



RESEARCH REPORT

March 26, 2018

Energy Market Update Light at the End of the Pipeline

With a new QUIC Energy & Utilities team in place, we thought it would be beneficial to do an overview on the current fundamentals in the oil markets. FY2017 saw a battle between two titans, the United States and the OPEC+ consortium, who attempted to defy and find equilibrium in global crude supply and demand.

In this report we look at the influx and restriction of crude supply at a national level, as well as the global demand trajectory moving forward, including the role China and India will play as key catalysts. We will apply this to Canada, and investigate the current price differential overhang on the Canadian market, which is causing investors and producers to look south of the border to spend their money.

Units Guide:

MMbbl/d = Million barrels per day

Mbbl/d = Thousand barrels per day

Boe = Barrel of oil equivalent (equals 1 barrel of oil or 6,000 cubic feet of natural gas)

Energy & Utilities

Jake Clements
jclements@quiconline.com

Matthew Ferreira
mferreira@quiconline.com

Garrett Johnston
gjohnston@quiconline.com

Ruby Harris
rharris@quiconline.com

The information in this document is for EDUCATIONAL and NON-COMMERCIAL use only and is not intended to constitute specific legal, accounting, financial or tax advice for any individual. In no event will QUIC, its members or directors, or Queen's University be liable to you or anyone else for any loss or damages whatsoever (including direct, indirect, special, incidental, consequential, exemplary or punitive damages) resulting from the use of this document, or reliance on the information or content found within this document. The information may not be reproduced or republished in any part without the prior written consent of QUIC and Queen's University.

QUIC is not in the business of advising or holding themselves out as being in the business of advising. Many factors may affect the applicability of any statement or comment that appear in our documents to an individual's particular circumstances.

Table of Contents

Global Oil Trends: OPEC and Supply Overview	2
Global Oil Trends: Demand Overview	5
Heavy Oil Environment in Canada	6
References	7

Global Oil Trends: OPEC and Supply Overview

Aggregate Supply Overview

The United States is one of the top players in global oil supply, with production spiking to a record 10.2MMbbl/d in March 2018. This was and continues to be a major impact on global demand, causing OPEC and complying nations to cut production by 39.2-39.6MMbbl/d through the end of 2018. This has been spearheaded by Saudi Arabia who is pushing for higher crude prices to increase valuation of Saudi Aramco's IPO, and Russia, in an attempt to increase market share in developing nations. Together, OPEC and Russia account for 40% of global supply, with Saudi Arabia and Russia producing 10MMbbl/d and 10.95MMbbl/d respectively.

OPEC Production

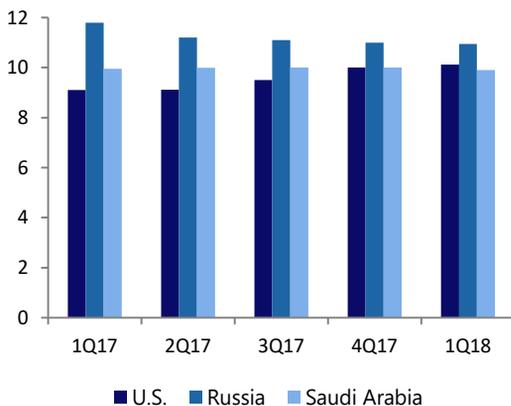
OPEC has capped production at a ceiling of 32.73MMbbl/d through to the end of 2018. Compliance has historically been steady at about 60%. However, OPEC has seen a 101% compliance rate as of February 2018, with member nations producing 32.39MMbbl/d of crude oil. One of the main drivers of this increase is Saudi Arabia's aforementioned incentive to push oil prices up to maximize the valuation of its long-awaited Saudi Aramco IPO.

This offering continues to be pushed-back as the Saudis seek a higher crude price, as well as consider changing initial plans of a foreign listing in London or New York to stay local in Riyadh. The decision to bring the state-owned oil company public stems from the result of the 2014 oil crash, as capital will be used to diversify the Saudi economy into a less oil-dependent market.

