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Saudi Arabia's oil reserves: how big are they really? Kemp

John Kemp



LONDON (Reuters) - “How much oil lies beneath the desert sands of Saudi Arabia and how long will it last before running out?” is a question that has intrigued and confounded oil experts for five decades.

Oil tanks seen at the Saudi Aramco headquarters during a media tour at Damam city November 11, 2007. REUTERS/ Ali Jarekji/File Photo

The kingdom has proven reserves of 266 billion barrels according to government estimates submitted to the Organization of the Petroleum Exporting Countries (“Annual Statistical Bulletin”, OPEC, 2015).

If these numbers are correct, Saudi Arabia’s reserves will last for another 70 years at the average production rate of 10.2 million barrels per day reported for 2015.

But there is widespread scepticism about the official estimates, which were abruptly raised without explanation from 170 billion barrels in 1987 to 260 billion in 1989

(tmsnrt.rs/29fzTm3).

Official reserves have remained constant every year since then at 260-265 billion barrels, even as the country has consumed or exported another 94 billion barrels (“Statistical Review of World Energy”, BP, 2016).

If the government data is accurate, the kingdom has managed the remarkable feat of exactly replacing each produced barrel with new discoveries or increased estimates of the amount recoverable from existing fields.

But most of the country’s giant and super-giant oil fields were discovered between 1936 and 1970 and no comparable discoveries have been made since then.

The implied increase in reserves must therefore come from enhanced estimates of the amount of oil recoverable from existing reservoirs.

The problem is that field-by-field production profiles and reserve estimates are state secrets known by only a small group of insiders, making it impossible to test or verify them.

Analyzing Saudi reserves and trying to predict when the kingdom’s production will begin to decline has been a graveyard for the reputation of professional oil analysts.

The kingdom is currently producing more oil than ever before, defying predictions that its output would peak and then fall (“Twilight in the desert”, Simmons, 2005).

RESERVE ESTIMATES

The oil industry employs a number of different ways of classifying the amount of oil available for future production.

The broadest category is the total amount of original oil in place (OOIP) in the reservoir formation before production began.

In the 1970s, there was broad agreement that the OOIP of Saudi Arabia's discovered oil fields was around 530 billion barrels.

The estimate for original oil in place was reported to the U.S. Senate's Subcommittee on International Economic Policy by executives for Arabian-American Oil Company (Aramco).

Aramco was then jointly owned by four U.S. oil companies (Exxon, Texaco, Socal and Mobil) as well as the government of Saudi Arabia so its owners and executives could be required to testify.

The subcommittee report, now nearly 40 years old, contains some of the last detailed information about Saudi reserves in the public domain ("The future of Saudi Arabian oil production", U.S. Senate, 1979).

But not all of the original oil in place can be produced technically or profitably so most analysts focus on a series of narrower measures which look at the amount of technically and economically recoverable reserves.

Proved reserves, the most conservative and prudent measure, are those which are estimated to exist, and are technically and economically recoverable, with a probability of at least 90 percent.

Probable reserves are those estimated to exist and be commercially recoverable with a probability of at least 50 percent.

Possible reserves, the most speculative and optimistic measure, are estimated to exist and be commercially recoverable with a probability of at least 10 percent.

In the late 1970s, Aramco put proven reserves at around 110 billion barrels, while the more speculative categories of probable and possible reserves were put at 178 billion barrels and 248 billion barrels respectively.

The question of which measure to use for production and planning purposes is a matter of judgment and caused controversy between the Aramco partners and the Saudi government in the 1970s.

PROVED OR PROBABLE?

Since 1980, the Saudi government has been the sole owner of Aramco. From 1982, detailed field-by-field information about the company's reserves and production has been restricted.

Saudi Arabia began reporting to OPEC that its "proved" reserves stood at around 168-170 billion barrels of crude oil.

The Saudi figure was much higher than the 110 billion barrels of proved reserves reported by the Aramco partners a few years before.

But it was very close to the figure for possible reserves that the Aramco partners had reported to the U.S. Senate.

That raised the question if the Saudis had chosen to increase their reported reserve base by reporting probable reserves as proved reserves.

In 1988/89, the proved reserve figure jumped again to 260 billion barrels despite no major new discoveries. ([tmsnrt.rs/29fzTm3](https://www.reuters.com/article/us-saudi-oil-kemp/saudi-arabias-oil-reserves-how-big-are-they-really-kemp-idUSKCN0ZL1X6)).

This was much higher than the proved figure reported by the Aramco partners but not far off the figure of 248 billion for possible reserves they had reported in the 1970s.

Again that posed the question whether the Saudis were reporting possible reserves as proved to increase the size of their reserve base.

The Society of Petroleum Engineers and the U.S. Securities and Exchange Commission have strict definitions for estimating and reporting reserves (“Guidelines for Application of the Petroleum Resources Management System”, SPE, 2011).

But it is far from clear that the “proven” reserves which Saudi Aramco has reported to OPEC employ the same definitions; because the calculations are secret outsiders have no way of verifying them.

RESERVE GROWTH

It is not uncommon for countries to produce far more oil than initial reserve estimates suggested would be possible.

Reserve increases can come from the discovery of new oil and gas deposits or from an increase in the estimated amount of oil that is commercially recoverable from an existing field.

Reserve growth from existing fields, also known as field appreciation, is one of the most important sources of increases in oil reserves in most countries.

As understanding of the reservoir increases, more information is known about its extent, and new technology and techniques become available, the amount of technically recoverable oil may rise (“Reserve growth of oil and gas fields”, United States Geological Survey, 2013).

Because the calculation of reserves is deliberately conservative, it is fairly common for reserves initially reported as “possible” to become “probable” and eventually “proved”.

But Saudi Arabia seems to have been unusually reliant on reserve growth within existing fields to revise its reserves up to 265 billion barrels and keep them there since the late 1980s.

SELLING ARAMCO

Saudi leaders have announced plans to seek a stock market listing for Saudi Aramco and make up to five percent of the company's shares available to investors.

The prospect of a partial floatation has triggered renewed interest in Aramco's reserves since they could be an important part of any valuation.

If Saudi Aramco was required to comply with the normal listing rules it would have to make much more information available about its reserves and how they are calculated.

But there are reasons to be cautious about expecting much more transparency: it is far from clear that any share sale would include ownership of the reserves in the ground.

In the meantime, no one really knows how much more oil can be recovered from beneath the Saudi desert and adjoining areas in the Gulf.

Rystad Energy, a respected consultancy, puts Saudi Arabia's proved reserves at 70 billion barrels, and its proved and probable reserves at 120 billion barrels.

If new field discoveries are included the reserve figure could grow to somewhere between 168 billion and 212 billion barrels ("United States now holds more oil reserves than Saudi Arabia", Rystad, 2016).

All these figures are substantially below the official numbers for proved reserves, though at the upper end the gap is relatively narrow.

The implication is that Saudi Arabia is relying on reserve growth from the reclassification of possible reserves and fresh discoveries to maintain its proved reserves at the same level since the 1980s.

(The opinions expressed here are those of the author, a columnist for Reuters.)

Editing by William Hardy

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