

# Global Oil Fundamentals

## Oil price update – higher in the short-term

### Equities

Global  
Oil Companies, Major

#### Raising 2H16 and 2017 Brent/WTI forecasts

After a stronger than forecast 2Q, helped by continuing robust demand and some significant supply interruptions, we are raising our oil price forecasts for the near term. We expect 2H 2016 Brent and WTI to average \$51/bbl and \$48/bbl, respectively, and 2017 \$60/bbl and \$57/bbl. Within this note we update on the key questions that we discussed in January's "[Answers to the most frequently asked oil and gas questions](#)".

#### Market re-balancing following expected trajectory

Except for the tightening effect of the unexpected 2Q production outages, the market adjustment is broadly following our expectations: oil demand growth remains robust (UBS +1.3Mb/d in 2016 and +1.2Mb/d in 2017). Meanwhile we expect non-OPEC production to decline 1.1Mb/d in 2016 driven by a 0.7Mb/d fall in US production; a similar fall in the US in 2017 (-0.5Mb/d) will be largely offset by a final strong year of longer-cycle non-OPEC supply additions. This means that we expect the market to move into a small under-supply this quarter before moving back to inventory builds until mid-2017. Thereafter we project the market inexorably tightening even as demand growth eases.

#### More relaxed about inventories

As this year has demonstrated, an historically high level of physical inventories (66.6 days of fwd OECD consumption, 7.3 days above the historic average) is no bar to a rising price if the direction of travel in market adjustment is supportive. Moreover we continue to point out that with an historically low level of spare production capacity (~2Mb/d versus a normal >4Mb/d) a more significant inventory buffer in the world's most important and strategic commodity is more than justified.

#### Risks to view remain many and varied

Near term downside risk to price lies in economic demand shock, aggressive supply policy among the Gulf producers and/or an unexpected return of Libyan or Nigerian supply. Upside risk lies with the ever-present geopolitical concerns around many of the producers. Medium term our worry is now that US production doesn't come back either quick enough or large enough to offset the impact of the decline in conventional project sanctions and the market tightens over-rapidly into 2018/19.

Figure 1: UBS oil price assumptions

	2014A	2015A	1Q16A	2Q16E	3Q16E	4Q16E	2016E	2017E	2018E	2019E	2020E	Normalised
<b>WTI (\$/Bbl)</b>	<b>\$92.89</b>	<b>\$48.81</b>	<b>\$33.64</b>	<b>\$45.59</b>	<b>\$47.00</b>	<b>\$49.00</b>	<b>\$43.81</b>	<b>\$57.00</b>	<b>\$67.00</b>	<b>\$72.00</b>	<b>\$72.00</b>	<b>\$72.00</b>
Previous Estimate				\$38.00	\$41.00	\$46.00	\$39.68	\$52.00	\$67.00	\$72.00	\$72.00	\$72.00
First Call Consensus					\$45.25	\$50.00	\$43.62	\$54.00	\$61.00	\$66.50	\$68.75	NA
Futures Strip Price					\$47.53	\$49.19	\$43.99	\$51.34	\$53.32	\$54.57	\$55.65	NA
UBS vs Consensus					4%	-2%	0%	6%	10%	8%	5%	NA
UBS vs Strip prices					-1%	0%	0%	11%	26%	32%	29%	NA
<b>Brent (\$/Bbl)</b>	<b>\$99.38</b>	<b>\$53.57</b>	<b>\$35.86</b>	<b>\$47.41</b>	<b>\$50.00</b>	<b>\$52.00</b>	<b>\$46.32</b>	<b>\$60.00</b>	<b>\$70.00</b>	<b>\$75.00</b>	<b>\$75.00</b>	<b>\$75.00</b>
Previous Estimate				\$41.00	\$44.00	\$49.00	\$42.35	\$55.00	\$70.00	\$75.00	\$75.00	\$75.00
First Call Consensus					\$47.00	\$50.00	\$45.07	\$56.00	\$64.00	\$69.00	\$70.00	NA
Futures Strip Price					\$48.59	\$50.05	\$45.48	\$52.51	\$55.22	\$57.25	\$59.16	NA
UBS vs Consensus					6%	4%	3%	7%	9%	9%	7%	NA
UBS vs Strip prices					3%	4%	2%	14%	27%	31%	27%	NA

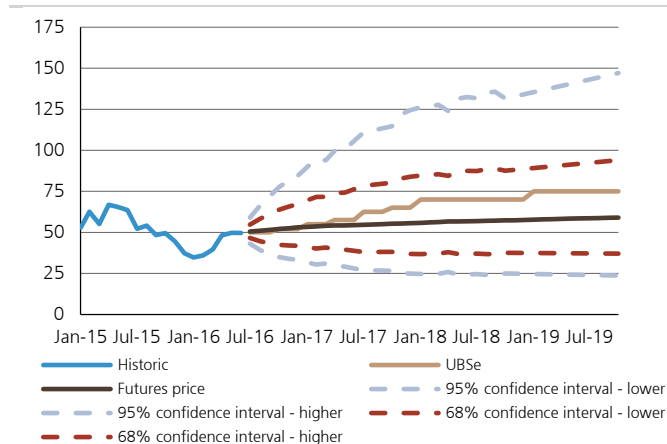
Source: UBS estimates, Bloomberg, DataStream

## Oil Price

### What is your new oil price forecast?

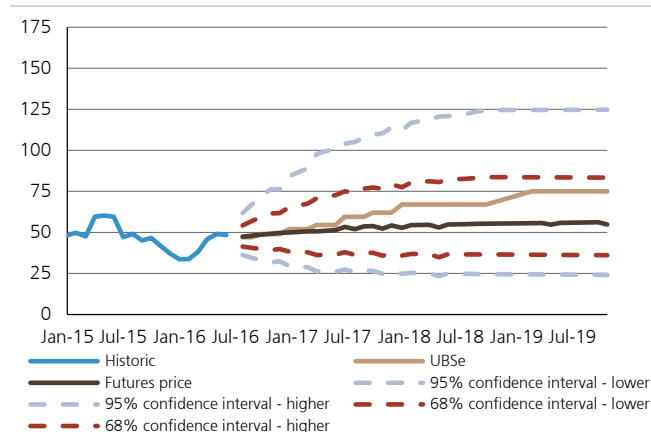
- We have marked to market for 2Q16 (Brent/WTI \$47.41/bbl and \$45.59/bbl, respectively) and raised our 3Q and 4Q forecasts to \$50/\$52 (Brent, \$/bbl) and \$47/\$49 (WTI, \$/bbl). The market has tightened somewhat faster than we expected, driven by a series of supply-side outages in May/June (Nigeria, Canada) that pushed prices up above \$52/bbl for the first time since October 2015. While return of these barrels may pressure the physical market in 2H16, and price upside could be hindered by a stronger US\$ following the UK referendum, our forecasts suggest that significant physical oversupply looks to be a thing of the past. US production continues to decline (down 222kb/d m/m in April alone) while 3Q16 sees peak seasonal demand (summer driving season) and likely a small inventory drawdown. Thus we expect crude to move higher over the remainder of 2016.
- We have also raised our 2017 Brent and WTI forecasts by \$5/bbl to \$60/bbl and \$57/bbl, respectively. Our S/D balances show a small (0.1Mb/d) inventory build during 1H17 (seasonally lower demand) before a 0.3Mb/d drawdown in 2H17. While a significant inventory overhang remains (OECD inventories are 357Mbbls above the seasonal average) and will likely take until at least 2018 to work off, our view is that with OPEC spare capacity at an historically low level (currently ~2Mb/d vs 3-6Mb/d over 2009-14) a higher than normal level of inventories is warranted as a 'buffer' against supply-side shocks. We see little prospect of a looser market before 2020: non-OPEC, non US output is effectively flat over 2017-20 with a few key growth regions (Canada, Brazil, Kazakhstan) offsetting natural decline elsewhere driven by a collapse in project sanctioning activity. Thus the burden of meeting incremental demand growth falls on OPEC (where there is limited prospect of capacity growth in the medium term outside of Iran and the UAE) and the US (where we calculate that \$60/bbl WTI would be required to generate ~0.5Mb/d of annual growth). Restoring the market to balance will require an oil price sufficient to incentivise investment in the non-OPEC, non-US regions where we believe the marginal barrel lies – and hence in our forecast 2017 sees prices continue to rise higher towards our long-term forecast of \$75/bbl.

**Figure 2: Brent futures strip, UBSe and options market implied confidence intervals (\$/bbl)**



Source: UBS, Bloomberg

**Figure 3: WTI futures strip, UBSe and options market implied confidence intervals (\$/bbl)**

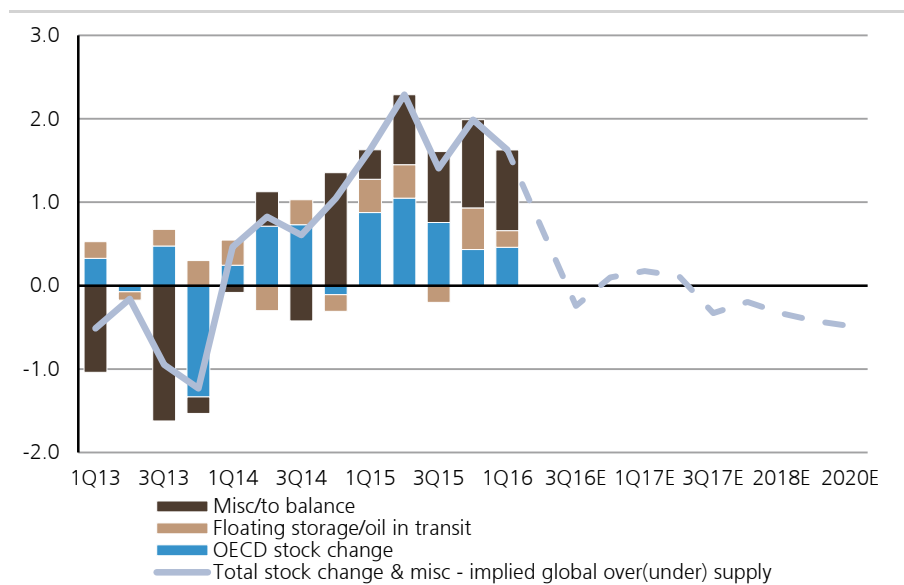


Source: UBS, Bloomberg

## When does the market rebalance?

- We project global oil demand growth of 1.3Mb/d y/y in 2016 (revised down by 110kb/d [vs our last update in June](#)) and non-OPEC supply to decline by 1.1Mb/d – the latter effectively offset by a 1.1Mb/d increase in OPEC output (crude + NGLs).
- For 2017 we forecast demand growth slowing to 1.2Mb/d and non-OPEC production to be flat y/y: US crude output bottoms in 1H17 and 2017 is a relatively good year for conventional project start-ups, the last big wave of major projects set in train at >\$100/bbl. 2017 also looks to be another relatively good year for OPEC output: we forecast the group's production up 0.6Mb/d y/y although this includes assumed reversals of a number of disruptions that have impacted 2016 (Nigeria, Iraq, some Libya).
- Peak physical oversupply was 2.3Mb/d in 2Q15 and this narrowed to ~1.6Mb/d in 1Q16 driven by demand growth and US output beginning to decline. We estimate that 2Q16 was ~0.7Mb/d oversupplied (the impact of Canada/Nigeria outages) and that in 3Q16 global inventories will draw by 0.2Mb/d, the first quarterly draw since 2013. Seasonally weaker demand likely means that inventories build by 0.1Mb/d over 4Q16-2Q17 but by 2H17 we anticipate that non-OPEC supply will have declined sufficiently to see sustained inventory drawdowns begin.

