

# OIL IN 2015: UNDERSTANDING THE MARKET

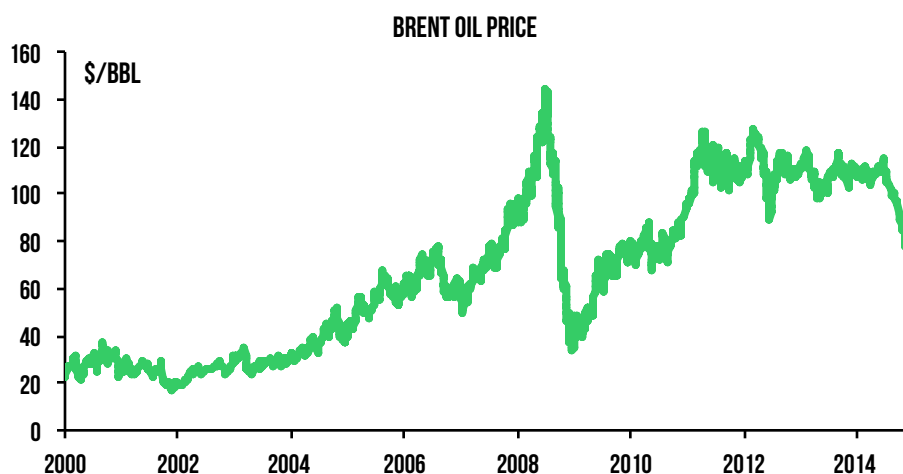
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## POINT OF DEPARTURE

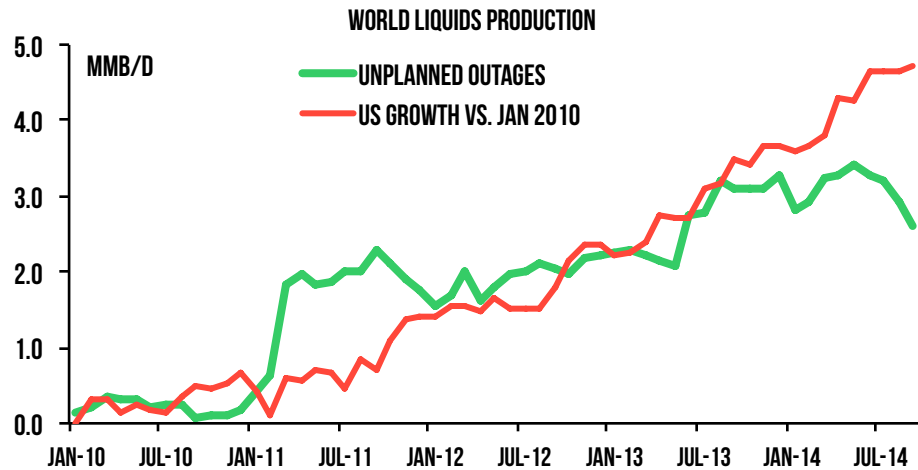
Crude oil closed 2014 at just \$55/bbl (Brent), a 50% decline from its yearly high of \$115/bbl in June. The sharp drop is due to market fundamentals—increased supply and weaker expectations about demand. But the price drop also underscores deep changes in the oil market which make forecasting even harder than before.



