey Currie, Abhisek Banerjee, Chris Mischaikow and Huan Wei, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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