**Figure 4: UBS S/D balance and implied global stock change (Mb/d)**



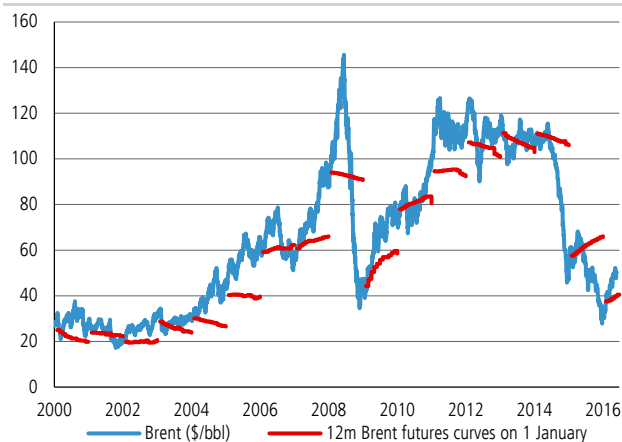
Source: UBS estimates, IEA, EIA, OPEC

## Why are you so far above the strip?

- [As we have previously discussed](#) the futures strip has not historically been a good predictor of spot prices. Over the 2000-2015 the difference between the 12m Brent contract on 1 January and the actual spot price on delivery date has averaged 29%, and 2016 to date has been no different: August Brent stood at \$41.81/bbl on 1 January. To some extent this is unsurprising: the futures curve is not actually a price forecast, rather a function of the spot price adjusted for

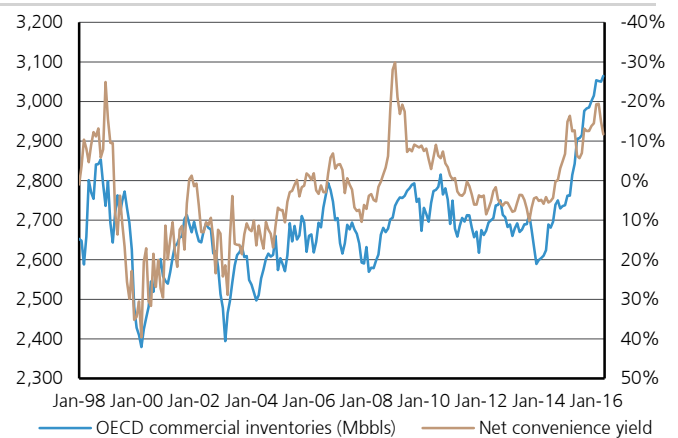
interest rates, storage costs and a 'convenience yield'. The latter two are effectively functions of physical inventories.

**Figure 5: The futures price as a forecast: Brent futures curves vs price outturn (\$/bbl)**



Source: Thomson Reuters, UBS.

**Figure 6: Net convenience yield (RHS, inverted) and OECD oil inventories (LHS, Mbbls)**



Source: IEA, Thomson Reuters, UBS. Note: net convenience yield calculated as risk-free rate (annualised) less log of the ratio of 13m futures price to the front month contract

## What are the risks to your view?

- At this point in time we find ourselves confronted with a very significant number of economic and political uncertainties. The total economic impact of the UK electorate's vote in favour of leaving the European Union is unclear at present, given the wide range of possible trading relationships, while even before the referendum the IMF had been warning of an increasingly fragile global recovery. At the outset of 2016 market focus was on the growth prospects for China and the US (the world's two largest oil consumers accounting for ~1/3 of global demand): while stimulus appears to have postponed a slowdown in the former, and the latter seems to have avoided an industrial recession, question marks remain in both cases. We sketch a downside macroeconomic demand scenario later in this note based on a 'hard landing' in Britain/Europe, but as a rough rule of thumb 100bps slippage on global GDP growth would be enough to defer the market's rebalancing by 6-12 months, holding prices at around current levels through 2017.
- There are further downside risks on the supply side – while our base case assumption is that Saudi elects to maintain its current market share (ramping up output proportionally with demand growth), aggressive pursuit of market share could see it utilise some of its 1.9Mb/d of spare capacity. Much of this is untested (all-time peak Saudi production was only 230kb/d above the May level) but we believe that that 11Mb/d within 6 months and 11.5Mb/d within 12 months would be feasible targets were Saudi policy to shift. Iranian capacity remains a relative unknown – output is now back at the pre-sanctions level of ~3.6Mb/d and we assume only slow growth to ~4Mb/d by 2020 (need for IOC capital + contract reform) but could be surprised here. Finally Nigeria/Libyan output remains volatile: we assume a gradual recovery over July-September in the former and from January 2017 in the latter. If we are wrong on either count this would imply a larger stock build in 1H17 than we currently project (although likely still a draw in 2H17), and likely keep Brent at ~\$50/bbl through 2017.

- However there are also upside risks to price coming from the supply side. Other regions remain vulnerable to interruption – Venezuela being the most obvious candidate (power outages and potential issues with financing diluent imports) but with risks present even in countries commonly perceived as more stable. As the industry attempts to survive the downturn it is seeking to take significant costs out – which can create the risk of strike-related outages. Impacts here have been relatively minor so far (the largest in Kuwait affecting ~1.7Mb/d but only for a few days; planned Norwegian strike averted) but it's not inconceivable that the market could see a more prolonged outage. The responsiveness of US shale to price signals in the up-cycle has also not been tested – our assumption is that as WTI moves sustainably above \$50/bbl operators will begin to add rigs again and help to offset the 'hole' in conventional project sanctioning activity – but if operators do not respond as we expect (e.g., if there is greater focus on shoring up balance sheets) then there is a risk the market over-tightens in 2019-20, sending prices above our long term \$75/bbl incentive price and perhaps laying the foundations for another cycle.

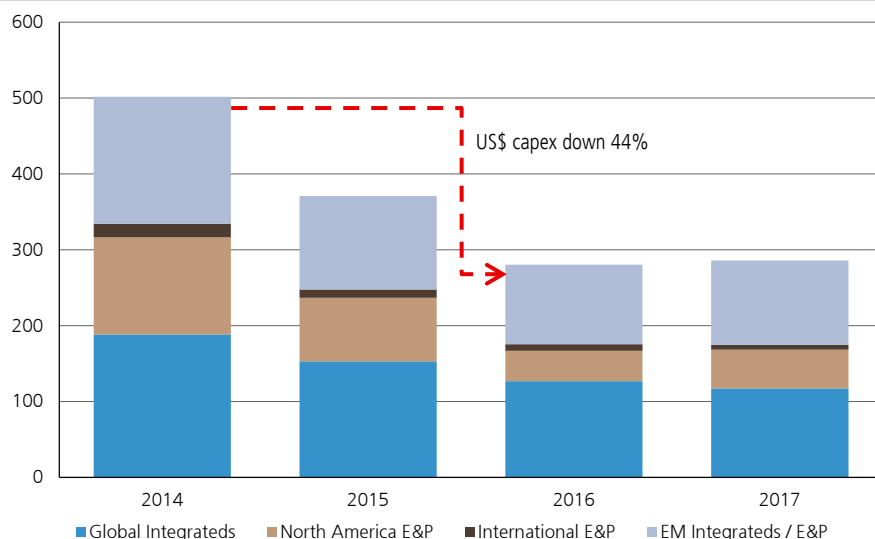
## Oil Supply

### How much do you expect US and global capex to decline in 2016? How does this compare to your expectations? What is the impact on supply?

- **We forecast US E&Ps are on track to reduce spending by >50% y/y in 2016, resulting in a ~53% y/y reduction in rig counts and an ~8.5% y/y decline in US oil production to ~8.6 Mb/d.** This compares to our estimates in January 2016 of capex being cut by ~39% y/y, resulting in a 28% y/y reduction in rig counts and a ~7% y/y fall in US crude production to 8.6 Mb/d (albeit complete 2015 data was not available at the time). Importantly, 2016 marks the second consecutive year of sharply reduced spending following 2015's ~40% y/y decline. But despite the larger reductions in spending this year relative to our original forecast, our 2016 US oil production forecast of 8.6 Mb/d is little changed from our expectations in January as our steeper estimated decline in production (8.5% vs 7%) comes off a higher, revised 2015 production base. While most US E&Ps (in our coverage) have indicated an oil price of ~\$50/bbl is required to increase drilling activity, we estimate these E&Ps are tracking to have operating cash flow match capex this year under strip prices (~100% plowback ratio currently), and many E&Ps need to first short up balance sheets and be confident WTI is *sustainably* >\$50/bbl before making incremental rig commitments. Thus, we do not expect a meaningful increase (or decrease) to 2016 capex budgets along with 2Q16 results.
- **We forecast global upstream capex down 44% over 2014-16 based on UBS' coverage universe (42% of global hydrocarbons production).** This is a massive \$221bn of annual investment forgone by 2017 from the 2014 peak, or \$530bn if grossed up for non-covered partner participation. Unlike in the US however, there is a greater lag between a change in drilling activity and an impact on non-US, non-OPEC production. Indeed we anticipate that 2017 will be a very good year for conventional non-OPEC start-ups, a legacy of heavy investment over 2012-14 when oil prices were >\$100/bbl. We estimate 38 and

33 major capital projects with peak cumulative capacity of 6.2Mboe/d and 5.1Mboe/d are coming on stream in each of 2016 and 2017 (2.8Mb/d and 2.2Mb/d liquids). The impact of this is that we expect non-OPEC, non-US supply to grow by 0.6Mb/d in 2017. This falls to an average 0.2Mb/d per annum over 2018-20, with growth concentrated in a few key countries: Brazil (low-cost Santos basin); Canada (a large pipeline of oil sands projects under construction and a lower natural decline rate given the long-life nature of these assets) and Kazakhstan (overdue start-up of Kashagan).

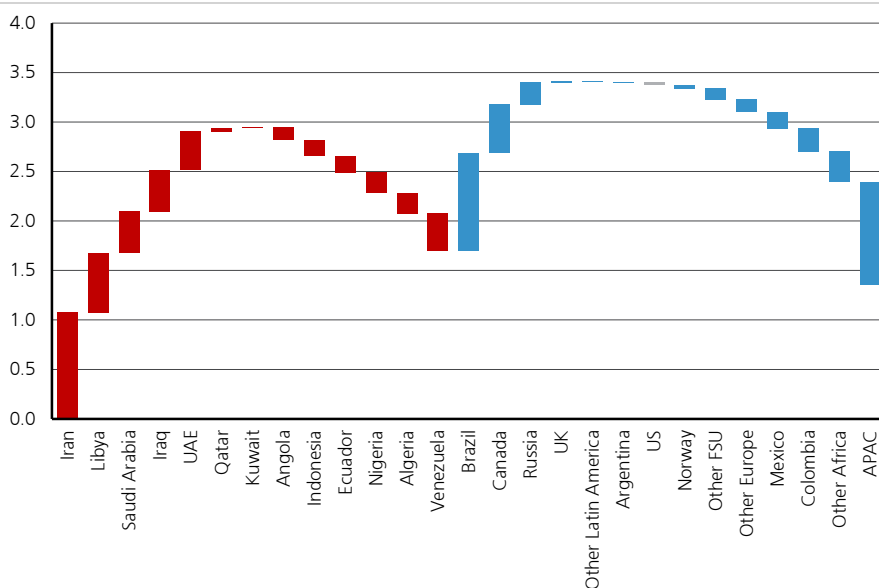
**Figure 7: Global upstream capex (\$bn)**



Source: UBS estimates, Company Data. Note: based on UBS' global oil and gas coverage universe of 79 integrated and E&P companies.

Based on UBS' global coverage universe of 79 integrated and E&P companies (comprising 63Mboe/d or 42% of global upstream production) we estimate that global upstream capex will be down by 44% over 2014-16. This is a staggering \$221bn of annual upstream investment forgone, or ~\$530bn if we were to gross up for equity partner participation, roughly the GDP of Belgium.

