

Oil Will Maintain Its Dominance During the 21st Century & Beyond

By Mamdouh Salameh

INTRODUCTION

In December 2017 the oil price broke through the \$60 barrier and reached \$66.78/barrel for the first time since 2015.

Oil started the year with further price gains touching \$70/barrel despite the quick restart of the Forties pipeline in the UK North Sea and the equally quick repairs of a pipeline in Libya. Sentiment on the oil market is more bullish than it has been for a long time.

What will be driving the oil price in 2018 is a healthy global demand for oil getting healthier by the day. The first law of economics is supply and demand. All other factors are extras. The second law is that oil is like a coin: one side is economics and the other is geopolitics and the two are inseparable.

When the glut was rampant in the global oil market during the period 2014-2016, the oil price trended downwards ignoring all the geopolitical developments such as the war against ISIS in Iraq, the war in Syria, escalating tension between Saudi Arabia and Iran, rising tension between Iraqi Kurdistan and Iraq and the war of words between the United States and North Korea.

Now that the market is fast re-balancing, any small geopolitical event pushes the price upwards.

All eyes will, therefore, be on U.S. shale in 2018 to see whether it can spoil the oil price rally particularly with the U.S. Energy Information Administration (EIA) projecting that shale oil production will rise to 10.5 million barrels a day (mbd) in 2018 and 11 mbd in 2019.¹

WORLD OIL OUTLOOK

According to ExxonMobil's 2017 *Outlook for Energy: A View to 2040*, oil is projected to account for 33% of the global primary energy consumption in 2040 as it did in 2016 (see Chart 1).

2017 had been an historic one for the Organization of Petroleum Exporting Countries (OPEC) and the global oil industry. It has been a period where the re-balancing of the global oil market has gathered vital momentum, buoyed by positive global oil fundamentals and underpinned by the OPEC/non-OPEC production cut agreement.

The global economy is projected to grow at 3.7% in 2018 compared with 3.5% in 2017 according to projections by the International Monetary Fund (IMF). In the longer term, global growth in the period from 2016-2040 is projected to average 3.5% per annum with most of this driven by developing countries.²

In the medium-period 2016-2022, oil demand is projected to increase by 5.7 mbd from 96.6 mbd in 2016 to 102.3 mbd. The outlook for long-term oil demand growth is more optimistic reaching 111.1 mbd by 2040 (see Table 1).

On the supply side, total non-OPEC supply is projected to grow by 5 mbd from 57 mbd in 2016 to 62 mbd in 2022. After 2022, non-OPEC growth begins to slow peaking in 2027 at 63.8 mbd before declining to 60.4 mbd by 2040 (see Table 2).

Most of the demand for oil is used for transportation. It is a sector where oil continues to face the weakest competition from alternative fuels. Between

Total OPEC supply
Non-OPEC supply
World

	2016	2020	2025	2030	2035	2040
Transportation	55.8	58.1	60.6	62.5	63.9	64.9
Industry	25.2	26.4	27.6	28.6	29.9	30.2
Other uses	15.6	16.2	16.1	16.3	16.2	16.0
World	96.6	100.7	104.3	107.4	109.7	111.1

Table 1 Sectoral Oil Demand Growth, 2016-2040

Source: OPEC 2017 World Oil Outlook 2040 / BP Statistical Review of World Energy, June 2017.

	2016	2017	2020	2025	2030	2035	2040
Total OPEC supply	38.8	38.7	40.4	41.0	44.1	47.6	50.9
Non-OPEC supply	57.0	57.7	60.7	63.6	63.5	62.3	60.4
World	95.8	96.5	101.1	104.5	107.6	109.9	111.3

Table 2 Projected Oil Supply Outlook, 2016-2040

Source: Courtesy of OPEC 2017 World Oil Outlook 2040.

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See footnotes at end of text.

Global energy mix evolves

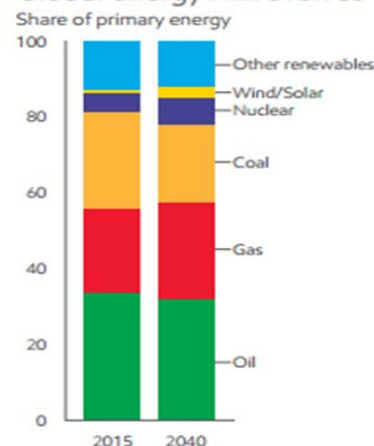


Chart 1

Source: Courtesy of Exxon Mobil 2017 Outlook for Energy

2016 and 2040, the transportation sector will account for two out of every three barrels consumed. Nevertheless, demand growth is projected to decelerate on the back of efficiency improvements driven by technological developments, a tightening of energy policies and a relatively low (albeit increasing) penetration of transportation fuelled by natural gas and electricity.³

U.S. shale oil will by far be the most important contributor to non-OPEC supply. Shale oil is projected to grow by 4.8 mbd in the 2016-2022 period before peaking after 2025.