*Source: Department of Energy, Energy Information Administration*

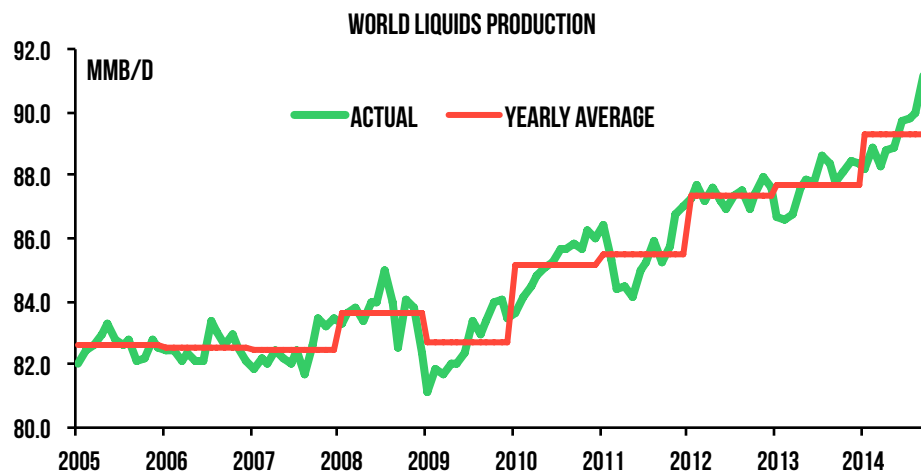
## INCREASED SUPPLY

Oil production has risen in the past decade, but the increases have been irregular: some years, production has grown significantly; other years, it has declined; and many years, it has stayed flat. These fluctuations reflect decisions made by many companies and the Organization of Petroleum Exporting Countries (OPEC), and they also reflect physical disruptions caused by weather (e.g. hurricanes), strife (e.g. civil wars) or policy (e.g. sanctions). In other words, despite a secular upward trend, production has many ups and downs, and the past few years have been no exception: in 2014, oil production likely grew by 1.8%, which is robust but not unheard of, but it followed a year of meager growth (+0.4%).



*Source: Department of Energy, Energy Information Administration*

The growth in world oil supply has been driven largely by the United States, which has grown production by almost 5 million barrels a day (mmb/d) versus 2010. Yet, the impact of this growth was muted by physical disruptions to supply elsewhere, mostly due to war (Libya, Syria) and tightening sanctions against Iran. In other words, the United States was pumping more oil, but this just replaced oil lost from elsewhere. These “unplanned outages” peaked in April 2014 and started to fall, largely due to Libya, whose output rose from 0.2 mmb/d in June to 1 mmb/d in October 2014. The supply picture changed dramatically in these short months.



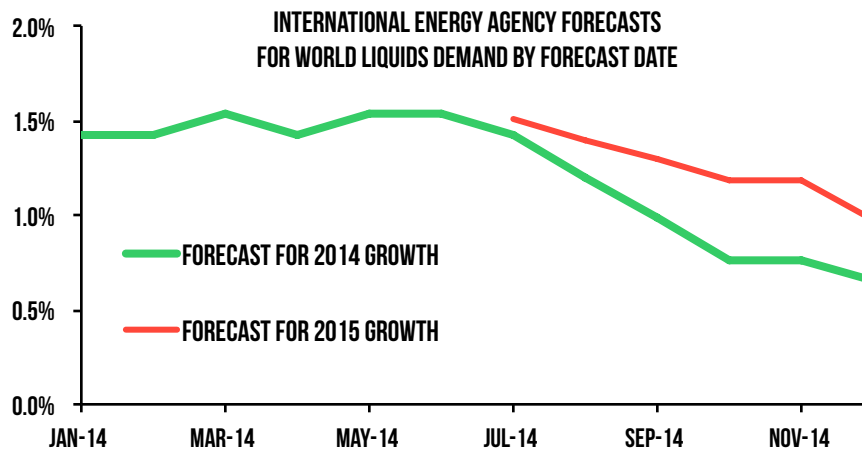
*Source: Department of Energy, Energy Information Administration*

## BEARISH DEMAND

Just as supply has (finally) started to grow, the outlook on demand has become bleaker, largely on the back of more bearish expectations for the global economy. In January 2014, the International Monetary Fund (IMF) forecast that world gross

domestic product (GDP) would increase by 3.7% in 2014 and 3.9% in 2015. In its latest forecast, in January 2015, it estimated that GDP grew by 3.3% in 2014, and that it would grow by 3.5% in 2015. More importantly, the IMF has revised down its expectations for the Chinese economy, which is a locomotive for commodities and, through trade, for other economies in the world.

The weaker economy soon translated into more bearish expectations for the oil market, as seen by the progressive reduction in growth expectations. In July 2014, the International Energy Agency (IEA) expected that oil demand would grow by 1.4% in 2014 and 1.5% in 2015. Within six months, it had revised both forecasts down: it now expected oil demand to grow by just 0.7% in 2014 and only 1% in 2015. In other words, from a place where it expected growth of ~3% over two years, it now saw growth being roughly half (1.7%) that rate. Given the growth in supply, which also came this summer, the market turned on its head: supply was growing faster and demand was growing more slowly than expected. Prices started to plummet.

