
9-Nov-17 – The Intrigue At The Heart Of The Beijing-Riyadh-Washington Triangle

Description

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Saudi Aramco (the Saudi Arabian Oil Company) is the world's largest petroleum business. It owns more than 100 oil and gas fields in Saudi Arabia with reserves of at least 264 billion barrels of oil, which is estimated to be approximately one-fourth of the world's known reserves of this raw material. The company's production figures do not give the full picture, as data exists only for a few years. But as an example, in 2013 Saudi Aramco [produced](#) 3.4 billion barrels of crude oil. Analysts calculate that every year the Saudi company extracts about twice as much oil and gas, in terms of barrels of oil equivalent, as the largest US company ExxonMobil. Interestingly, Saudi Aramco never appears in the rankings of the world's largest oil producers, since it does not publish financial information such as profit, sales, assets, or market capitalization. Therefore America's ExxonMobil and Chevron, China's Sinopec and PetroChina, the Anglo-Dutch company Royal Dutch Shell, Great Britain's BP, and France's Total top the rankings. **But everyone knows perfectly well that these leaders in the global oil industry are mere dwarfs compared to Saudi Aramco.**

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Saudi Aramco's management set off a real bomb in early 2016 when they announced their plans to privatize part of the company through a stock market IPO. The proposal was to sell shares in Saudi Aramco equal to about 5% of the company. But an estimate of the company's potential market price is needed in order to understand how much this would be in absolute terms. Almost the next day after the announcement of the potential sale of part of the company (in January 2016), the global media published a stunning evaluation by the independent oil analyst Mohammad Al Sabban, a former senior adviser to the Saudi Arabian oil ministry. He estimated the company's worth at \$10,000,000,000,000 (ten trillion USD). For comparison I should add that in 2016 the largest US oil company, ExxonMobil, barely exceeded \$350 billion in share capital. And yes, It's true that later on some of the hype in the assessments died down and more rational numbers were cited, most often \$2 trillion. This meant that Saudi Arabia would be able to rake in approximately \$100 billion from the sale of 5% of the company. **But the company's biggest trump card isn't even the current record levels of oil production, but rather the reserves of hydrocarbon raw materials at Saudi Aramco's disposal.** And that's a number that none of the companies named in the rankings of the global oil industry can even begin to approach.

At present, Riyadh adjusts and verifies the data on the hydrocarbon reserves in the fields owned by Saudi Aramco. Financial reports are painstakingly drafted in the needed formats for a public offering of shares. The company is being restructured to optimize the way it is organized and managed. And finally, a crucial step was taken to lower the taxes on the company's profits. The traditional tax rate has been 90%, but this year it was set at 50%, which roughly corresponds to the level at which the leading Western oil companies are taxed. Lowering the tax rate raises dividends and makes the company a more attractive target for investment.

But beginning in early 2017, the estimates of Saudi Aramco's market value have unexpectedly begun to decline.

Appraisals began to surface that claimed the company's share capital was only worth \$1.5 trillion, then \$1 trillion. The consulting firm Wood Mackenzie [estimated](#) Saudi Aramco's worth at \$400 billion overall, bringing it closer to US-based ExxonMobil. And suddenly Western consultants began talking about the need to "discount" the value of the Saudi company, since it is state-owned, and in the securities markets all government issues are by convention sold "at a discount." They point out that although Saudi Aramco currently pays 50% of its profits in taxes, since the government owns the company anyway it could restore the 90% tax rate tomorrow with a simple stroke of the pen. There is also the fear that oil prices could be low for the next few years, and Saudi Aramco might not be able to generate big profits. **But none of that can remotely explain why the valuations of the Saudi company have dropped so precipitously in the past year.**

Analysts blame this on the pressure Washington is putting on Riyadh, for reasons that have as much to do with the currency market as the oil market. And the pressure coming from Washington is, in turn, a response to the pressure also being exerted on Riyadh by China, which wants to buy oil from Saudi Aramco in renminbi instead of dollars. China is currently the world's biggest oil importer, knocking the US out of its former first-place position. China is also the Saudi oil industry's biggest customer, and Beijing does not want to pay extra for that black gold using American currency. **A number of oil exporters that sell to China have already partially or entirely transitioned to settling their accounts in renminbi.** Topping that list are Nigeria and Iran. Russia has also recently begun to sell some oil to China for renminbi (although only small percentage as yet).