U.S. SHALE OIL

While the U.S. shale production has enabled the United States to reduce its oil imports, there has been a lot of hype surrounding it with regard to its ability to cap oil prices, profitability of the shale oil industry and the continued rise in production.

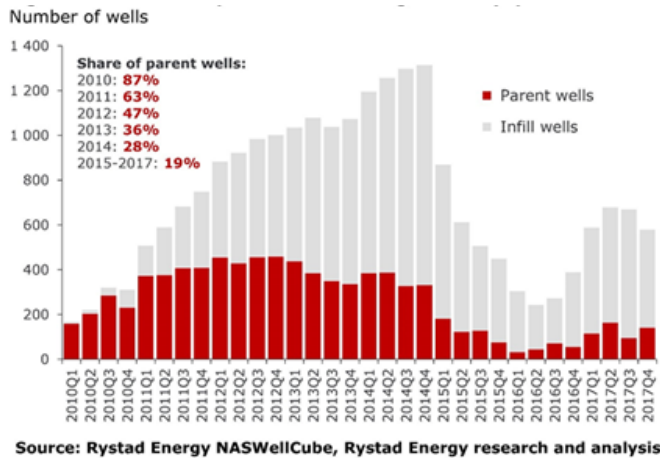
The U.S. shale oil industry will never be a profitable industry. U.S. shale oil producers are so deeply in debt that they have become like the saying of “robbing Peter to pay Paul”. They are heavily indebted to Wall Street to the extent that they continue to produce oil even at a loss just to pay some of their outstanding debts.

There is mounting pressure on U.S. shale producers from shareholders to rein in production growth and start making profits instead.

Because of a very high depletion rate estimated at 70%-90%, U.S. shale producers have to spend billions every year drilling thousands of wells just to maintain production. In so doing they sink deeper and deeper in debt. Sometime in the foreseeable future, there may not be many rich shale plays left in the United States from where to produce oil.

Still, more cracks are beginning to appear that raise serious questions about the long-term future of U.S. shale oil production.

While the U.S. shale industry has boasted of higher initial production (IP) rates from their shale wells in recent years, there is some evidence that suggests those higher IP rates do not necessarily translate into larger gains in the total volume of oil and gas that is ultimately recovered. According to Rystad Energy, an independent Norwegian-based energy research and analysis outfit, a sample of wells in the rich Eagle Ford shale basin in Texas showed that higher IP rates in recent years were offset by steeper declines than before.



Source: Rystad Energy NASWellCube, Rystad Energy research and analysis
 Figure 1 Horizontal spudded wells in Eagle Ford by quarter

The first few horizontal wells in a section are classified as “parent” wells, with follow-up completions described as “infill” wells. In the Eagle Ford, according to Rystad Energy, the makeup of spudded wells has shifted dramatically towards infill wells as many areas of the basin have been worked over. In 2010, Rystad says, “up to 90% of activity corresponded to new pad development. This share declined rapidly over time, falling to 15-20 % in 2015-2017.” As such, the rebound in output from the Eagle Ford over the past year has mostly come from infill drilling (see Figure1).

THE INCOMING OIL SUPPLY GAP

With oil prices ebbing and flowing against a background of OPEC and non-OPEC production cuts and U.S. shale oil production inching up, nobody is paying enough attention to the fast-approaching oil supply gap.

Industry experts are predicting a supply gap and rising oil prices by 2020. This is due in large part to an oil investment drought marked by three years of consecutive decline in oil prices, a statistic that has no precedent in the oil industry. Last year a report by IEA projected that if oil investment remains stagnant over the next few years, by 2020 we will see a significant hike in the price of oil. The IEA reiterated its concerns more recently in its World Energy Investment 2017 Report that the rate of new oil discoveries is at its lowest level in more than 70 years.⁴

And by 2020, 15 mbd of new oil supply may be needed to meet a projected annual average rise in global oil demand of 1.60 mbd and also offset an annual natural depletion rate in global oil production estimated by the IEA at 5% or 4.8 mbd, virtually equivalent to losing the current output of Iraq.⁵

According to the IEA, the world needs \$44 trillion in investment in global energy supply between

now and 2040 to meet the coming global energy needs with 60% or \$26 trillion allocated for oil and gas production.⁶

A lack of investment will cause oil production to decline steeply and 80% of the current new oil supply is needed to offset natural declines.