**Figure 8: Global oil production capacity growth 2015-20E (Mb/d)**



Source: UBS estimates, IEA, EIA, OPEC, WoodMackenzie

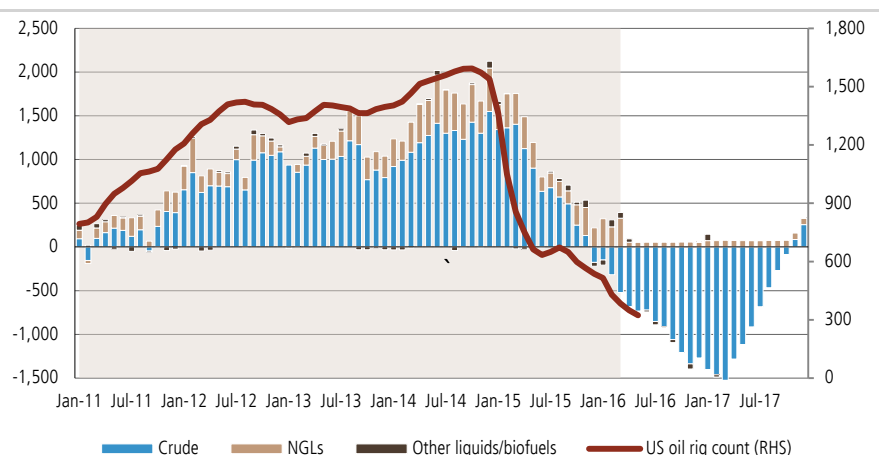
As a consequence of the dramatic decline in investment over 2014-16, we forecast global oil production capacity will grow by 1.5Mb/d over 2015-20E. To put this in context: at the crest of oil prices in 2Q14 we expected total capacity growth of 6.6Mb/d over the same period, and we forecast 2015-20 demand growth of 5.4Mb/d.

This 'missing' capacity is partly compensated for by OPEC's decision to ramp up out of existing spare capacity, but also serves as the main lever for reducing the 1.8 Mb/d physical oversupply in 2015.

## What is your forecast for US oil production in 2016 and 2017?

- **We forecast U.S. oil production will fall ~800 kb/d y/y to average 8.63 Mb/d (-8.5% y/y) in 2016 and decline another ~575 kb/d y/y to 8.06 Mb/d (-6.6% y/y) in 2017.** We forecast the y/y production decline 2016 and 2017 will be driven by a 11.2% and 6.6% decline from the four biggest shale plays (to 4.62 Mb/d and 4.31 Mb/d), respectively, and a steeper 13.8% and 15.3% decline in the rest of onshore production (to 2.32 Mb/d and 1.97 Mb/d), partly offset by a 10.0% and 5.0% increase in Gulf of Mexico production (to 1.70 Mb/d and 1.78 Mb/d), respectively. We expect U.S. production to exit 2016 at 8.02 Mb/d (for December, down 13.3% y/y) and bottom at 7.74 Mb/d in February 2017 (a ~1.95 Mb/d decline from the April 2015 peak of 9.694 Mb/d), before steadily increasing to 8.46 Mb/d (up 5.5% y/y) in December 2017.
- **We forecast total oil production from the four biggest shale plays to average 4.62 Mb/d and 4.31 Mb/d in 2016-17, down ~11.2% and ~6.6% y/y, respectively.** Roughly 95% of U.S. unconventional oil production comes from the "Big Four" shale plays (Permian, Eagle Ford, Bakken, and Niobrara), where we expect production to exit 2016 at 4.13 Mb/d (for December, down 19.9% y/y) and bottom at 4.04 Mb/d in February 2017 (a ~1.3 Mb/d decline from the March 2015 peak of 5.33 Mb/d), before steadily increasing to 4.68 Mb/d (up 13.4% y/y) in December 2017.
- **Following a 48% y/y decline in FY average rig count (oil and gas rigs combined) in the onshore oil plays to ~850 in 2015, we forecast a 53% y/y decline to ~400 rigs this year.** In 2017, we forecast FY average rig count increases by 50% y/y to ~600 rigs. Underlying our forecast is our assumption that U.S. oil rigs average 350 in 2H16 (vs. current level of 341) and 550 in 2017 after rig additions in early 2017. Meanwhile, we assume productivity per rig in the "Big Four" increases by 2-3% per month this year, but declines close to 1% per month next year as the rig count ramps up.

Figure 9: US oil production y/y (kb/d)



Source: EIA, UBS estimates,

## How many rigs are required in the US to hold oil production steady? What about to grow by 0.5Mb/d? What oil price would each of these require?

- From the current low of 341 US oil rigs (320 onshore), we estimate nearly 200 oil rigs would need to be added in early 2017 to reach a total of ~530 (515 onshore) by May 2017 to hold 4Q17 US oil production flat with the 4Q16E level of 8.08 Mb/d. In order to generate 0.5 Mb/d of y/y growth in 4Q17, we estimate ~335 incremental oil rigs would need to be added to reach an overall ~675 oil rigs (660 onshore).
- Assuming the average US onshore rig costs ~\$110 million per annum and a December 2016E US oil production exit rate of 8.0 Mb/d implies WTI needs to rise by ~\$8/Bbl (after adjusting for royalties & production taxes) from the 2016 strip to the low \$50s/Bbl in order to generate enough incremental cash flow to support the additional rigs and hold production flat. While our bottom-up analysis for our E&P coverage shows ~\$48/Bbl is needed to hold volumes flat next year, these are the most efficient operators in the US. Using similar assumptions, we estimate WTI needs to rise by ~\$15/Bbl to \$60/Bbl to fund the incremental ~335 rigs required to generate 0.5 Mb/d of growth from 4Q16 to 4Q17.

## How short cycle is US shale? When can we expect production to bottom?

- We estimate the US production response to a change in drilling activity is roughly six months, although we expect a delayed increase in drilling activity as the industry emerges from this downturn after oil prices begin to improve given the damage done to balance sheets and the large reduction in labour that has left industry. The six month lag is consistent with the US oil rig count peaking in October 2014 at 1,609 rigs and US oil production subsequently hitting a high of 9.694 Mb/d in April 2015 and the Big-4 shale plays peaking at 5.33 Mb/d in March 2015. The majority of US drilling activity is directed to development of liquids rich shales. And once these plays move from the exploration and appraisal stage to the development phase, operators typically develop the fields by drilling 6-8 wells per pad with 10-20 days from spud to rig release per well, with completion crews moving in behind the rig to complete wells over the next month. Importantly, we expect that it would take companies more time to increase production than to cut activity levels and output, mainly due to the time it takes to hire and train additional employees when ramping up. And during this cycle, the longer oil prices stay low, the longer it should take for US E&Ps to increase capex and therefore production as they prioritise balance sheet rehabilitation given the damage done to their financials and liquidity during this vicious downturn. Based on the need to re-hire labour and re-activate rigs that are cold-stacked, we estimate it can take up to three months for E&Ps to secure rigs after making the decision to increase activity. And then adding on another 6 months to a change in drilling activity actually impacting production, it can take up to 9 months from the time a decision is made to increase activity to seeing an

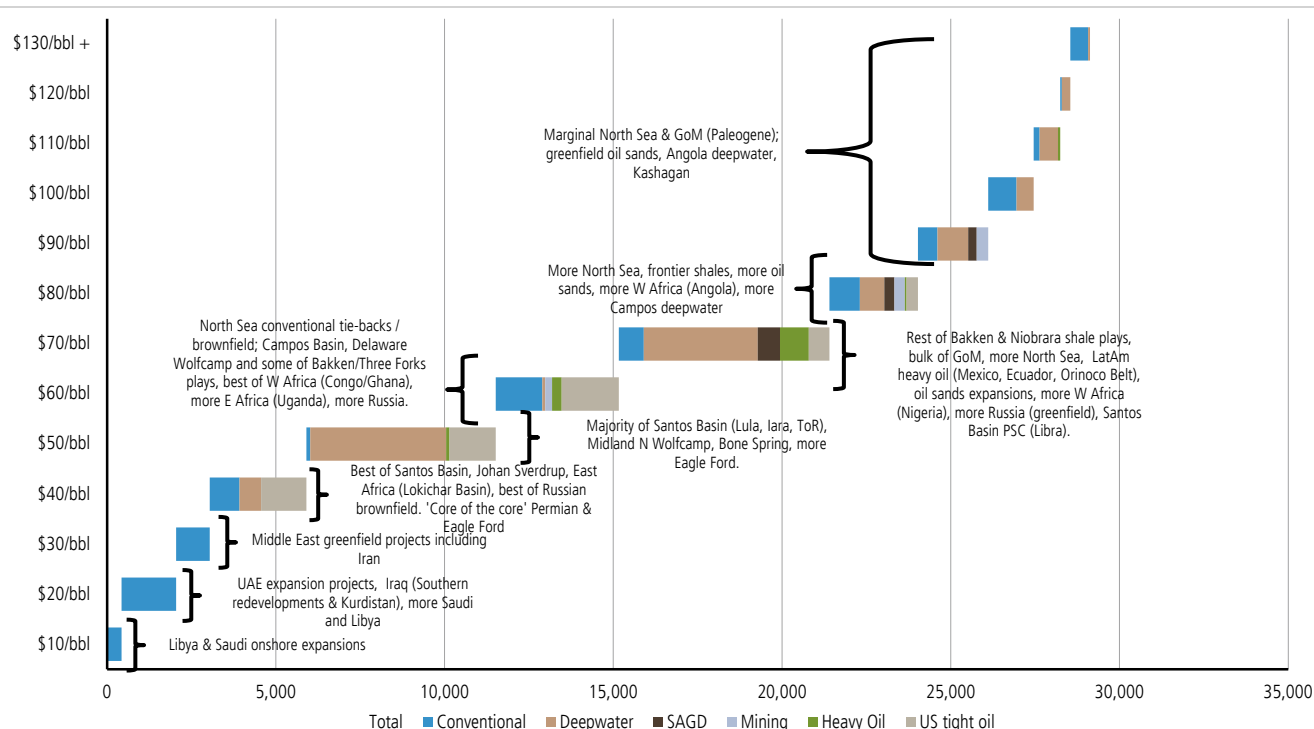


impact on production from increased drilling activity. We believe the US oil rig count bottomed in late May at ~316 rigs, and expect US oil production to bottom in February 2017 at ~7.735 Mb/d.

- **The industry estimate for the number of drilled but uncompleted wells (DUCs) in the US is ~5,000, and drawing down on this outsized inventory may provide a temporary boost to production as the industry initially reacts to higher oil prices.** Within our coverage universe, we estimate our E&Ps are on track to reduce their number of DUCs from >2,500 at YE15 to ~1,800 by YE16 as companies seek to temper production declines in as capital efficient a manner as possible. Notably, the cost to complete a well is roughly ~70% of the total well cost, with the drilling of a well accounting for the other 30% of the total cost. Thus, if oil prices continue to rise this year, E&Ps may draw down their DUC inventory more aggressively as it is the most capital efficient way to boost production and capitalise on higher prices.

## Do you have a picture of the global cost curve? Where does the marginal barrel lie? What is the outlook for sanctioning activity in 2016/17?

**Figure 10: Marginal cost of new oil supply 2016-25 (cumulative kb/d new production)**



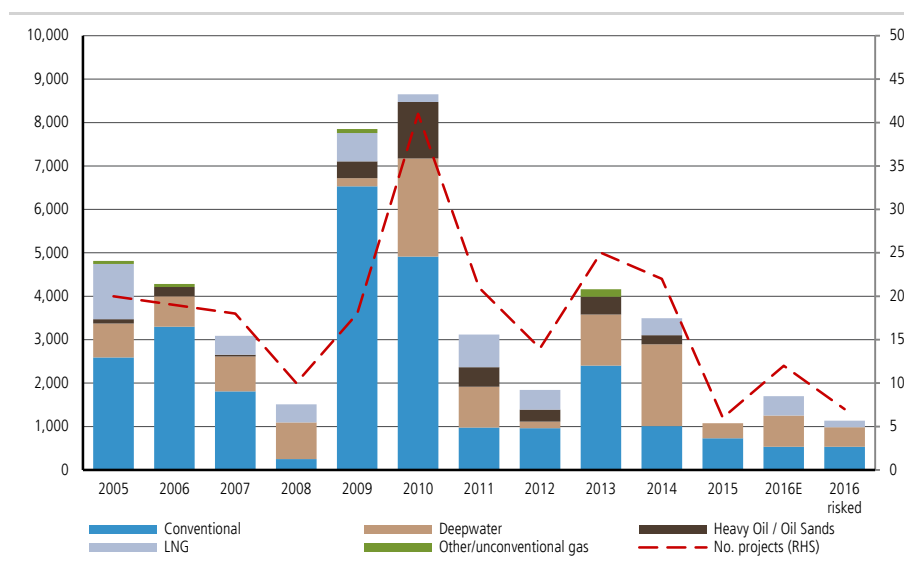
Source: UBS estimates, WoodMackenzie. Note: include 181 major projects with a material liquids component (UBS' upstream database tracks identifiable projects at around the 30kboe/d level or larger as a means of sampling key project trends). 'Marginal cost' defined as Brent oil price required to generate full-cycle IRR of 10% for oil sands/long-life projects, 12% for conventional projects and 15% for deepwater projects.