Although Saudi Arabia has been complying with production cuts, its exports of refined products soared to record highs in January of 2018, showing an advantage over other OPEC producers who are more dependent on lower-value crude. Regional exports of jet fuel and diesel have been growing by 160Mbb/d each year since 2014. The Jazan refinery (set to be completed in 2019) will add 400Mbb/d to Saudi refinery capacity, positioning it well to meet growing international demand. This expansion into refineries has allowed for steady revenue during crude-supply cuts. This is expected to become increasingly important for both Saudi Arabia as well as other OPEC nations as U.S. shale continues to take over market share in the near future.

EXHIBIT I

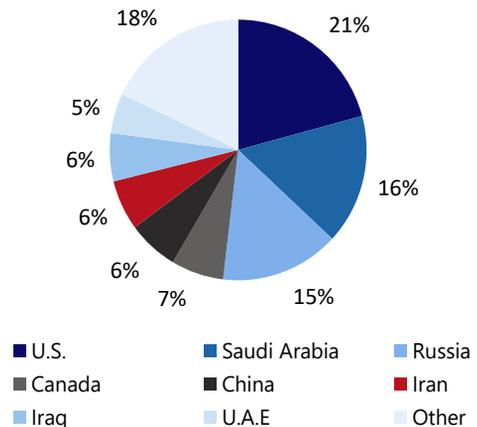
Crude Production Comparison (MMbbl/d)



Source(s): IEA

EXHIBIT II

Production of Petroleum Products by Country



Source(s): EIA

Global Oil Trends: OPEC and Supply Overview

Russia has created a working relationship with Saudi Arabia and committed to adhering to production cuts along with OPEC. Russia's main incentive has been to gain market share in developing economies with growing demand such as India and China, consuming 5.87MMbbl/d and 11.67MMbbl/d respectively. Russia is planning on further cementing this relationship with China through a new shipment channel in Kazakhstan.

Iran has been one of the few nations (apart from Libya and Nigeria) to not conform to supply cuts. While Libya and Nigeria have been exempted from production caps due to political unrest, Iran continues to increase oil production contrary to attempted imposed reductions.

North American Production

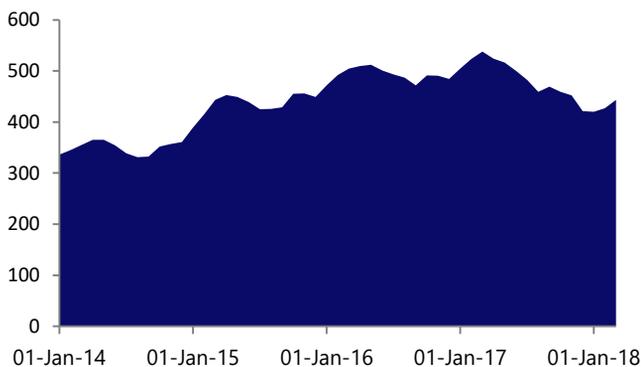
U.S. shale is the second largest global player in terms of supply, behind only Russia, producing a record 10.2MMbbl/d in February 2018. Production has been increasing; however, inventories have seen a fairly steady decrease from the March 2017 peak of 537.88MMbbl to 419.98MMbbl in January 2018, with a slight rebound from January to March 2018. This means that although production has been increasing, it's not keeping pace with both the combined global and domestic demand, thus causing a draw on inventories.

An increase in technological advancements such as horizontal drilling and hydraulic fracking has helped the U.S. survive the oil price dip; however, many researchers have found that a more accurate cause for its ability to produce large quantities of shale is its premium drilling sites. The EIA suggests that such sites could become scarce within the next decade, creating a potential catalyst for oil prices as well as allowing OPEC to maintain a larger control over world benchmark prices. However, in the short-term the IEA estimates that the U.S. will provide for the majority of the world's supply growth, with an estimated average of 10.7MMbbl/d of oil production in 2018 and 11.3MMbbl/d in 2019.