EXPANDING INVESTMENTS IN OIL & GAS IN THE MIDDLE EAST

Oil will remain the backbone of Middle Eastern economies for the foreseeable future. However, natural gas production and exports are emerging as an important and additional source of income for countries of the Middle East.

Despite depressed oil and gas prices since 2014 and concerns about the continued oil glut in the market, oil and gas producers across the Middle East and North Africa (MENA) region are investing an estimated \$294bn in projects aimed at expanding oil, gas and petrochemical's production capacities according to according to MEED Insight's 'MENA Oil and Gas Report 2017'.⁷

Iraq has been able to double its oil production capacity through one of the world's largest upstream investment programmes. Iraqi oil production has risen to almost 5 mbd between 2010 and 2016 and is projected to hit 6-7 mbd by 2020/21.⁸

Qatar is planning to boost liquefied natural gas (LNG) production capacity from its giant North Field by 30% from 77 million tons currently to 100 million tons per year. Qatar accounted for 29% of the global LNG market in 2016.⁹

The seven major oil companies in the world – Royal Dutch Shell, BP, Exxon Mobil, Chevron, Total, ENI and Statoil – need a price of \$125-\$135/barrel to balance their books. They also need certainty about the future trend of oil prices before committing themselves to huge investment in exploration and production.¹⁰

As a result of declining oil prices, the global oil industry has already sold many of its production assets and cancelled more than \$200 bn in oil & gas investments so far, which will eventually translate into a smaller share in the global oil production.¹¹

Oil production by Exxon Mobil, Shell, Chevron and ENI has declined from 11.5 mbd in 2003 to 9.5 mbd in 2015. This will be reflected in steeper oil prices in the near future.¹²

At prices much below \$75/barrel, some of the North Sea's remaining economically-recoverable reserves, estimated at 15 and 16.5 billion barrels (bb) of oil and natural gas, will end up as so-called stranded assets – hydrocarbons that are simply too expensive to develop.

Moreover, global investment in upstream exploration from 2014 to 2020 will be \$1.8 trillion less than previously assumed, according to leading U.S. consultants IHS.¹³

As for the United States, it is doubtful whether the steep decline in oil prices would provide a boost to the U.S. economic recovery. And while the price decline would certainly provide the equivalent of a sizable tax cut for U.S. consumers, it will deliver a major blow to the increasingly important U.S. oil industry which is estimated to employ around 2% of the U.S. workforce. It is also raising the risk of major defaults on the \$200 billion in loans that have been extended to the domestic shale oil industry.¹⁴

TRANSITION AWAY FROM OIL

A few experts have been projecting the advent of the post-oil era within the next fifty years.

Hardly a day goes by without another media report about the impending demise of the Internal Combustion Engine (ICE) as petroleum-powered cars and trucks are replaced by super-clean Electric Vehicles (EVs).

The media claims it is just a matter of time before EVs start to materially reduce global oil demand. They also claim that EVs are yet another reason why the decline of oil production and consumption is inevitable.

Some experts are now saying that widespread electric vehicle use could spell the end of oil. The tipping point, they reckon, is 50 million EVs on the roads. This they believe could be reached by 2024.¹⁵

However, 50 million EVs could hardly make a dent on the global demand for oil let alone replace it.

Currently, electric and hybrid cars combined number under 2 million cars out of 1.477 billion ICEs on the roads worldwide in 2015, or a negligible 0.14%. The total number of ICEs is projected to reach 2.0 bn by 2025 rising to 2.79 bn by 2040 according to U.S. Research.¹⁶

In 2016 the world used 35 bn barrels of oil (bb) of which 66% or 23 bb were used to power 1.477 billion conventional cars around the world.¹⁷ Bringing 50 million EVs on the roads will reduce the global oil demand by only 0.9 bb, or 3.9%. This will neither be the end of oil as some experts are suggesting nor a tipping point.

A tipping point for oil could only be reached once 739 million EVs (50% of the current global ICEs number) are on the roads worldwide within the next fifty years. This is impossible to achieve within that time frame. One then can only guess how many decades will have to pass before the entire global car fleet of conventional cars is replaced by electric cars.