Saudi Arabia, however, is heavily dependent on the US and has thus far refused to settle its accounts in renminbi. And that rebuff is costing the country dearly: Beijing is gradually finding other suppliers to take Riyadh's place. The Saudis used to be China's biggest foreign supplier of oil, but recently Russia has squeezed them out for that number-one spot. If this continues, Saudi Aramco might lose its Chinese market altogether.

Riyadh now finds itself caught between a rock and a hard place. It's hard to imagine what Saudi Arabia could be hit with from across the Atlantic, should it sell even one barrel of oil for Chinese currency. After all, that would be a direct challenge to the petrodollar, which was born right there in Saudi Arabia in the 1970s, midwived by the negotiations between Henry Kissinger and King Faisal.

Washington has sternly warned Riyadh to refrain from any ill-considered move to replace the dollar with the renminbi in its transactions with China, lest other players in the oil market follow suit (oil might then be traded for rubles, rupees, rials, etc.) And tomorrow **that epidemic of transitioning to national currencies could infect other commodity markets.** Incidentally, this year Beijing will begin to trade oil futures priced in renminbi on its commodity exchanges and claims that this is only the first step.

Voices have already been heard within the US president's entourage that suggest blocking the listing of Saudi Aramco shares on the New York Stock Exchange. Signs have emerged of an organized campaign to short-sell the Saudi oil company. In light of that development, Riyadh has announced that it will put off its share listing until a later date. But its problem isn't going to go away – Saudi Arabia will still have to make a choice between the dollar and the renminbi.

Although **Beijing is upping its pressure on Riyadh, it is also simultaneously offering to directly buy out 5% of Saudi Aramco,** while allowing the Saudis to forgo the usual ritual of listing shares on Western stock markets. And China is prepared to shell out a "fair" price (about \$100 billion). The Chinese government has already announced that it is forming a consortium of energy and finance

companies, plus China's sovereign wealth fund, in order to purchase a "chunk" of the Saudi company. The Chinese media [reports](#) that that consortium is ready to become a cornerstone investor in Saudi Aramco.

Beijing's winning move in its chess game against Washington has neutralized the US threat to disrupt the sale of Saudi Aramco, while simultaneously **pushing Riyadh toward a decision to transition Saudi oil sales to the renminbi.**

And so the plot thickens inside the Beijing-Riyadh-Washington triangle of intrigue.

[CEOoftheSOFA Nov 3, 2017 2:42 AM](#)

Saudi Aramco is selling reserves that don't exist:

It is well known that in 2011 Wikileaks reported that the Saudi Aramco oil reserves were overstated by as much as 40%. As [reported](#) in the Guardian, Sadad al Hussini, former Saudi Aramco exploration chief, stated that "recoverable reserves are overstated by 300 billion barrels (Bbbl)" Many other oil analysts concur with this view. Saudi Aramco disputes this statement and insists that recoverable reserves are much higher than the skeptics contend. This paper will attempt to explain, in laymen terms, the oil reserve situation in Saudi Arabia.

This information is now critical because Saudi Aramco has recently announced that they intend to sell a portion of the company in an IPO. Proven reserves are typically a significant source of value for an oil company, despite the Wall Street Journal [article](#) of 24 January, 2016 which stated "Saudi Arabia's potential sale of shares in its state-owned oil giant wouldn't include the kingdom's oil reserves". The Journal article also stated that the company would be "valued in the trillions of dollars". The only way to achieve a value in the "trillions" would be to include the reserves, so it is necessary to ignore the fiction being peddled by the Wall Street Journal.

Reserves Calculation

Oil reserves are calculated by this simple equation:

Present Reserves = Initial Reserves – Production + Discoveries.

Initial Reserves

The last audited, published production and reserve calculation for Saudi Aramco was done in 1980 by BP. Production and reserve figures have been secret since then. BP calculated the proven recoverable reserves to be 260 billion barrels in 1980. This will use for the Initial Reserves. Saudi Aramco states that the current, proven, recoverable reserves are still 260 billion barrels.

Production

Figure 1, below, from the USEIA, lists the annual and total oil production from Saudi Arabia from 1980 to 2015. The production since 1980 totals 110 billion barrels.

Two of the three variables in the equation are now known with reasonable certainty:

Current Reserves = 260 – 110 + Discoveries

Discoveries

There has only been one significant oil discovery in Saudi Arabia since the 1960's, the Hawtah Trend. The problem is that the primary producing formation, the "Arab D" formation, does not exist outside the immediate Gulf area.