- Since the oil price began to fall in 2014 we have seen considerable cost deflation work its way through the industry which, if sustainable, has a significant impact on the shape of the global cost curve. Our long-term price forecast of \$75/bbl (Brent, unchanged since January 2016) is based on our view of the price required to generate an acceptable rate of return for the marginal barrel, adjusted for a project risk element. Industry cash costs lie well below \$50/bbl: WoodMackenzie estimates that at \$40/bbl, ~1.5Mb/d of global supply

is cash negative although it can take a prolonged period below this level to see output shut-in (indeed the more common situation is for fields shut-in due to technical issues not to restart while the price remains below cash costs, as in the case of Nexen's Long Lake facility earlier this year).

- However, while the market goes through the rebalancing process it needs to appropriately incentivise new capacity. This process is quicker than often understood, because while oil demand grows only slowly (~1% per annum), unmitigated decline of existing capacity is around 8-10% per annum (mitigated 3-5%).
- The build of US tight oil production is not the marginal barrel: for the most part it lies comfortably in the middle of the cost curve. Cuts to investment in the short-term have been liquidity driven and reflect the shorter cycle nature of production. In the longer term the bulk of the adjustment in supply comes areas such as West African deepwater, the North Sea, Canadian oil sands and other technically (or fiscally) challenging regions. This process is clearly underway – 2015 saw just one major liquids project FID in West Africa (Eni's Cape Three Points, economics aided by domgas sales at >\$9/Mbtu) and two in the North Sea (Wintershall's Asgard tie-back Maria, and the exceptional Johan Sverdrup field). 2016 has seen just one major liquids FID, the Tengiz Future Growth Project in Kazakhstan.
- Our expectation is that it is highly unlikely that a conventional oil project will be sanctioned unless it returns its hurdle rate at \$60/bbl or lower. And while it is plausible to think the bulk of the supply chain deflation has happened companies are actively re-scoping and re-working projects to get them to meet that test. This is work in progress and will meaningfully slow the pipeline of new projects.

**Figure 11: Major upstream project FIDs – plateau production by year (kboe/d)**

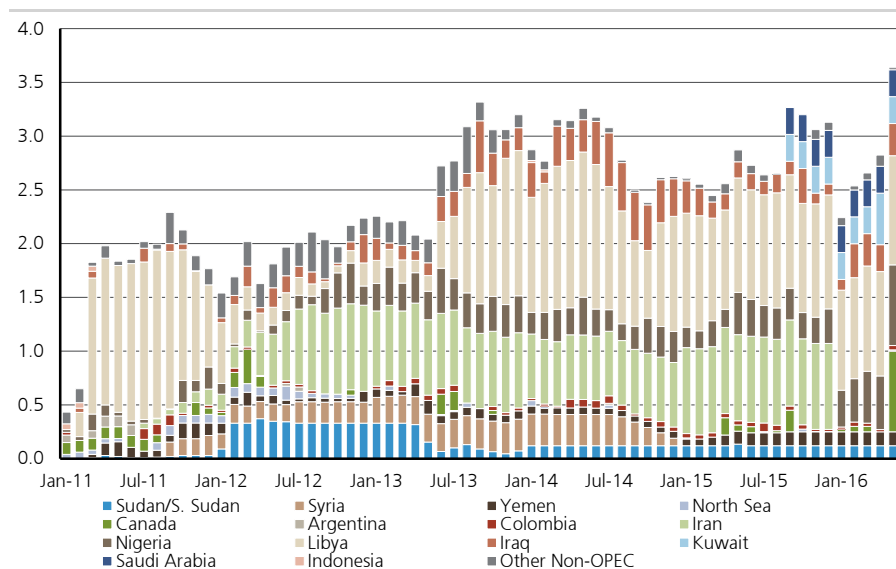


Source: UBS estimates, Company Data, WoodMackenzie. Note: UBS' upstream database tracks identifiable major projects at around the 30kboe/d threshold or larger as a means of sampling key project trends.

## What's going on with supply outages? When might these come back online? Where are the near-term risks?

- A series of unplanned supply outages has impacted physical markets, narrowing the 2Q16 oversupply to just 0.7Mb/d (UBS) vs the peak of 2.3Mb/d in 2Q15 and our April estimate for 2Q16 of 1.0Mb/d. At the peak in early May we believe there was close to 4Mb/d offline globally – meaning inventories likely drew before output began recovering.

**Figure 12: EIA estimated unplanned outages (Mb/d)**



Source: EIA, UBS

- In Canada ~1.3Mb/d of output has been impacted to varying degrees by the recent wildfires near Fort McMurray. The majority of facilities have either restarted or are in the process of, and while ramp-up likely takes until mid-July (particularly for more complex steaming facilities), Canadian crude is gradually returning to the market. In Italy the 75kb/d Val D'Agri field has been shut-in for an investigation into waste disposal practices, although our understanding is that an agreement has been reached to allow a 3Q restart.
- Within OPEC however there are a number of more persistent outages. Nigeria has seen ~0.8Mb/d offline at times, primarily due to a step-up in militant attacks in the Niger Delta region. A lull in activity in the second half of June saw output begin to recover although another wave of attacks last weekend suggests that this is a continuing issue. In Iraq an ongoing dispute between the KRG and Baghdad over export revenues has seen 150kb/d of Kirkuk exports shut-in – and an elusive political settlement is likely required before these volumes return to the market.
- In Libya output is currently running at ~0.3Mb/d and remains volatile – crude production was at 0.9Mb/d in October 2014, and were a comprehensive political settlement to be agreed and all infrastructure bottlenecks removed (i.e., ports in the East re-open) we anticipate that production could double from current levels in relatively short-order. Extensive looting and damage to facilities likely means that despite excellent reservoir characteristics, significant investment will be required before output can grow back towards the post-Gaddafi peak of 1.45Mb/d again.

- There is also 500kb/d currently-shut in in the Saudi-Kuwaiti Neutral Zone. The 280kb/d Khafji field has been shut-in since October 2014 due to non-compliance with new Saudi gas flaring regulations, and while Kuwait unilaterally declared in March that production would restart imminently, this has yet to materialise. We assume the field remains shut-in until new gas processing facilities are complete in mid-2017. The onshore Wafra and Umm Gudai fields have been shut since May 2015 due to a diplomatic dispute (originating from use of land earmarked for the Al-Zour refinery) and operator Chevron has since removed employees from the region: again there is no sign of a restart here and Chevron has said it would take at least 6 months to bring the field back online.
- In the near term Venezuelan output is likely the most at risk globally – the country has been plagued by power outages recently and while the oil sector has been protected, if the situation were to worsen it could impact the country's 2.3Mb/d of production. In the absence of upgraders a number of early-stage Orinoco belt projects are reliant on diluent imports – and so output could also be impacted if PDVSA is unable to finance diluent purchases.

## Oil Demand

### How has 2016td demand data been?

- Global oil demand grew by 1.5Mb/d y/y in 1Q16, with the US (+150kb/d y/y), OECD Europe (+200kb/d), India (a very impressive +390kb/d) and Russia (+280kb/d y/y vs a very weak 1Q15) the most significant contributors. Chinese growth has begun to slow, up just 165kb/d y/y in 1Q with strong gasoline and LPG demand being partly offset by pronounced weakness in diesel and fuel oil (slowing industrial activity).
- Strong 1Q growth came in spite of concerns around a slowing Chinese economy and potential industrial recession in the US – concerns that ultimately proved misplaced. The IEA for example revised up its projections for 1Q16 demand growth by 0.4Mb/d over the course of the quarter as oil demand globally (in particular transport fuels) demonstrated consistent resilience in the face of macroeconomic headwinds.
- Initial 2Q data has also been positive, suggesting continued strength in US and OECD Europe transport fuel demand. We tentatively project y/y global demand growth of 1.2Mb/d in 2Q16, a little above trend.

### What is your 2016/17 demand growth forecast?

- We have cut our 2016 demand growth forecast by ~100kb/d to +1.3Mb/d, driven primarily by reduced expectations for industrial activity within the UK and Europe following the results of the UK referendum on membership in the European Union. UBS's economists last week cut their 2016/17 GDP forecasts for both [Eurozone](#) and [UK](#) GDP growth arguing that both regions would suffer from a material uncertainty shock suppressing investment in the first instance along with a more lagged impact on consumption driven by higher inflation and an erosion of real income.
- We have also reduced our 2017 demand growth forecast to +1.20Mb/d for similar reasons. We expect growth in the more price-sensitive US to slow to just 40kb/d y/y as prices continue to rise (dampening the impressive gasoline

demand growth that has driven the US strength in 2015 and 2016td), while Chinese demand growth will continue to decelerate to just 280kb/d y/y (vs 520kb/d y/y in 2015). Downside risks to this figure are primarily macroeconomic in nature: a 'harder landing' from the UK vote to leave and a scenario in which UK and Eurozone GDP growth slows to -0.2% and 0.8% respectively ([the downside case sketched by UBS economists](#)) coupled with spillover effects that see global GDP growth slowing to 2.3% (well into the territory traditionally considered to be a global recession and compared to UBS's base case forecast of 3.3% growth in 2017E) would see demand growth in the region of 0.6-0.7Mb/d we estimate. This would defer the rebalancing process until at least 2018 – although the eventual price recovery would likely be sharper after another year of depressed supply-side investment.

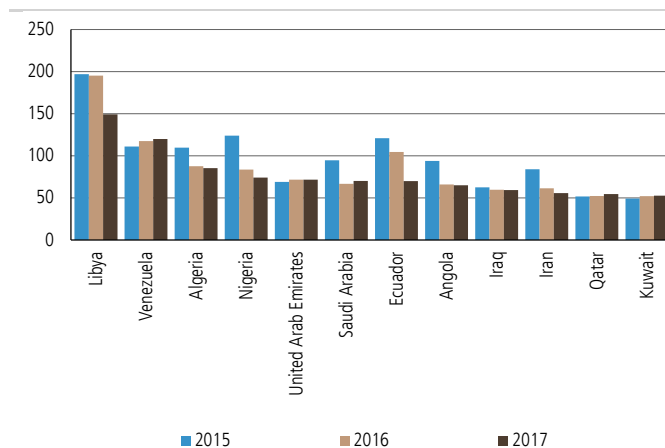
## OPEC

### **What price do OPEC members require over the long-term? Which producers are facing stress in the near-term? Could we see a Saudi devaluation?**

- Fiscal breakevens for the majority of the key GCC producers lie at the sub-\$70/bbl mark. Outside of the GCC, many producers need something significantly higher – above \$150/bbl for Libya (a function of ongoing conflict and depressed crude production) and >\$100/bbl for Venezuela. Prior to OPEC's inability to agree to cut output in November 2014 these figures had been a closely watched datapoint – the logic being that fiscal and trade balances could be used to try and infer a likely price target for the group. Budget requirements had risen dramatically following increased social spending commitments in the wake of the Arab Spring, although we suspect that the direction of causality was from rising oil prices to budget inflation rather than the reverse (a state-level parallel to the capex inflation seen at the IOCs). In the near term this analysis is less relevant as budgets are set with the knowledge that they will be in deficit given price expectations (c.f. the 2016 Saudi budget which implied a planning Brent price in the low \$40s but a fiscal breakeven of ~\$70/bbl).
- The vast majority of producers have now begun implementing new fiscal measures in response to widening budget deficits – which drives a reduction in the breakeven level down over 2016/17. In many cases the first victims of budget cuts have been long-running domestic subsidies for oil products: Algeria, Angola, Iran, Nigeria, Qatar, Saudi, UAE and Venezuela have all raised domestic fuel prices over the last 18 months (although prices still remain extremely low by global standards, [as we have previously discussed](#)).
- Another casualty of lower oil prices has been long-standing FX pegs. Kazakhstan (oil and gas 65% of exports, 50% of government revenues and 25% of GDP) moved to a floating exchange rate regime in August 2015 while Azerbaijan (95% of exports, 75% of government revenues and 40% of GDP) did so in December 2015. Within OPEC, Nigeria announced in June that it would end its \$/Naira peg following continued pressure on foreign reserves (but a surprise given the Buhari administration's continued insistence that the peg would be maintained) – the Naira has since depreciated by 44%.
- Unsurprisingly given low oil prices and the experience of other producers, 2015/16 has seen significant speculation that Saudi may seek to de-link its currency from the US\$. Typically speculation against the Riyal tends to be in the