Canadian producers are shifting focus to disciplined capital allocation in order to decrease production costs, with large producers committing to debottlenecking and expanding projects. One of the disadvantages of Canadian production is that bitumen is sold at a substantial discount to WTI as seen in Exhibit IV. Many factors affect this differential including the density and current pipeline capacity. Pipeline constraints are expected to continue to be a challenge, with Canadian production expected to increase to 5.1MMbbl/d by 2030, and current pipeline capacity sitting at 4MMbbl/d. This is a large challenge for Canada's production costs, as shipping by rail is a much more expensive alternative

EXHIBIT III

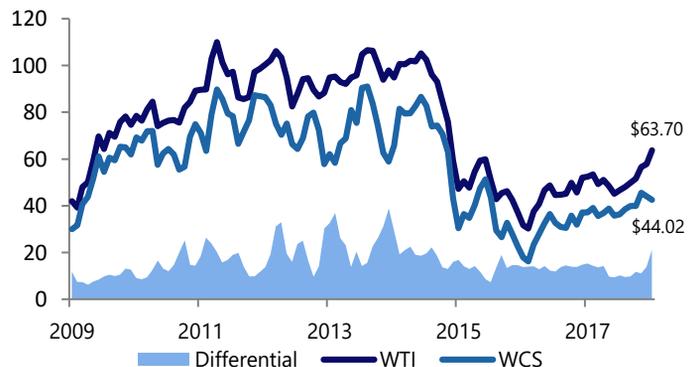
U.S. Oil Inventories (MMbbl)



Source(s): EIA

EXHIBIT IV

WCS and WTI Differential



Source(s): EIA

Global Oil Trends: OPEC and Supply Overview

Risks of the current main supply streams stem from potential geopolitical events such as Iranian sanctions, civil unrest and protectionist measures. The U.S. shale industry could see costs rise as a result of retaliatory action with regard to President Trump's protectionist policies, as the prices of imported inputs appreciate. Further, the IEA has cited Venezuela as a large risk to global oil supply as the nation lost another 60Mbbbl/d in February, inflating OPEC's compliance rate. Due to Venezuela's poor track-record with regard to paying for sales on account, the U.S. is the last remaining country willing to supply them with diluent. This dependency upon one nation for a required input makes Venezuela's supply position precarious.

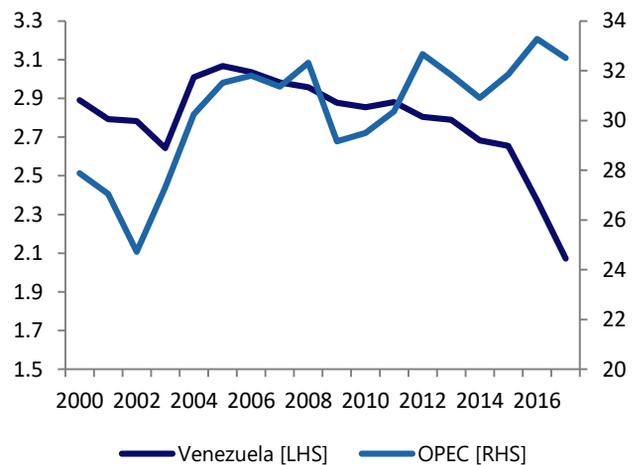
The IEA has stated that they see the market rebalancing and becoming more closely aligned. With OECD stocks falling closer to average levels and continuing production supply cuts. We expect a slow steady build in oil prices moving into the foreseeable future.

Demand Overview

Global oil demand is expected to rise by 1.5MMbbl/d in 2018 - to 99.3MMbbl/d. This represents an upward revision from the IEA by approximately 100Mbbbl/d since February 2018. Further, world oil demand is expected to increase by approximately 6.9MMbbl/d to 2023. However, recent signs of protectionism from the U.S. could represent a risk towards global economic growth. A slowdown in world trade would have strong consequences, particularly for fuel used in the maritime sector and trucking industry. The growth in world trade, which accelerated from 2.5% in 2016 to 4.7% in 2017, is part of the strong increase in global gasoline demand last year, according to the IEA. While the IMF expects world trade to increase 4.6% in 2018, any significant slowdown would affect demand for refined products.