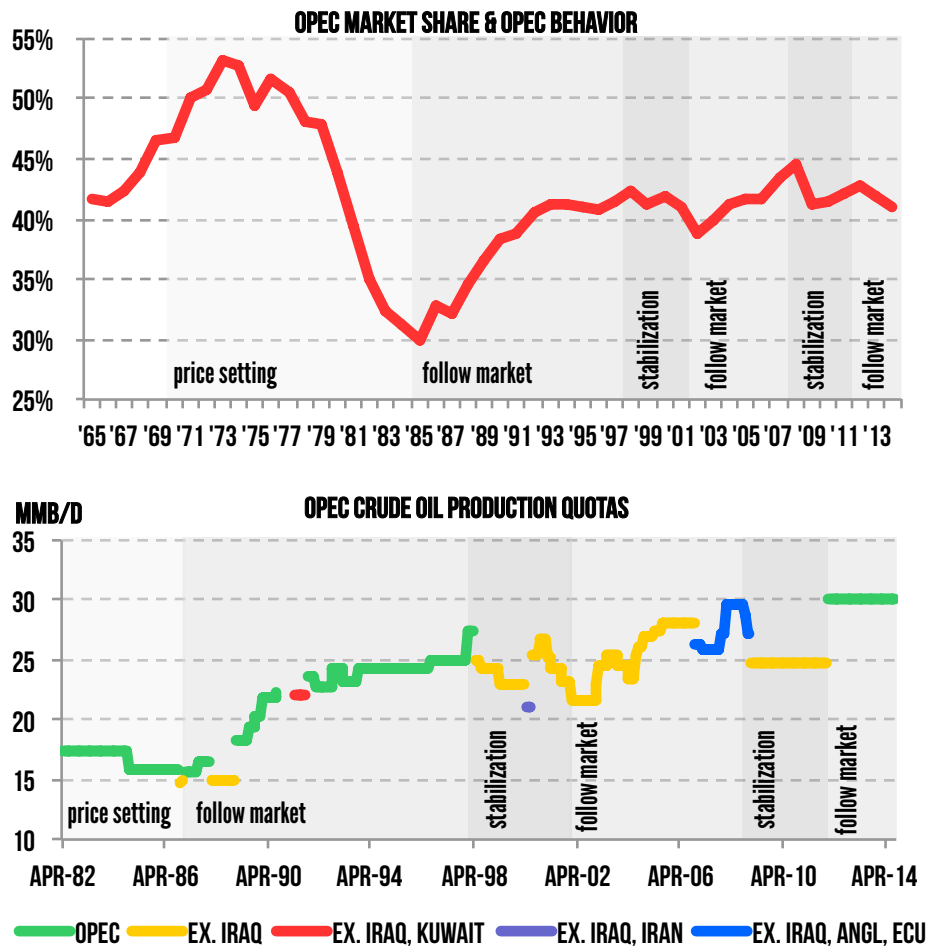


*Source: International Energy Agency, Oil Market Reports*

## OPEC'S ROLE

Given these market fundamentals, we should expect prices to fall. But prices have fallen more precipitously than anyone expected, in large part because OPEC (mostly Saudi Arabia) made it very clear that it has no intention to cut production in an effort to prop up prices.

Inevitably, such declaration prompted many analysts to talk about a “sharp reversal” in OPEC’s role or, even, of OPEC’s death. In reality, OPEC has never been able to set prices—the one time it tried, it only managed to cut production so much that its market share collapsed (from 1973 to 1986). Twice, OPEC tried to stabilize markets—once successfully (2008–09) and once unsuccessfully (1998–2001). Mostly, OPEC has followed markets—providing additional oil when needed, and cutting back slightly to prevent excessive price volatility.



*Source: BP Statistical Review of World Energy; US Department of Energy, Energy Information Administration; Organization of Petroleum Exporting Countries (OPEC)*

OPEC has few good options: if it cuts back production to prop up prices, it will merely send a signal to US producers to keep drilling and keep growing production. Defending prices is thus merely a recipe for losing market share. Instead, OPEC is basically letting the market play itself out: let prices drop to the point that new supply becomes uneconomic and comes off the market. Rather than try to estimate that price point, it is letting markets tell it what it is.