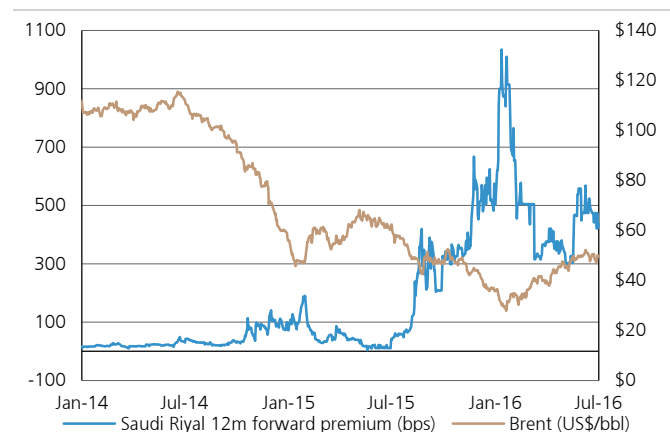
forward market – so the 12m forward premium can be used as an indicator of interest in devaluation. This currently stands at 438bps, well below the >1000bps peak reached as oil prices bottomed in January 2016, but still implying material degree of speculative interest (for context at the start of August 2015, when crude was also ~\$50/bbl, the 12m forward premium stood at 73bps). We do not think a devaluation is likely: the Riyal has been pegged against the US\$ at 3.75 since 1986 and has successfully endured a number of crude price collapses since then (1998, 2001, 2008/09). The Saudi Arabian Monetary Agency had \$581bn in reserve assets at end-May, enough to support the peak burn rate (December 2015) for 2.5 years, the 2015 average burn rate for 5 years or the April 2016 burn rate (SAMA reserves actually built in May) for 7.5 years. Furthermore while reserves were last at the current level in April 2012, Saudi only began accumulating significant foreign reserves in 2005 and held just \$5-30bn in reserves over the prior 20 years, with which it was able to defeat greater speculative attacks – in August 1998 the forward premium reached 950 points as speculators attacked the peg in light of falling oil prices.

**Figure 13: OPEC fiscal breakevens (\$/bbl Brent)**



Source: IMF, UBS estimates.

**Figure 14: Saudi Riyal 12m forward points vs Brent**



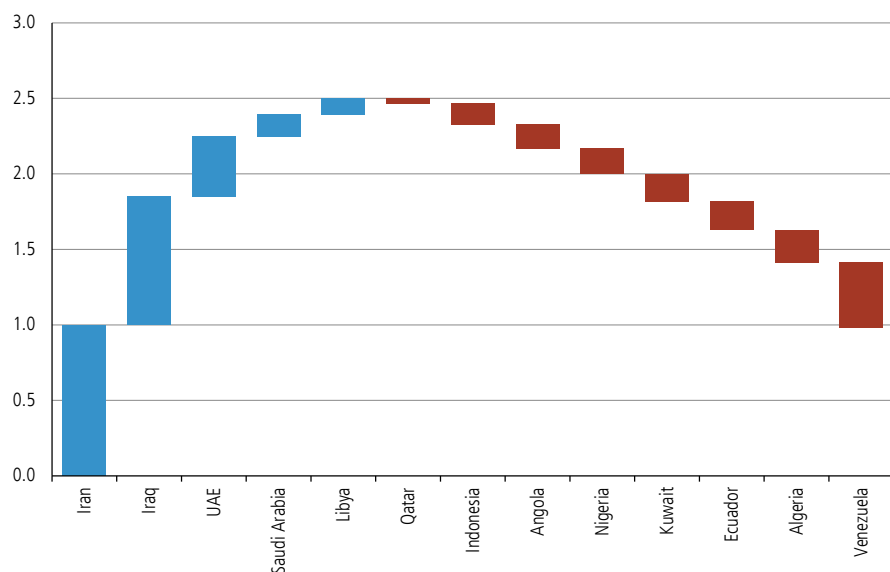
Source: DataStream, UBS

## What are your forecasts for capacity growth?

- 2014-16 saw OPEC crude output rise from 30.7Mb/d at the outset of 2014 to a peak of 32.7Mb/d in April 2016 (before Nigerian outages began to force output lower in May). The majority of this (Iraq excepted) has come not from new fields coming online but rather increasing production from existing hitherto spare capacity (which is now ~2Mb/d, down from >4Mb/d in January 2014).
- We expect OPEC's crude production capacity to increase to 36.1Mb/d in 2020 from 34.6Mb/d in 2015. This is driven primarily by a return of production from Libya, Iran, and the Saudi-Kuwaiti neutral zone, resolving above-ground issues rather than new investment. Genuine additions from new fields are limited to the UEA (ADCO, Upper Zakum redevelopment) and Iraq (although the pace of growth tails off dramatically after 2016 due to cuts to development budgets and infrastructure bottlenecks in the South). The more peripheral members are expected to see production decline, driven by a slowdown in investment and sanctioning activity. Algeria, Ecuador and Indonesia are particularly affected with no major startups in the pipeline, while Nigeria and Angola see capacity declines begin in 2018/19 as the 2015/16 slowdown in deepwater FIDs begins resolving. Venezuela, probably the OPEC member with the greatest resource

potential to grow capacity behind Iran and Iraq, likely sees production continue to decline until the domestic political situation stabilises and IOC investment in the Orinoco Belt restarts.

**Figure 15:2014-20E OPEC crude production capacity growth (Mb/d)**



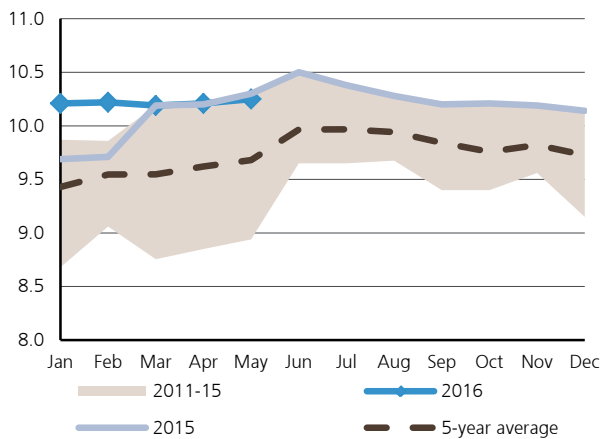
Source: UBS estimates, WoodMackenzie, IEA, OPEC.

## What do you expect Saudi production policy to be?

- Saudi crude production hit an all-time high of 10.50Mb/d in June 2015 and was running at 10.25Mb/d in May 2016 (according to the IEA). Saudi remains the main source of spare capacity within OPEC – 1.95Mb/d at present – although this figure is untested in practice.
- Typically Saudi ramps up production during the summer months in order to satisfy domestic power generation demand (air conditioning). This has yet to materialise to the same extent in 2016 (a Reuters survey published last week suggested a figure of 10.30Mb/d for June, 200kb/d below the 2015 peak) – likely due to the startup of the Wasit gas project in March which has added ~1.4Bcf/d of domestic production. It had previously been unclear whether access to additional gas meant Saudi would see less of a summer ramp in crude production or whether it would back out additional volumes for export – at present at least it appears to be the former.
- On the liquids front Saudi recently brought the Shaybah field expansion online (250kb/d incremental capacity) and expects to bring a 300kb/d expansion at Khurais online in 2018 (delayed from 2017). Neither of these is intended to do much more than offset natural decline rates at fields elsewhere in Saudi however.
- Recent comments from new oil minister Khalid al-Falih suggest that while a return to pre-2014 policy is off the table ("I think managing in the traditional way that we tried in the past may never come again... Certainly we will not go with certain price targets", producers should "let the market forces continue to seek and find that equilibrium price between supply and demand"), aggressive pursuit of a 'market share plus' strategy is not the current aim. Our working

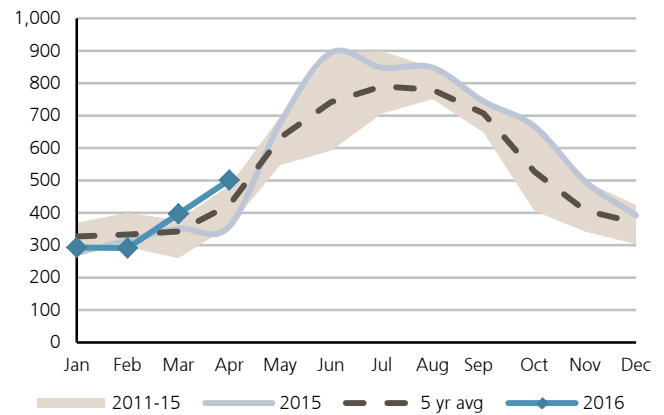
assumption is that Saudi production policy will be to *maintain* market share – i.e., output is grown proportional to demand growth over the next few years.

**Figure 16: Saudi Arabia crude production (Mb/d)**



Source: IEA, JODI, UBS. Note: includes 50% of Neutral Zone (currently shut-in).

**Figure 17: Saudi crude burn for power gen (kb/d)**



Source: JODI, UBS

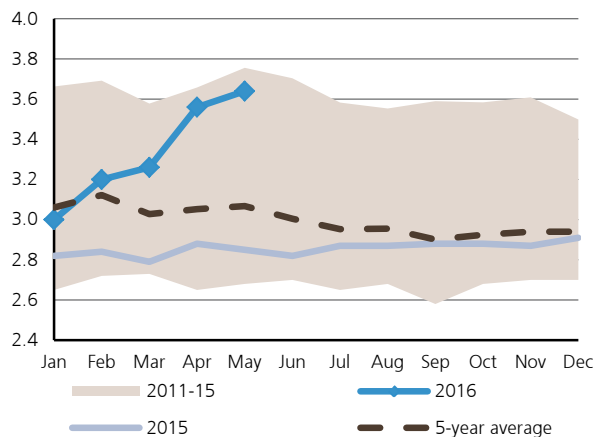
## What is the longer-term potential for Iran now that output back at 3.6Mb/d? Which IOCs are involved?

