



OPEC and Saudi Arabia oil policy options in response to USA shale oil

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Introduction

The question facing OPEC producers, and Saudi Arabia in particular, is what level of production cut is needed to reduce the excess oil stocks? Our view is that current production of cut (approximately 1 million b/d) is inadequate and should ideally be doubled to ensure the excess stocks are eliminated by end 2017.

USA shale oil (light tight oil or LTO) poses new challenges to OPEC's ability to manage the oil market. These challenges arise from two specific characteristics of shale oil production that distinguish it from other non-OPEC production. Whilst these characteristics offer significant challenges to OPEC, analysis can also provide insight into how the oil market may be managed.

Important Characteristics of US LTO (shale oil)

- **Speed of response:** shale oil production in the USA takes about 12 months to respond to a price signal, whereas new production capacity from conventional and deepwater production can take 5-10 years to respond to a rise in oil price.
- **Response to fall in oil price:** Unlike capacity from other non-OPEC production, US shale oil can also respond to falls in oil price with a drop in production capacity – albeit with at least a 12 months time lag between price signal and production response.

The oil price drives shale oil drilling activity and drilling activity drives production. At any oil price level there is a matching production level that is different for each basin and sub area of each basin. At \$55/b, this production level is estimated to be over 600,000 b/d above current USA shale oil production levels. The increase in US shale oil in recent months is overwhelmingly in the Permian basin and the result of the price rise from a low of \$36/b in January 2016.

Like any oil accumulation, shale oil is a finite resource defined by the volume of commercially recoverable oil. There is a limit to the number of wells that can be drilled as the well spacing is constrained by well-to-well interference. Shale oil basins are not uniformly productive. There are a limited number of US shale oil basins and these are all under development – Bakken, Permian Basin, Eagle Ford and Niobrara are the principal producers. There are also a limited number of sweet spots that are commercially viable and these have tended to be preferentially developed as soon as they have been identified. Modeling analysis of US shale oil basins taking these factors into account shows that production is likely to peak between 2024 and 2030 and then decline.

There are several additional shale oil basins in Mexico, Canada and Argentina that are probably commercially viable at somewhat higher oil price than their US counterparts and will take many years to become meaningfully productive.

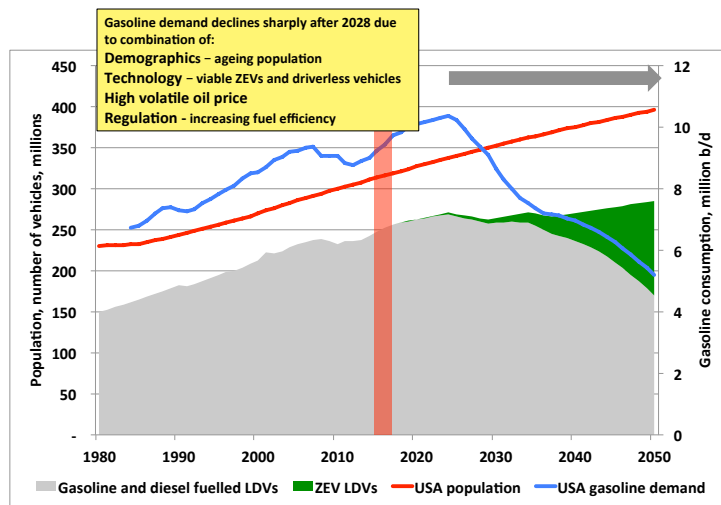
It is not possible to eliminate US shale oil production. Firstly, development and production are commercially viable at oil prices ranging from \$25 to \$100/b. Technical improvements continually reduce this cost spectrum. Secondly, consolidation and the entry of larger, better, financed companies ensure shale oil production will continue.

General View of the Supply-Demand Picture Over the next Decade

| Supply component | Average annual increment (b/d) | |
|---------------------------------|--------------------------------|------------------|
| | 2017 to 2022 | 2023 to 2030 |
| Conventional non-OPEC crude oil | (350,000) | (650,000) |
| Deepwater non-OPEC crude oil | 500,000 | 350,000 |
| NGLs | 170,000 | 150,000 |
| Non-OPEC LTO | 450,000 | 350,000 |
| Total | 770,000 | 200,000 |
| Demand | 1,300,000 | 1,300,000 |
| Call on OPEC | 530,000 | 1,100,000 |

The table above summarises and simplifies the important production increments and decrements for two time periods based on the integrated supply-demand-price model). The following points can be made:

- With the current level of OPEC production constraints (1 million b/d), the market is likely to remain just in balance or oversupplied in 2017. The return of Libya to 1.2 million b/d (plus 400,000 b/d) and some recovery in Nigeria (plus 300,000 b/d) together with new production from Iraq will be greater than the incremental call on OPEC of 530,000 b/d.
- After 2017 the situation eases but it will take a long time to eliminate the excess oil stocks. In addition, potential increments from Nigeria and Iraq will overhang the market. To be sure to eliminate the stocks in 12 months and accommodate Iraq an additional 1 million b/d of production cut is required, i.e. a total cut of 2 million b/d.
- After 2024, the combination of: low upstream investment in 2013-2022; a plateau in US shale oil; and an accelerating decline in conventional non-OPEC production will usher in a period of steadily rising oil price due to progressively tightening supply.
- Whilst the global shift to ZEV LDVs is expected to be well underway in the early 2020s, replacement of the fleet takes time and the overall numbers of ZEVs will not be sufficient to significantly impact the demand for hydrocarbon transport fuels until after 2028. For example, for the USA the central scenario has ZEVs as 10% of the new vehicle market in 2020 (up from around 1% in 2016), rising to 40% by 2030 (see the impact of this on gasoline demand in the USA in the figure below).



OPEC Policy Options

The primary objective in the short term must be to eliminate the excess oil stocks. This can best be achieved by imposing additional cuts to OPEC production of the order of 1 million b/d to a total of around 2 million b/d. Thereafter there are two policy options:

Maximize Production: This has been the policy since November 2014 with the objective of eliminating much of US shale oil production. For reasons explained above, this cannot be achieved without several years at \$30-40/b. For an average oil price of \$50/b and average production of 9.5 million b/d, Saudi Arabia's net annual oil revenues are roughly \$130 billion leaving a significant budget deficit. The expansion of US shale oil even at this price is likely to require a further OPEC production cut of 1 million b/d by 2022 just to hold this price level. This would reduce annual oil revenues to \$120 billion.

Maximize Revenues: An additional cut of 1 million b/d to OPEC production now will probably put the oil price in the \$70/b price range and will not start to impact US shale oil production until mid 2018. This level of production could be more than sustainable as demand rises to more than compensate for any rise in US shale oil production. Saudi Arabia's oil revenues at this price and production level would be much higher, around \$200 billion. To fully pursue a maximum revenues option, production could be adjusted through 2018 to achieve any desired outcome, say \$80/b. The model suggests that Saudi production of 8.5 to 9 million b/d could achieve this price level with annual oil revenues of \$220 billion.

The first option generates a price regime that is unstable to the downside for the next 5-7 years. Thereafter, the price rises steadily due to tightening non-OPEC conventional supply. Oil revenues will be below budget requirements and variable.

The second option cedes production growth to US shale oil but gets the inevitable pain over with quicker. It also eliminates the excess stocks and increases Saudi Arabia's annual oil revenues by more than \$100 billion per year. US shale oil is a finite resource and production growth will eventually decline. This is expected to be between after 2023.