## FLOORS AND CEILINGS

Such a response from OPEC is neither revolutionary, nor shocking (although the emphasis with which OPEC declares that it will not defend prices is). But it does pose a challenge for forecasters. Broadly speaking, observers in the oil market predict long-term prices based on supply, rather than demand. Mostly, this is due to simplicity: demand is more diffuse and affected by myriad choices, policies and technologies. Mapping the elasticity of demand at different prices is a daunting

task that requires insights into driving patterns, fuel substitution, technology, and fiscal policies (subsidies, taxes) across many countries.

Instead, supply is simpler to forecast because it has effectively boiled down to two numbers: the break-even price for new, marginal projects and the fiscal break-even price for OPEC countries. The former tells us the price at which new supply does or does not come to the market; this has generally meant Canadian oil sands or deepwater projects because those have been at the edge of the supply curve (representing the most expensive barrels of oil that come to market only when prices are high enough to make the major projects to produce them viable). The latter is a proxy for the price that OPEC countries need “to run their economies”, in particular to maintain a sustainable budget deficit and to finance imports, and is meant to tell us when OPEC will feel pain and thus step in to prevent prices from falling further. Both are crude estimates with several problems, but they are both simple enough that they work.

In today's market, however, it is clear that neither estimate is very helpful. OPEC is unwilling to step in and prop prices artificially high, even though oil prices are below what countries need to “run their economies”, for fear of repeating the mistakes of the 1970s and 1980s, when its cuts to maintain prices allowed new developments like Alaska's North Slope and the UK and Norwegian North Sea to take much of its market share. Similarly, the marginal barrel is no longer easy to model by focusing on a handful of mega projects (oil sands or deepwater). Rather, the marginal barrel is scattered around thousands of wells across the United States, controlled by many companies making decisions independently from each other, and responding to different incentives and market signals (including a willingness to accept sub-optimal returns, and thus drill even when a project may not “break even”). This difficulty in understanding the true break-even price might explain OPEC's reticence—it too wants to know that pricing point and it can only find out by letting the market follow its course.

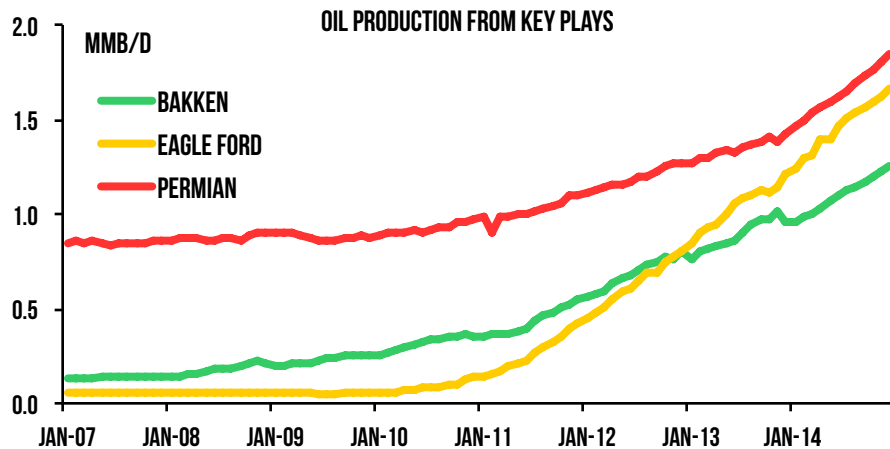
## OIL IN THE LOWER 48

Oil in the Lower 48 will drive oil prices over the next few years. Making sense of oil in the Lower 48 depends on understanding three central facts:

**Scale.** Three regions have produced the bulk of the new oil in the United States: the Bakken (North Dakota and Montana), the Eagle Ford (Texas) and the Permian (Texas and New Mexico). The Bakken was marginal in 2007, the Eagle Ford was marginal until 2010, and the Permian produced mostly conventional oil. Since 2010, each region has increased production by more than 1 mmb/d, with the Eagle Ford showing the sharpest increase. Such dynamism illustrates how quickly the market can respond and deploy resources to produce additional oil.