- Iranian output has now recovered to the pre-sanctions level of 3.6Mb/d, and crude exports are back above 2Mb/d. The 2.5Mb/d figure for June indicated by preliminary tanker data is likely impacted by phasing: Reuters reported last week citing insider sources that exports were expected to decline by 170kb/d m/m in July due to reduced condensate sales to South Korea. Export growth has come both from increased volumes to existing Asian buyers but also more recently to former European customers (France, Spain, Greece, Netherlands, UK).
- The pace of ramp-up at Iran has been faster than what was initially expected – our view in January was that it would likely take until year-end to reach the current 3.6Mb/d level. This was based on an expectation that there may not be a rapid increase in exports as US primary sanctions remain in place which will continue to prohibit all US persons including US financial institutions from engaging in transactions or dealing involving Iran. However as shipping P&I insurance clubs provided increased "fall-back" cover in April, this offset any shortfall in payments from US reinsurers, which enabled international vessels to begin support Iran's own tanker fleet in lifting cargoes.
- In the longer term capacity growth will be contingent on access to IOC capital and technological expertise. In November 2015 Iran unveiled the framework of its new fiscal regime, the Iran Petroleum Contract, designed to improve the returns on offer by providing something more akin to a PSC than the previous buyback regime (which typically resulted in single-digit rates of return for operators that also took on the risk of cost overruns and/or delays). However full technical details are yet to be provided: Deputy Oil Minister Rokneddin Javadi suggested these would be revealed in July, with IOCs invited to bid at same time (a planned London conference scheduled for February intended to outline detailed contracts was cancelled). We expect IOCs to be cautious, especially ahead of 2016's US Presidential elections, and expect that continued



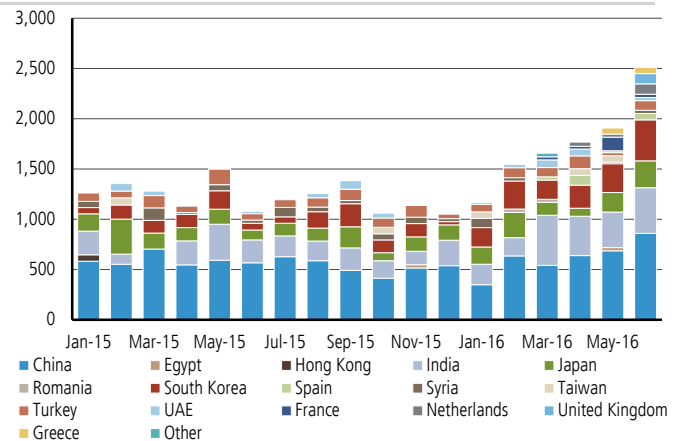
implementation of non-nuclear secondary sanctions and US primary sanctions will still make investment in Iran's petroleum industry complicated. Furthermore, Iran will also be competing for scarce capital at a time when project sanctioning activity is almost non-existent and even onshore OPEC opportunities are being delayed (e.g., a number of Iraqi field expansions and Shell's withdrawal from the Bab sour gas project in Abu Dhabi). We therefore cautiously project a build-out of capacity to ~4Mb/d by the end of the decade, a material increase but short of the 4.5-5Mb/d referenced by Iranian authorities.

**Figure 18: Iran crude production (Mb/d)**



Source: UBS, IEA

**Figure 19: Iran oil exports by destination (kb/d)**



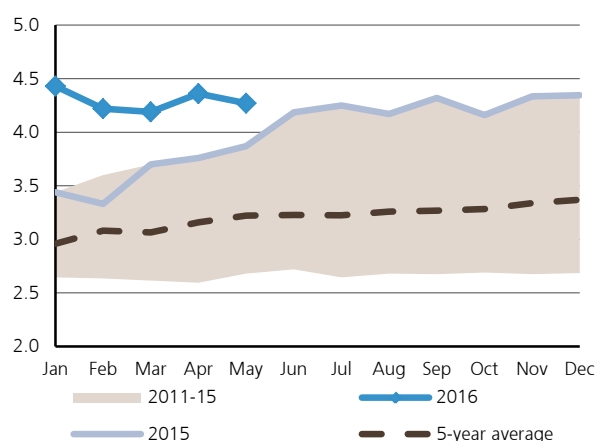
Source: Thomson Reuters, UBS estimates

## Will Iraq keep on growing in the near-term?

- Iraq has been one of the main drivers of OPEC production growth over the past few years, growing output from 3.09Mb/d in January 2014 to a peak of 4.43Mb/d in January 2016. Pipeline disruptions in Kurdistan and a political dispute between the KRG and the federal government have since seen output fall back below 4.3Mb/d.
- In our view the prospects for further Iraqi production growth in the near-term are limited. In 2015 gains were driven by a mix of Kurdish growth (100kb/d), a recovery of output at Kirkuk (~75kb/d) and a splitting of Southern export streams into Basra Light and Heavy (which allowed the release of heavier volumes previously shut-in to improve the quality of the Basra Light stream). None of these factors are likely to repeat in 2016/17. Southern production is currently running close to infrastructure limits and has been curtailed on several occasions in recent months due to power issues or bad weather preventing loadings. South Oil Company chairman Hayan Abdulzahra has said that he expects exports to remain flat for the remainder of the year, with new infrastructure due online in 2017/18 that could help alleviate the existing issues (a new mooring facility in mid-2017 and new storage capacity in 2018). Development budgets for the major redevelopments have been cut while other projects (e.g., Shell's Majnoon FFD) have been postponed entirely – these two factors combined likely mean that Southern output holds steady at current levels through 2016/17.

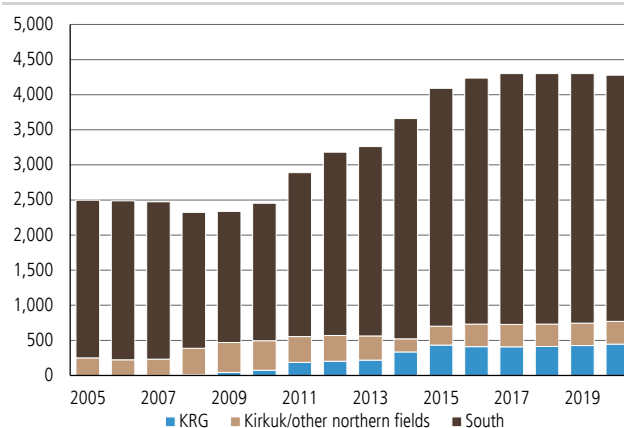
- In the North there is the potential for a ~150kb/d increase in production: Kirkuk output is currently being voluntarily curtailed by the federal NOC due to an ongoing budget dispute between the KRG and the federal government. Should an agreement be reached these volumes may once again be exported through the KRG pipeline to Ceyhan. While Erbil has suggested that it would be open to a deal with the federal government on oil exports if it received its 17% share of the federal budget (~\$1bn per month) a previous arrangement along these lines fell apart in June 2015 and saw the KRG return to independent exports after it only received 40-50% of its budget entitlement from Baghdad. A resolution here does not appear imminent and so we assume that the Kirkuk volumes remain shut-in in the near term.

**Figure 20: Iraq crude production (Mb/d)**



Source: IEA, UBS

**Figure 21: Iraq oil production (kb/d) by region**



Source: UBS estimates, WoodMackenzie

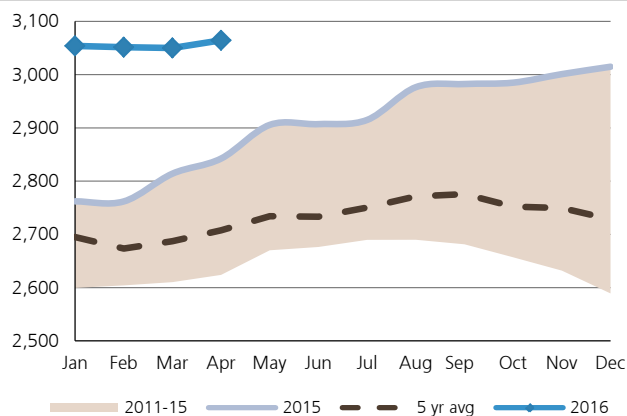
## Inventories

### How long will the inventory overhang take to work off?

- OECD commercial inventories reached an all-time high of 3,064Mbbbls in April, 357Mbbbls above the 5-year seasonal average and 66.6 days in forward demand terms (7.3 days above seasonal average). Inventories have been driven to record levels by the prolonged oversupply, although we estimate that the pace of stockpiling has slowed from a peak of 2.3Mb/d in 2Q15 to 0.7Mb/d in 2Q16: driven by continued strong demand growth (UBSe +1.3Mb/d y/y in 2Q16) and significant supply-side interruptions (Nigeria, Canada).
- On our S/D balances, eliminating this inventory overhang entirely would likely take until mid-2019 – although any currently unforecastable supply outage would speed this process materially. For example, if Nigerian output remains at its current depressed level (~800kb/d below normal), rather than gradually recovering as we assume, the OECD inventory overhang could be entirely eliminated by end-2017.
- Furthermore, in the context of an historically low level of OPEC spare capacity (~2Mb/d at present vs the historic norm of >4Mb/d), heightened levels of geopolitical risk (financial/political stress in major producers, c.f. Nigeria, Venezuela), and a dearth of conventional project sanctioning activity over 2015-16 (creating a 'gap' in 2019-20 supply), our view is that a higher than normal level of inventories is warranted. Without OPEC spare capacity providing the buffer in the event of a supply shock, a higher level of inventory

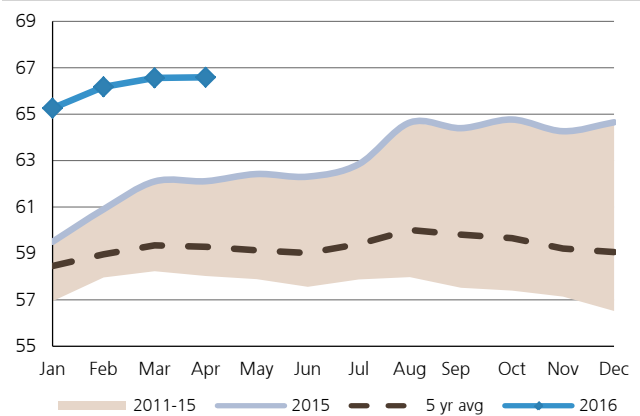
is required in order to 'smooth' out disruptions. Longer term, US shale may provide the 'short-cycle' response mechanism that OPEC no longer can, but in this cycle at least the damage to balance sheets in the independent E&P sector is such that initial surplus cashflows from a rising price will need to be directed towards balance sheet rehabilitation rather than growing volumes.

**Figure 22: OECD commercial inventories (crude + products, Mbbls)**



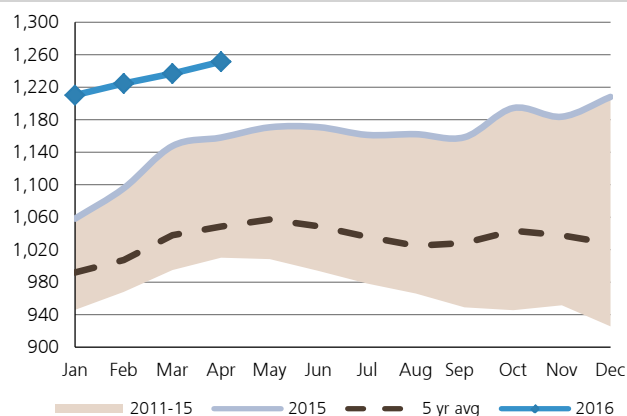
Source: UBS, IEA

**Figure 23: OECD commercial inventories (crude + products, days fwd demand)**



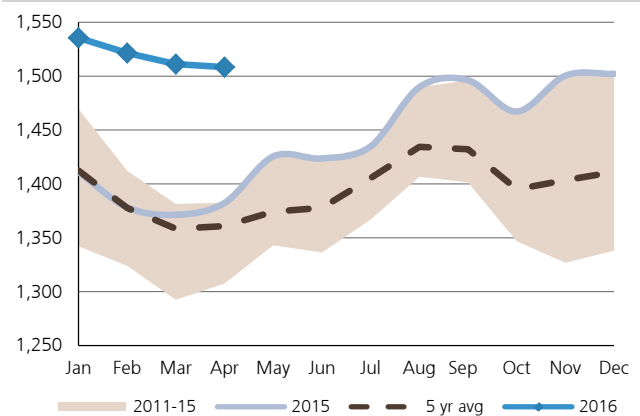
Source: UBS, IEA

**Figure 24: OECD commercial crude inventories (Mbbls)**



Source: UBS, IEA

**Figure 25: OECD refined product inventories (Mbbls)**



Source: UBS, IEA

## Is storage capacity still something to be worried about?

- We see more than sufficient global storage capacity to accommodate our base case S/D balances and do not believe that a 'tank-top' scenario is likely. Furthermore, we believe that with a clear line of sight on the market's rebalancing process (and a significantly tighter physical market during 2Q than initially expected), investors have become more confident that existing capacity is sufficient. This is most visible in the shape of the futures curve – 12m Brent contango now stands at \$4.30/bbl, well below the ~90c/month that would be required to make floating storage (the storage of last resort in a 'tank-top' scenario) viable at current tanker charter rates and bunker fuel prices.
- Our base case S/D balances imply global inventories build by ~80Mbbls vs the end-April level before sustained inventory drawdowns begin in 2H17. This compares to our estimate of OECD crude storage capacity (based on analysis of

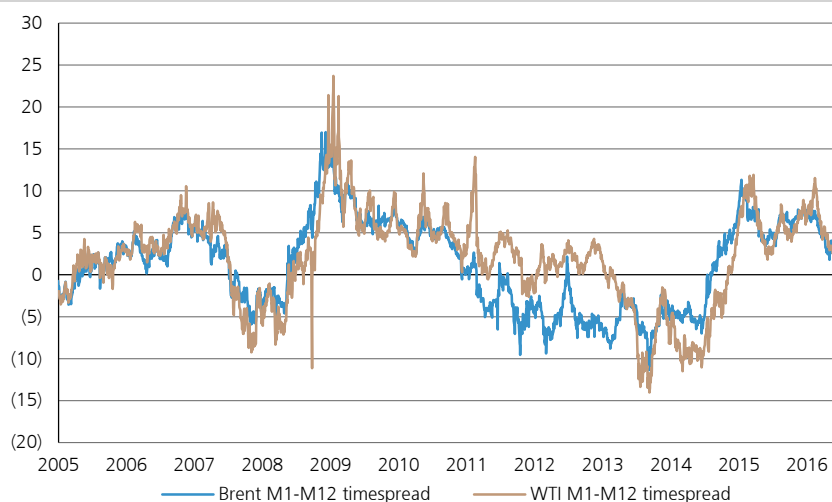
historic inventory peaks) at 335Mbbbls. This is a much wider margin for error than we had anticipated at the outset of 2016, and so we are relatively comfortable in our assessment that there is little risk of a tank-top scenario today.