Moreover, growth in EV sales thus far has been supported by significant government subsidies. Sales would crash once the subsidies are withdrawn according to a report in April 2017 by U.S. auto research firm, Edmunds.

Furthermore, there will be a need for trillions of dollars of investment to expand the global electricity generation capacity in order to accommodate the extra electricity needed to recharge 50 million EVs.

Other alternatives to ICEs include hydrogen fuel cells (FCVs).¹⁸ However, experts estimate it will take at least 40 years or more before FCVs could have any meaningful impact on the demand for oil.

WOULD THERE EVER BE A POST-OIL ERA FOR THE ARAB GULF OIL PRODUCERS?

For the Gulf Cooperation Council (GCC) countries - Saudi Arabia, UAE, Kuwait, Qatar, Oman and Bahrain - there would be no post-oil era ever.

Contrary to widely accepted wisdom, oil will remain an integral part of the Middle East economies throughout the 21st century and far beyond. Even if cheap alternatives to oil in transport, water desalination and electricity generation were to become readily available in the future, oil will not be left underground. The Arab Gulf oil producers will use it to power thousands of water desalination plants to generate enough water not only for drinking but also for irrigation to make the desert bloom again. They will also use it to dominate the global petrochemical industries and any industries in which oil is a feedstock.¹⁹

CONCLUSIONS

Oil is expected to remain the world's primary energy source throughout the 21st century and probably far beyond. Still, demand growth is projected to decelerate particularly in transport on the back of efficiency improvements driven by technological developments, a tightening of energy policies and a wider EV use.

And whilst experts around the world project the advent of the post-oil era within the next fifty years, it will take far more than five decades before EVs could start to make an impression on the global oil demand for transport, let alone replace it.

A post-oil era is a myth. Oil will continue to reign supreme through the 21st century and maybe far beyond.

Footnotes

¹ Mamdouh G Salameh, "OPEC & the Oil Price Will Triumph over U.S. Shale Oil in 2018", posted by the Research Centre of Energy Management (RCEM) at ESCP Europe Business School, London on the 15th of January 2018).

² OPEC's 2017 World Oil Outlook 2040, p. 2.

³ Ibid., p.15.

⁴ Mamdouh G Salameh, "Is Saudi Arabia Losing Its War of Attrition against U.S. Shale Oil?" (An article posted by the ESCP Research Centre for Energy Management (RCEM) on the 19th of September, 2016).

⁵ Mamdouh G Salameh, "Oil & the U.S. Economy" (an article posted by the ESCP Research Centre for Energy Management (RCEM) on the 7th of July, 2016).

⁶ Breakdown of Oil Consumption by Sector, GlobalPetrolPrices.com, Published October 7, 2015), accessed on 15 November, 2016.

⁷ U.S. Energy Information Administration (EIA) data (Today in Energy).

⁸ Mamdouh G Salameh, "Iraq: An Oil Giant Constrained by Infrastructure & Geopolitics" (A USAEE Working Papers Series No:13-151, published on the 25th of December, 2013).

⁹ Reuter's report on the 3rd of July 2017.

¹⁰ Mamdouh G Salameh, "What Is Behind the Steep Decline in the Crude Oil Prices: Glut or Geopolitics?" (A research Paper published by the Arab Centre for Research & Policy Studies, Doha, Qatar, June 2015).

¹¹ Fatih Birol, Qatar Today, February 2016, p. 20.

¹² Mamdouh G Salameh, "Saudi Arabia's Misguided Oil Strategy & Its Impact on Oil Prices" (A paper given at the Regional Energy Conference organized by the Arab Administrative Development Organization of the Arab League May 17-18, 2016, Cairo).

¹³ Mamdouh G Salameh, "Is Saudi Arabia Losing Its War of Attrition against U.S. Shale Oil?" .

¹⁴ International Energy Agency's (IEA) World Energy Outlook 2017.

¹⁵ Molly Lampriere, "As our carparks turn electric, at what point should big oil begin to worry?" published December 8, 2016 and accessed on powertechnology.com on 11 January 2017.

¹⁶ Green Car Reports, 7th of July 2014.

¹⁷ BP Statistical Review of World Energy, June 2017, p.9 & p.15.

¹⁸ Mamdouh G Salameh, "How Viable is the Hydrogen Economy: The Case of Iceland" (A paper given at the 28th USAEE/IAEE North American Conference, 3-5 December 2008, New Orleans, USA).

¹⁹ Mamdouh G Salameh, "No Post-Oil Era for the GCC Countries" (an article published by the Crawford School & Policy Forum of the Australian National University in April, 2016).