Hawtah Trend

The Oil Drum [reports](#) that the only oil discovery in Saudi Arabia since the 1960's is the Hawtah (Najd) Trend, discovered in 1988, which reportedly had an initial production rate of 400,000 barrels per day (BPD) from a group of nine small fields. Saudi Aramco added 30 billion barrels to their reserves in 1988 for the Hawtah Trend. It would take 2 centuries to produce 30 billion barrels at 400,000 BPD, and the field production had already declined by 50,000 BPD by the early 1990's. Extrapolating this decline rate, I estimate the field had initial reserves of 5 billion barrels.

Other Reserve Additions

Other [reported](#) reserve additions are as follows ([from World Oil Magazine](#)):

Shaybah: Discovered in 1968 but was not brought online until 1998 at 500,000 BOPD. Production was increased to 750,000 BOPD in 2009. Reserves are reportedly 14 billion barrels. Using typical decline curves, I estimate the field has proven recoverable reserves of 2 billion barrels.

Khurais: The Khurais field was discovered in 1957 and shut down in 1961. The oil reservoir had little pressure and required water injection to initiate production. In 2009, water injection was initiated which increased production to 1.2 million BOPD. Aramco assigned 19.4 billion barrels of reserves to Khurais. Using a typical decline curve, I estimate the proven, recoverable reserves of this field to be 3 billion barrels.

Manifa: Discovered in 1957 but shut down almost immediately because the oil was extra heavy and contaminated with H₂S and vanadium. The field was put on line in April 2013 and was reportedly producing 900,000 BOPD in 2014. Aramco states that the production rate will increase to 1.4 million BOPD. Aramco assigned 11 billion barrels of reserves to Manifa. Using a typical decline curve, and an initial production rate of 1.4 million BOPD, I estimate that this field has proven, recoverable reserves of 8 billion barrels.

Technology Improvements

In 1988, Saudi Aramco increased their reserves by 70 Billion barrels for "technology improvements", like horizontal drilling. The reserve number is [suspect](#) and politically motivated, according to the Oil Drum. Horizontal drilling in the KSA oil fields would only increase the short term production rate, not the reserves. It is more likely that the reserve increase was politically motivated since Aramco was negotiating with OPEC for an increased share of production. I estimate the reserve additions due to technology improvements to be zero.

All of my reserve estimates are very rough since there is very little public information available.

However, I think my estimates are closer to reality than the numbers released by Aramco. Reserve additions since 1980 are therefore $5+2+3+8=18$ billion barrels.

Remaining reserves for Aramco should therefore be in the neighborhood of:

Remaining reserves = 260 – 110 + 18 = 168 Billion barrels

Aramco still [estimates](#) the remaining proven, recoverable reserves to be 260 billion barrels, despite producing 110 billion barrels since 1980 and having few reserve additions. My rough estimate is therefore 35% less than the stated Aramco reserves. This is close to the reserve number reported by Wikileaks, who stated that reserves were overstated by 40%.

Production Rate

A number that is more important than reserves is the sustainable production rate. The sustainable production rate has a problem called “Ghawar”.

Ghawar Field

The Ghawar field was [discovered](#) in 1948, and is by far the largest oil field in the world and is 3 times the size of the second largest oil field in the world. The field has had a water production problem since the 1970's and is nearing the end of its' producing life.

The producing [formation](#) is a carbonate (limestone) called the “Arab D” formation, with a thickness of 250 feet. The formation is in the shape of an elongated dome with a length of 174 miles. Oil occupies the higher elevations of the dome. Salt water occupies the lower elevations. The field is underlain by an active aquifer which fills the lower elevations of the reservoir with water as the oil is produced from above. This helps to sustain the reservoir pressure. The Ghawar field has produced 5 million BOPD for decades and continues to produce 6% – 8% of the world's oil production.

The Aramco engineers employed a unique [method](#) of injecting water into the aquifer along the periphery of the field during the primary production phase. Water injection rates are 8 million BWPD in Ghawar to sustain oil production of 5 million BOPD. A total of 12 million BWPD is injected into all Saudi oil fields in this manner to sustain reservoir pressure, according to the book, [“Twilight In the Desert”](#).

Most Saudi oil fields were [producing](#) large volumes of water by the end of the 1970's. The Aramco engineers began an aggressive recompletion program to reduce the water production. When a well starts producing water, the water has a tendency to “crowd out” the oil due to waters' lower viscosity. Most of the producing wells had an “open-hole” completion, where there is no production casing across the producing formation. Aramco ran production casing into many wells and then perforated the upper levels of the oil reservoir in an effort to produce the oil without water. This resulted in water cuts being reduced only slightly, according to [“Twilight in the Desert”](#).