**Figure 26: End-April 2016 available (unfilled) storage capacity – UBS estimates**

Storage category	Mbbbls storage available	Methodology
OECD ex-US available crude storage	163	Difference between current crude inventories and 10-year country-level peak, adjusted for refinery distillation capacity additions/closures over the period to 2015 (we assume that refineries require crude storage to cover 7 days' worth of intake)
US available crude storage - tank farms and refineries to 90% utilisation	137	End-March EIA tank farm and refinery crude storage capacity disclosure, adjusted for commercial stock builds in April-June weekly DoE data. We assume 90% utilisation is the practical maximum level as transportation systems require some working storage available to be filled at all times to receive pipeline deliveries, etc.
OECD refinery capacity additions/closures in 2016	-2	60kb/d in US capacity additions post March 2016 (last storage capacity data from EIA) less 324kb/d of closures (Europe) - assuming 7 days of crude storage
OECD commercial storage capacity additions	37	New European and North American storage terminals due to start up in 2016 - IEA estimate
<b>OECD crude storage</b>	<b>335</b>	
China SPR facilities	110	2016 new SPR facilities - Huizhou, Yangpu, Kintan and Zhangjian
India SPR facilities	29	Padur and Mangalore facilities - 2016 commissioning
Non-OECD commercial storage capacity additions	26	IEA estimate
Non-OECD refinery capacity additions/closures in 2016	4	577kb/d in non-OECD capacity additions in 2016 - assuming 7 days of crude storage
<b>Non-OECD crude storage</b>	<b>169</b>	
<b>OECD product storage</b>	<b>254</b>	Difference between current product inventories and 10-year country-level peak. Assumes no impact from refinery closures - in reality a significant portion of mothballed refineries have been converted into product storage terminals so we believe this a fair assumption.

Source: UBS estimates, IEA, BP Stat Review, Oil & Gas Journal, EIA. Note: we make no attempt to estimate non-OECD product storage capacity due to scarcity of data.

**Figure 27: M1-M12 Brent and WTI timespreads (\$/bbl)**



Source: UBS, Thomson Reuters.

**Figure 28: UBS oil supply/demand balances (Mb/d)**

Demand	2014	2015	1Q16	2Q16E	3Q16E	4Q16E	2016E	1Q17E	2Q17E	3Q17E	4Q17E	2017E	2018E	2019E	2020E
US	19.4	19.7	19.8	19.8	20.0	19.8	19.8	19.8	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Other OECD Americas	4.7	4.7	4.6	4.4	4.8	4.8	4.7	4.7	4.5	4.9	4.8	4.7	4.8	4.7	4.7
OECD Europe	13.5	13.7	13.6	13.7	14.1	13.7	13.8	13.7	13.8	14.2	13.8	13.9	13.8	13.7	13.6
OECD Asia-Pacific	8.1	8.1	8.6	7.7	7.9	8.2	8.1	8.6	7.9	8.0	8.2	8.2	8.2	8.1	8.1
<b>Total OECD</b>	<b>45.7</b>	<b>46.2</b>	<b>46.6</b>	<b>45.7</b>	<b>46.8</b>	<b>46.5</b>	<b>46.4</b>	<b>46.8</b>	<b>46.0</b>	<b>47.0</b>	<b>46.8</b>	<b>46.6</b>	<b>46.6</b>	<b>46.4</b>	<b>46.2</b>
FSU	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.2
China	10.5	11.0	11.0	11.5	11.7	11.5	11.4	11.2	11.8	12.0	11.8	11.7	11.9	12.2	12.4
Other Asia	12.0	12.5	13.0	13.0	12.7	13.3	13.0	13.5	13.4	13.2	13.7	13.5	13.8	14.2	14.5
Latin America	6.9	6.8	6.5	6.7	6.8	6.8	6.7	6.4	6.6	6.7	6.7	6.6	6.7	6.8	7.0
Middle East	8.0	8.2	7.8	8.2	8.7	8.3	8.2	8.0	8.4	8.8	8.4	8.4	8.6	8.7	8.9
Africa	4.0	4.1	4.2	4.2	4.2	4.3	4.2	4.4	4.4	4.3	4.5	4.4	4.5	4.6	4.7
<b>Total Non-OECD</b>	<b>47.0</b>	<b>48.2</b>	<b>48.1</b>	<b>49.3</b>	<b>49.8</b>	<b>49.9</b>	<b>49.3</b>	<b>49.2</b>	<b>50.3</b>	<b>50.6</b>	<b>50.9</b>	<b>50.2</b>	<b>51.3</b>	<b>52.4</b>	<b>53.5</b>
<b>TOTAL DEMAND</b>	<b>92.8</b>	<b>94.4</b>	<b>94.7</b>	<b>95.0</b>	<b>96.6</b>	<b>96.4</b>	<b>95.7</b>	<b>95.9</b>	<b>96.3</b>	<b>97.6</b>	<b>97.6</b>	<b>96.9</b>	<b>97.9</b>	<b>98.8</b>	<b>99.8</b>
<b>Supply</b>															
US	11.9	12.9	12.8	12.4	12.1	11.8	12.3	11.4	11.4	11.9	12.1	11.7	12.0	12.5	13.2
Other OECD Americas	7.1	7.0	7.1	6.3	6.7	6.9	6.7	7.0	6.9	6.8	7.0	6.9	7.1	7.3	7.4
OECD Europe	3.2	3.4	3.5	3.4	3.3	3.5	3.5	3.5	3.4	3.2	3.4	3.4	3.4	3.3	3.4
OECD Asia-Pacific	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
<b>Total OECD</b>	<b>22.7</b>	<b>23.8</b>	<b>23.8</b>	<b>22.5</b>	<b>22.5</b>	<b>22.5</b>	<b>22.9</b>	<b>22.3</b>	<b>22.1</b>	<b>22.3</b>	<b>22.9</b>	<b>22.5</b>	<b>22.9</b>	<b>23.6</b>	<b>24.5</b>
Russia	10.9	11.1	11.2	11.1	11.1	11.2	11.2	11.3	11.2	11.2	11.3	11.2	11.3	11.3	11.3
Other FSU	3.0	2.9	3.0	2.9	2.8	3.0	2.9	3.1	3.2	3.1	3.1	3.1	3.2	3.2	3.2
China	4.2	4.3	4.2	4.1	4.0	4.0	4.1	3.9	3.9	3.9	3.8	3.9	3.7	3.6	3.5
Other Asia	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.5
Latin America	4.4	4.6	4.4	4.5	4.6	4.6	4.5	4.8	4.7	4.8	4.7	4.8	4.9	5.1	5.2
Middle East	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3
Africa	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0
<b>Total Non-OECD</b>	<b>28.9</b>	<b>29.3</b>	<b>29.0</b>	<b>28.8</b>	<b>28.8</b>	<b>29.0</b>	<b>28.9</b>	<b>29.4</b>	<b>29.1</b>	<b>29.2</b>	<b>29.2</b>	<b>29.2</b>	<b>29.3</b>	<b>29.2</b>	<b>29.1</b>
Biofuels	2.2	2.3	1.9	2.5	2.7	2.4	2.4	2.0	2.5	2.9	2.5	2.5	2.5	2.5	2.5
Processing Gains	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4
<b>Total Non-OPEC</b>	<b>56.0</b>	<b>57.6</b>	<b>57.0</b>	<b>56.1</b>	<b>56.3</b>	<b>56.2</b>	<b>56.5</b>	<b>56.0</b>	<b>56.0</b>	<b>56.7</b>	<b>56.9</b>	<b>56.5</b>	<b>57.0</b>	<b>57.7</b>	<b>58.6</b>
OPEC non-Crude	6.5	6.6	6.7	6.8	6.9	6.9	6.8	6.9	6.9	7.0	7.0	7.0	7.0	7.0	7.0
<b>OPEC Crude Production (actual/forecast)</b>	<b>31.0</b>	<b>32.1</b>	<b>32.6</b>	<b>32.8</b>	<b>33.2</b>	<b>33.3</b>	<b>33.0</b>	<b>33.2</b>	<b>33.5</b>	<b>33.6</b>	<b>33.5</b>	<b>33.5</b>	<b>33.6</b>	<b>33.8</b>	<b>33.7</b>
Call on OPEC Crude (to balance market)	30.2	30.2	30.9	32.1	33.4	33.2	32.4	33.1	33.4	33.9	33.7	33.5	33.9	34.2	34.2
<b>TOTAL SUPPLY</b>	<b>93.5</b>	<b>96.2</b>	<b>96.3</b>	<b>95.7</b>	<b>96.3</b>	<b>96.5</b>	<b>96.3</b>	<b>96.1</b>	<b>96.4</b>	<b>97.3</b>	<b>97.4</b>	<b>96.9</b>	<b>97.6</b>	<b>98.4</b>	<b>99.3</b>
<b>Implied global stock change</b>	<b>0.7</b>	<b>1.8</b>	<b>1.6</b>	<b>0.7</b>	<b>-0.2</b>	<b>0.1</b>	<b>0.6</b>	<b>0.2</b>	<b>0.1</b>	<b>-0.3</b>	<b>-0.2</b>	<b>0.0</b>	<b>-0.3</b>	<b>-0.4</b>	<b>-0.5</b>
<b>OPEC Crude Capacity</b>	<b>34.3</b>	<b>34.7</b>	<b>35.1</b>	<b>35.4</b>	<b>35.5</b>	<b>35.7</b>	<b>35.4</b>	<b>35.8</b>	<b>35.7</b>	<b>35.8</b>	<b>35.9</b>	<b>35.8</b>	<b>36.0</b>	<b>36.2</b>	<b>36.1</b>
<b>OPEC Spare Capacity - at output</b>	<b>3.3</b>	<b>2.6</b>	<b>2.5</b>	<b>2.6</b>	<b>2.4</b>	<b>2.3</b>	<b>2.5</b>	<b>2.5</b>	<b>2.2</b>	<b>2.3</b>	<b>2.3</b>	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>
<b>OPEC Spare Capacity - at "call"</b>	<b>4.0</b>	<b>4.5</b>	<b>4.2</b>	<b>3.3</b>	<b>2.1</b>	<b>2.4</b>	<b>3.1</b>	<b>2.7</b>	<b>2.4</b>	<b>1.9</b>	<b>2.2</b>	<b>2.4</b>	<b>2.1</b>	<b>2.0</b>	<b>1.9</b>