**Diffusion.** Unlike other places in the world, oil in the United States is decentralized. Of course, there are bigger companies in each play, but overall activity is driven by dozens of actors. In Texas, for instance, the top 32 producers only accounted for two-thirds of the state's oil production in 2013. As such, production reflects the

choices of dozens of players with diverse incentives, financial positions, and strategies, which makes forecasting much harder to do.



*Source: US Department of Energy, Energy Information Administration, Drilling Productivity Report*

**Variation.** The flip side to diffusion is variation: while it is fairly common to look at average numbers (production per rig), these figures become less meaningful when the spread between top and bottom performers is very large, as is the case in the Lower 48. The best producing wells can be 20 to 30 times better than the worst performers. This also means that scaling back activity can have a trivial impact on output if operators cut the worst performers—this is precisely what happened a few years ago with natural gas in the Lower 48 where the rig count was cut in half while production stated flat.

These facts complicate the forecasting exercise of the link between oil prices and production in the Lower 48. For one, the market can respond quickly and deploy tremendous resources in response to a price signal. Moreover, the response will be decentralized, and some companies may appear to behave uneconomically but quite rationally given their incentives and constraints (need to cover debt, for instance, making them accept lower returns). And the variation means that activity may have to be scaled back significantly before production falls. This is why, despite an overall consensus that production will be hurt at \$40 to \$50/bbl, there is considerable uncertainty around this point forecast.

In short, the drop in oil prices represents a perfect storm: increased supply and weaker (actual and expected demand). But the drop underscores the inapplicability of old forecasting models that looked at a few mega projects and OPEC budgets. As long as US oil supply is the marginal barrel, forecasting prices will be even more difficult and imprecise given how diffuse the oil supply picture is in the Lower 48.

## ABOUT US



**Janak Mayer.** Before co-founding enalytica, Janak led the Upstream Analytics team at PFC Energy, focusing on fiscal terms analysis and project economic and financial evaluation, data management and data visualization.

Janak has modeled upstream fiscal terms in all of the world's major hydrocarbon regions, and has built economic and financial models to value prospective acquisition targets and develop strategic portfolio options for a wide range of international and national oil company clients. He has advised Alaska State Legislature for multiple years on reform of oil and gas taxation, providing many hours of expert testimony to Alaska's Senate and House Finance and Resources Committees.

Prior to his work as an energy consultant, Janak advised major minerals industry clients on a range of controversial environmental and social risk issues, from uranium mining through to human rights and climate change. He has advised bankers at Citigroup and policy-makers at the US Treasury Department on the management and mitigation of environmental and social impacts in major projects around the world, and has undertaken macroeconomic research with senior development economists at the World Bank and the Peterson Institute for International Economics.

Janak holds a BA with first-class honors from the University of Adelaide, Australia and an MA with distinction in international relations and economics from the Johns Hopkins School of Advanced International Studies (SAIS).



**Nikos Tsafos.** Nikos Tsafos has a diverse background in the private, public and non-profit sectors. He is currently a founding partner at enalytica. He previously spent 7 ½ years at PFC Energy, where he advised the world's largest oil and gas companies on some of their most complex and challenging projects; he also played a pivotal role in turning the firm into one of the top natural gas consultancies in the world, with responsibilities that included product design, business development, consulting oversight and research direction.

Prior to PFC Energy, Nikos was at the Center for Strategic and International Studies (CSIS) in Washington, DC where he covered political, economic, and military issues in the Gulf, focused on oil wealth, regime stability and foreign affairs. Before CSIS, he was in the Greek Air Force, and prior to his military service, Nikos worked on channeling investment from Greek ship-owners to Chinese shipyards.

Nikos has also written extensively on the domestic and international dimensions of the Greek debt crisis. His blog (Greek Default Watch) was listed as one of "Europe's Top Economic Blogs" by the Social Europe Journal, and his book "Beyond Debt: The Greek Crisis in Context" was published in March 2013.

Nikos holds a BA with distinction in international relations and economics from Boston University and an MA with distinction in international relations from the Johns Hopkins School of Advanced International Studies (SAIS).