In the 1990's, the original vertical oil wells were [abandoned](#) and replaced by new horizontal wells. The new wells were drilled horizontally in the upper elevations of the oil reservoir, to keep the wells away from the encroaching aquifer.

Aramco engineers had published articles through the Society of Petroleum Engineers for decades, outlining the production problems and their remedies for controlling the problems. Each article in itself

does not indicate a significant, country-wide problem. Matt Simmons was the first to read all the articles and piece together the puzzle of the Saudi Arabian oil fields. He realized that maintaining the oil production has been a constant struggle, over a period of decades, involving the deployment of substantial capital and the employment of state-of-the-art technology. This was covered in detail in the book [“Twilight In the Desert”](#).

The Oil Drum also [estimated](#) a decade ago that the aquifer was beginning to encroach into the upper levels of the reservoir. When the water level reaches the horizontal wells, the individual wells will “water out” in a short period of time. As the water level works its way up to the upper elevations of the reservoir, the production rate will exhibit steep declines. It is of utmost importance to know the rate of decline that is expected, and when the decline will begin.

Ghawar Decline Rate

One way to [estimate](#) the production decline rate for Ghawar is to examine the decline rates for other similar fields. Oil fields completed in limestone formations tend to have higher decline rates than sandstone formations. Limestone tends to have a lot of fractures, which become super highways for water.

According to [“Twilight in the Desert”](#), The Yibal field in neighboring Oman has the most in [common](#) with Ghawar. This carbonate reservoir also has an active aquifer, with additional water injected into the lower elevations, in the periphery of the field. When the original vertical wells began producing excessive water, the wells were abandoned and replaced with horizontal wells. Engineers were shocked at the steepness of the decline rates and had to substantially reduce the expected remaining reserves of the field. The annual decline rate from peak production is 22%.

Zero Hedge reported that the Haradh field in Saudi Arabia declined by 60% between 2006 and 2010. This decline rate is 20% per year.

If Ghawar declines at a rate of 22%, production declines could be similar to the table below:

Daily

Production

Year

BOPD

Current

5,000,000

1

3,900,000

2

3,042,000

3

2,372,760

4

1,850,753

In 4 years, 3.2 million BOPD of production will be lost, just from the Ghawar field. This problem will be replicated in many Saudi fields, and many others in the Arab Gulf area. There are no new oil fields in Saudi Arabia large enough to replace this production.

When will the production rate begin to decline?

If this were a conventional oil reservoir, this question could have been answered accurately in the 1960's. The active aquifer complicates the reserves calculation, because the production rates and pressures have remained constant for decades. This is further complicated by the existence of the horizontal wells. If the wells were vertical, the increases in the water cuts could be extrapolated to the point where the well becomes uneconomic. When the water level reaches a horizontal well, production from that well will "water-out" completely in a short period of time. When the lower elevation horizontal wells start watering out, the water level will continue to rise and eventually water out the higher elevation wells. As the water level works its way up to the higher elevation wells, the field will experience steep production declines. One way to determine when this will happen is to drill observation wells to measure the water level. This data has to be input into a sophisticated computer reservoir model. Aramco has observation wells and a reservoir model that was developed in-house. Complicating the reserves calculation is the fact that field production data has been secret since 1982, as are the results of the computer model. This leaves us with having to make a guess.

The Oil Drum [reported](#) that there are indications that the level of the aquifer is starting to encroach into the upper levels of the reservoir but it's anyone's guess when the production rate will begin to decline. My hunch is that it is no longer a long term problem, it is now a short term to medium term problem. If the production rate begins to decline in 10 years, the remaining reserves for Ghawar would be in the range of 25 billion barrels and not the 70 billion [estimated](#) by the IEA.

Conclusions

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There is ample evidence which indicates the Aramco oil reserves are significantly overstated.

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Proven, recoverable oil reserves are closer to 168 billion barrels than the 260 billion barrels claimed by Saudi Aramco.

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The sustainable production rate will decline rapidly when the level of aquifer in the Ghawar field approaches the higher elevations of the reservoir. It is not known when this will occur, but it is reasonable to assume that this is a short term to medium term problem.

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In order to properly price an IPO, reserves must be audited by an independent engineering firm.

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Individual investors should ignore the Wall Street Hype Machine that will be in overdrive if this IPO becomes a reality.

CEO of the Sofa