Source: UBS estimates, IEA, EIA, OPEC, national statistics agencies including ANP, NPD, DECC. Note: Gabon still included within non-OPEC supply to aid comparability with 3 agencies' forecasts

**Figure 29: UBS oil supply/demand balances (Mb/d, y/y change)**

Demand (mb/d change Y-o-Y)	2014	2015	1Q16	2Q16E	3Q16E	4Q16E	2016E	1Q17E	2Q17E	3Q17E	4Q17E	2017E	2018E	2019E	2020E
US	0.1	0.3	0.2	0.3	0.0	0.1	0.1	0.0	0.1	-0.1	0.2	0.0	0.0	0.0	0.0
Other OECD Americas	-0.1	-0.1	0.0	-0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
OECD Europe	-0.2	0.3	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	-0.1	-0.1	-0.1
OECD Asia-Pacific	-0.2	0.0	-0.1	0.1	0.1	-0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	-0.1	0.0
<b>Total OECD</b>	<b>-0.3</b>	<b>0.5</b>	<b>0.2</b>	<b>0.4</b>	<b>0.2</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>0.4</b>	<b>0.1</b>	<b>0.3</b>	<b>0.2</b>	<b>0.0</b>	<b>-0.2</b>	<b>-0.2</b>
FSU	0.2	0.0	0.3	0.0	0.0	0.0	0.1	0.1	0.0	-0.1	0.0	0.0	0.1	0.1	0.1
China	0.3	0.5	0.2	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
Other Asia	0.3	0.5	0.7	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
Latin America	0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1
Middle East	0.1	0.1	0.1	-0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Africa	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>Total Non-OECD</b>	<b>1.2</b>	<b>1.1</b>	<b>1.3</b>	<b>0.8</b>	<b>1.1</b>	<b>1.2</b>	<b>1.1</b>	<b>1.1</b>	<b>1.0</b>	<b>0.9</b>	<b>0.9</b>	<b>1.0</b>	<b>1.1</b>	<b>1.1</b>	<b>1.1</b>
<b>TOTAL DEMAND</b>	<b>0.9</b>	<b>1.6</b>	<b>1.5</b>	<b>1.2</b>	<b>1.2</b>	<b>1.4</b>	<b>1.3</b>	<b>1.2</b>	<b>1.3</b>	<b>1.0</b>	<b>1.2</b>	<b>1.2</b>	<b>1.0</b>	<b>0.9</b>	<b>0.9</b>
<b>Supply (mb/d change Y-o-Y)</b>															
US	1.7	1.0	0.0	-0.6	-0.9	-1.2	-0.7	-1.3	-0.9	-0.2	0.3	-0.5	0.3	0.5	0.7
Other OECD Americas	0.2	-0.1	-0.1	-0.3	-0.4	-0.2	-0.2	-0.1	0.6	0.2	0.1	0.2	0.2	0.2	0.1
OECD Europe	0.0	0.2	0.2	0.0	0.1	0.0	0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.1
OECD Asia-Pacific	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total OECD</b>	<b>1.9</b>	<b>1.1</b>	<b>0.2</b>	<b>-0.9</b>	<b>-1.3</b>	<b>-1.5</b>	<b>-0.9</b>	<b>-1.5</b>	<b>-0.4</b>	<b>-0.1</b>	<b>0.4</b>	<b>-0.4</b>	<b>0.4</b>	<b>0.7</b>	<b>0.9</b>
Russia	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Other FSU	0.0	0.0	-0.1	-0.1	0.0	0.1	0.0	0.2	0.3	0.3	0.1	0.2	0.1	-0.1	0.0
China	0.0	0.1	-0.1	-0.3	-0.3	-0.4	-0.3	-0.3	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1
Other Asia	0.0	0.1	0.0	0.0	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	-0.1
Latin America	0.2	0.2	-0.3	-0.1	0.0	0.0	-0.1	0.4	0.2	0.2	0.1	0.3	0.1	0.2	0.2
Middle East	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Africa	0.1	0.0	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1
<b>Total Non-OECD</b>	<b>0.2</b>	<b>0.4</b>	<b>-0.4</b>	<b>-0.5</b>	<b>-0.3</b>	<b>-0.2</b>	<b>-0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.1</b>	<b>0.3</b>	<b>0.1</b>	<b>-0.1</b>	<b>-0.1</b>
Biofuels	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Processing Gains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
<b>Total Non-OPEC</b>	<b>2.4</b>	<b>1.5</b>	<b>-0.1</b>	<b>-1.2</b>	<b>-1.4</b>	<b>-1.7</b>	<b>-1.1</b>	<b>-1.1</b>	<b>-0.1</b>	<b>0.4</b>	<b>0.6</b>	<b>0.0</b>	<b>0.6</b>	<b>0.7</b>	<b>0.9</b>
OPEC non-Crude	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0
<b>OPEC Crude Production</b>	<b>-0.2</b>	<b>1.1</b>	<b>1.4</b>	<b>0.6</b>	<b>0.7</b>	<b>0.9</b>	<b>0.9</b>	<b>0.7</b>	<b>0.7</b>	<b>0.4</b>	<b>0.2</b>	<b>0.5</b>	<b>0.3</b>	<b>0.3</b>	<b>0.1</b>
<b>Call on OPEC Crude</b>	<b>-1.7</b>	<b>0.0</b>	<b>1.4</b>	<b>2.2</b>	<b>2.4</b>	<b>2.8</b>	<b>2.1</b>	<b>2.1</b>	<b>1.3</b>	<b>0.5</b>	<b>0.5</b>	<b>1.1</b>	<b>0.4</b>	<b>0.3</b>	<b>0.0</b>
<b>TOTAL SUPPLY</b>	<b>2.3</b>	<b>2.7</b>	<b>1.5</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-0.5</b>	<b>0.1</b>	<b>-0.2</b>	<b>0.7</b>	<b>0.9</b>	<b>0.9</b>	<b>0.6</b>	<b>0.7</b>	<b>0.9</b>	<b>0.8</b>
OPEC Crude Capacity	-1.2	0.4	0.5	0.7	0.9	1.0	0.8	0.7	0.3	0.3	0.2	0.4	0.1	0.2	-0.1
OPEC Spare Capacity - at 'call'	0.4	0.4	-0.9	-1.5	-1.5	-1.8	-1.4	-1.5	-0.9	-0.2	-0.3	-0.7	-0.3	-0.1	-0.1

Source: UBS estimates, IEA, EIA, OPEC, national statistics agencies including ANP, NPD, DECC. Note: Gabon still included within non-OPEC supply to aid comparability with 3 agencies' forecasts

Figure 30: UBS S/D forecasts vs IEA, EIA, OPEC

		2015	1Q16	2Q16E	3Q16E	4Q16E	2016E	1Q17E	2Q17E	3Q17E	4Q17E	2017E	2016E	2017E
													y/y	y/y
<b>Demand</b>														
IEA	OECD	46.2	46.6	45.8	46.5	46.3	46.3	46.6	45.9	46.7	46.4	46.4	0.15	0.06
	Non-OECD	48.6	48.6	49.7	50.2	50.5	49.7	49.9	51.0	51.4	51.6	51.0	1.18	1.23
	Total Demand	94.7	95.2	95.5	96.7	96.9	96.1	96.5	96.8	98.0	98.0	97.4	1.33	1.30
EIA	OECD	46.2	46.6	45.9	46.4	46.8	46.4	46.7	45.7	46.5	47.0	46.5	0.17	0.05
	Non-OECD	47.6	47.6	49.2	49.5	49.0	48.9	49.0	50.7	51.0	50.4	50.3	1.28	1.41
	Total Demand	93.8	94.2	95.1	95.9	95.8	95.3	95.7	96.4	97.5	97.4	96.7	1.45	1.47
OPEC	OECD	46.2	46.5	45.6	46.8	46.5	46.4						0.18	
	Non-OECD	46.8	46.6	47.6	48.4	48.7	47.8						1.02	
	Total Demand	93.0	93.1	93.3	95.2	95.2	94.2						1.20	
UBS	OECD	46.2	46.6	45.7	46.8	46.5	46.4	46.8	46.0	47.0	46.8	46.6	0.22	0.24
	Non-OECD	48.2	48.1	49.3	49.8	49.9	49.3	49.2	50.3	50.6	50.9	50.2	1.09	0.96
	Total Demand	94.4	94.7	95.0	96.6	96.4	95.7	95.9	96.3	97.6	97.6	96.9	1.30	1.20
<b>Supply</b>														
IEA	Non-OPEC	57.6	57.2	56.2	56.7	56.9	56.8	56.6	56.9	57.2	57.2	57.0	-0.90	0.24
	OPEC non-crude	6.7	6.8	6.8	6.9	6.9	6.9	6.8	6.9	6.9	7.0	6.9	0.18	0.05
	Call on OPEC crude	30.4	31.2	32.4	33.1	33.0	32.5	33.0	33.1	33.9	33.8	33.5	2.04	1.01
	OPEC crude	32.1	32.6											
	Total Supply	96.4	96.5											
EIA	Non-OPEC	57.6	57.3	56.8	57.0	56.9	57.0	56.3	56.9	57.0	57.1	56.8	-0.58	-0.24
	OPEC non-crude	6.6	6.7	6.9	6.9	7.0	6.8	7.1	7.1	7.2	7.3	7.2	0.27	0.33
	Call on OPEC crude	29.6	30.2	31.4	31.9	32.0	31.4	32.3	32.4	33.3	33.0	32.8	1.76	1.37
	OPEC Crude	31.5	31.6	32.2	32.8	32.8	32.3	32.8	33.1	33.1	33.1	33.0	0.81	0.69
	Total Supply	95.7	95.6	95.8	96.8	96.7	96.2	96.2	97.1	97.3	97.5	97.0	0.50	0.78
OPEC	Non-OPEC	56.4	57.1	55.8	56.0	56.7	56.4						0.00	
	OPEC non-crude	6.3	6.2	6.3	6.3	6.3	6.3						0.00	
	Call on OPEC crude	30.3	29.7	31.2	32.9	32.2	31.5						1.20	
	OPEC Crude	31.8	32.3											
	Total Supply	94.5	95.7											
UBS	Non-OPEC	57.6	57.0	56.1	56.3	56.2	56.5	56.0	56.0	56.7	56.9	56.5	-1.08	-0.03
	OPEC non-crude	6.6	6.7	6.8	6.9	6.9	6.8	6.9	6.9	7.0	7.0	7.0	0.18	0.14
	Call on OPEC crude	30.2	30.9	32.1	33.4	33.2	32.4	33.1	33.4	33.9	33.7	33.5	2.20	1.09
	OPEC Crude	32.1	32.6	32.8	33.2	33.3	33.0	33.2	33.5	33.6	33.5	33.5	0.92	0.49
	Total Supply	96.3	96.3	95.7	96.3	96.5	96.3	96.1	96.4	97.3	97.4	96.9	0.02	0.60

Source: UBS estimates, IEA, EIA, OPEC, national statistics agencies including ANP, NPD, DECC. Note: Gabon still included within non-OPEC supply to aid comparability with 3 agencies' forecasts

### **Valuation Method and Risk Statement**

In history, oil prices have proved consistently unpredictable because so many political, geological, and economic trends and events affect the supply of and demand for oil.

Oil prices are extremely volatile in the short, medium and long term, as they are frequently affected by inherently unpredictable events, including natural disasters.



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12-Month Rating	Definition	Coverage <sup>1</sup>	IB Services <sup>2</sup>
<b>Buy</b>	FSR is > 6% above the MRA.	49%	32%
<b>Neutral</b>	FSR is between -6% and 6% of the MRA.	38%	26%
<b>Sell</b>	FSR is > 6% below the MRA.	14%	19%
Short-Term Rating	Definition	Coverage <sup>3</sup>	IB Services <sup>4</sup>
<b>Buy</b>	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
<b>Sell</b>	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 31 March 2016.

1:Percentage of companies under coverage globally within the 12-month rating category.

2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.

3:Percentage of companies under coverage globally within the Short-Term rating category.

4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

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