EXHIBIT V

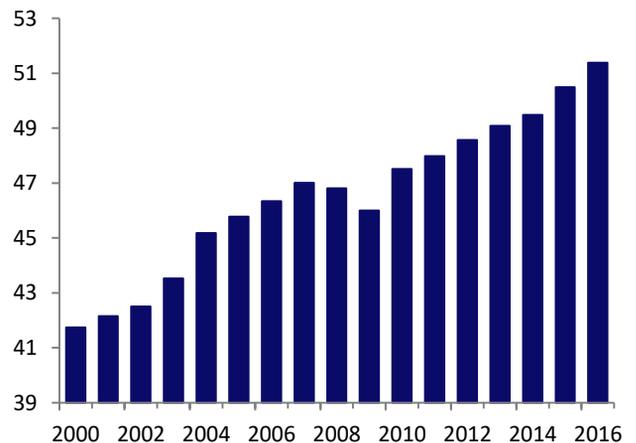
Venezuelan and OPEC Production (MMbbl)



Source(s): Council of the Americas

EXHIBIT VI

Global Petroleum Consumption (TWh)



Source(s): IEA

Global Oil Trends: Demand Overview

China has been the world's largest oil consumer since 2011, and just recently overtook the UK and Holland to become the second-largest destination for U.S. crude exports. This trend is expected to continue as Beijing seeks to partially address the Trump Administration's complaints about the current U.S.-China trade deficit. Recent decreases in domestic supply as well as increasing consumption growth has prompted the Chinese government to allow refiners to import directly instead of purchasing from the state. Both this trend and growing domestic demand for petroleum products has caused a refinery boom. This increase in demand has been integral to global supply maintenance and helping to diminish global stockpiles.

India's oil consumption growth peaked at over 11% in 2016 but saw a steep drop to only 2% growth in 2017 due to a ban on high-value currency notes and a new national sales tax weakening the economy. Although the IEA has posted downward revisions of demand forecasts for India, the agency still estimates demand growth to shoot back to 275Mbb/d in 2018. As the government embarks on pro-growth policies to revive

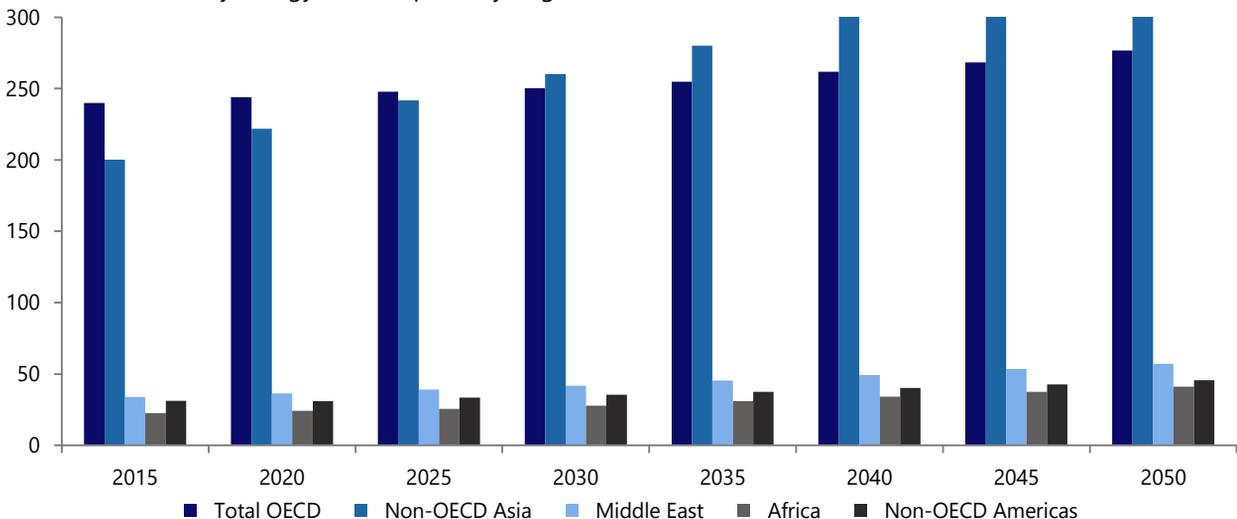
the economy and consolidate electoral support before the 2019 general election, Indian oil demand is likely to rebound strongly, spiking back to 10.3% in January. Given these factors, long-term growth is expected to be dominated by India, outpacing China as the fastest growing energy market by 2030.

Key Demand Drivers

1. Growth in world trade - up from 2.5% in 2016 to 4.7% in 2017; IMF expects it to increase by 4.6% in 2018. Demand for gasoil (for shipping and transportation - accounting for 56% of total oil demand) will increase.
2. Increased demand for oil as an input for petrochemicals and refined products. Demand for such products will drive a quarter of anticipated international oil growth through to 2023.
3. The second-largest driver of oil demand stems from industrial sectors such as iron, steel, cement production, construction, and mining.

EXHIBIT VII

Global Total Primary Energy Consumption by Region (B Btu)



Source(s): IEA

Heavy Oil Environment in Canada

While WTI has seen positive trajectory through the start of FY2018, the Canadian energy market has noticeably lagged its U.S. counterparts. Corporations are either limiting or cancelling their Canadian capital programs. Canadian oil spending is expected to decrease for the fourth year in a row by 12% to \$33B. In addition, supermajors are outright leaving the country, as they no longer consider Canada as part of their core strategy; ConocoPhillips began the process in 2017 when the firm sold its Canadian assets to Cenovus for \$17B. The iShares TSX Capped Energy ETF has seen \$52MM in outflows this year, while its U.S. counterpart has received \$32MM in inflows.

While the oil price is quoted through the WTI benchmark, actual realized prices for E&P's differ. Canadian heavy oil, quoted through WCS, historically has traded at a discount to WTI due to its high sulphuric content (3.5% on average) and its heaviness (API gravity 20.5). The current differentials are historically immense, reaching U.S.\$30 as of writing. At these levels, they will cost the economy \$15.6B. The differentials are being driven by a lack of market access for the oil; WCS is typically refined at the Gulf Coast, where recent investments have increased local capacity. However, the oil cannot get there due to pipeline capacity constraints. While there are proposed pipeline expansion projects from Enbridge (L3RP) and KML (TransMountain) that are federally approved, investors are hesitant due to local regulatory battles and the time it will take for these to be in operation.

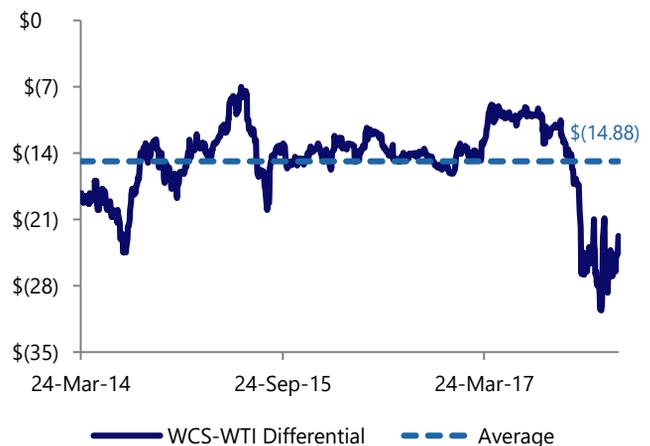
E&P's are shipping through an alternative method: rail. Already a more expensive alternative to pipelines, rail companies such as CN and CP are cranking up their crude-by-rail prices in return for adding locomotives and crews to transport as they realize the demand will likely dry up once new pipelines come on. All in all, the prices have increased by U.S.\$4.50 to ~U.S.\$20 to get a barrel from AB to the Gulf Coast. This compounds the margin issue facing Canadian producers, who have breakeven costs of ~\$45/bbl. Volume-wise, crude shipments by rail are expected to double to 390Mbb/d in 2019, but recede to

170Mbb/d should the L3RP proceed, adding 450Mbb/d of market access.

This is a rather bearish undertone; however, there is light at the end of the pipeline. We expect differentials to tighten for the following reasons: Keystone will resume full design (591Mbb/d) of pressure in the near term; AB is negotiating multi-year crude-by-rail contracts with Cn and CP; Venezuelan heavy crude production has been tanking, which represents a large portion of Gulf Coast's refining complex, increasing demand for WCS. Canadian E&P's, namely QUIC's holding CNQ, have been shifting their programs in the interim to focus on light oil drilling, which has been favourably received by the market. In addition, QUIC holding SPE is focused on Viking light oil, which sells at a tight differential to WTI. Canadian E&P's are trading relatively cheap due to the differentials, and are positioned for appreciation should the differentials tighten, as expected. We believe that if foreign investors decide to return to Canadian energy, CNQ is a safe-haven, well-known name that we expect to receive a large inflow of investment.

EXHIBIT VIII

WCS-WTI Differentials, in USD



Source(s): Bloomberg

References

1. Bloomberg
2. Council of the Americas
3. EIA
4. Financial Times
5. IEA
6. Thomson Reuters