

# Big Oil Asks: Where Will Tomorrow's Oil Come From?

By Jason Simpkins

The Kingdom of Saudi Arabia is the world's leading petroleum exporter. Officially, it has reserves of about 260 billion barrels of crude oil - approximately 24% of the world's total proven petroleum reserves.

But Saudi Arabia has a problem. And it's the same one that every oil-producing nation will face someday: Its oilwells are drying up.

Saudi Arabia's largest and most productive field, the Ghawar field, produces about five million barrels a day - accounting for more than half of the kingdom's total production and 6% of total world output. But Ghawar was discovered in 1948 and has required large-scale injections of seawater to artificially pressurize the well since the 1970s. There's no telling when the last drop of oil will be purged from the biggest oil find of the 20th century, but there's no doubt Ghawar has seen better days.

As investing legend [Jim Rogers pointed out in a recent interview](#) with *Money Morning* Investment Director [Keith Fitz-Gerald](#) Saudi Arabia has claimed to have the same amount of oil it did 20 years ago, but logic seems to run contrary to that assertion.

"Saudi Arabia has announced for 20 years in a row that they have 260 billion barrels of oil in reserve," Rogers told *Money Morning* during an interview in Singapore last month. "It's astonishing. The figure never goes up and it never goes down. They have produced dozens of millions - billions - of dollars of oil in that period of time.

"If you go to Saudi Arabia, you have to wonder: 'How could this be? How could it be that every year for 20 years in a row, you always have 260 billion barrels of oil in reserve?' The Saudis say: 'You either believe us or you don't.' And that's the end of the conversation."

About 75% the Kingdom's revenue and 90% of its export earnings come from the oil industry. The oil industry accounts for 45% of Saudi Arabia's gross domestic product, compared with 40% from the private sector. Without oil, Saudi Arabia would be little more than a desert. So its absolutely imperative the Kingdom find a way to maintain its high production levels.

With all of the most productive, most accessible and most cost-efficient reserves already tapped, Saudi Arabia has undertaken one of the largest industrial projects being executed in the world today. It is spending an estimated \$15 billion on a vast network of pipes, treatment facilities, horizontal wells, and water-injection systems for its Khurais complex - a reserve expected to yield 1.2 million barrels a day.

Originally discovered in 1957, Saudi officials hoped the field would turn out to be another Ghawar but were vastly disappointed. The reserve lacks natural pressure, a key component in getting oil out of the ground. It was put into limited production in 1959 before being sidelined. It was brought back online when oil prices spiked in the 1970s and hit a brief peak of 150,000 barrels a day in 1981 before being shut down again.

"It was mainly token production, enough to help power the city of Riyadh and keep the king's palace cool," Jack Zagar, a reservoir engineer who worked on Khurais in the 1970s, [told \*The Wall Street Journal\*](#).

In 2001, reservoir engineers launched an investigation into the field's potential and found that injecting massive amounts of seawater would be the only way to generate any significant output from the field. But Khurais is located about 120 miles inland from the Persian Gulf, and more than 60 miles west of Ghawar. Hundreds of miles of pipes will be needed to transport highly filtered saltwater from the Gulf and carry oil back from the middle of the desert.

According to the *Wall Street Journal*, [Saudi Arabian Oil Co.](#), otherwise known as Aramco, spent 20 months shooting 2.8 million three dimensional images of the field's geological makeup. The company then built models to simulate how the field might respond to water injection. The water injection program will require 125 injection wells and dozens of electric submersible pumps to drive 2.4 million barrels of seawater a day into the reserve. That's two barrels of water for every barrel of oil the company hopes to extract.

"This will be the biggest smart field the world has ever seen," Nansen Saleri, Aramco's former head of management, told the *Journal*.

It will also be a very risky procedure as the water will have to be filtered down to minute particles to avoid clogging the Khurais' dense layers of rock and blocking the oil. Aramco also runs the risk of flooding the well.

"When you're injecting water into the periphery [of a field], if you hit fissures in the rock and aren't managing it well, you can have water flow in and kill a well. And a dead well doesn't flow," Saleri said.

At \$15 billion, the well will also be very expensive, but with the majority of the world's "low hanging fruit" already spoken for costly endeavors like these are the future of the oil industry. While in even the latter part of the 1990s it may have cost Aramco \$4,000 to add one barrel of daily production capacity, analysts believe it now costs \$16,000 for the same production increase.

## **Could Brazil be the "New Saudi Arabia?"**

Rising global demand is a big reason reserves are running low and prices are shooting higher. The International Energy Agency estimates that demand could climb to 99 million barrels a day by 2015, up from the 87 million barrels this year.

But the fact that there hasn't been a significant oil discovery in the last half century hasn't hurt either.

And while there may be no stemming the rise in demand, the possibility of another significant discovery, the discovery of a deposit large enough to significantly alter the world's energy landscape can't be ruled out.

In fact, just such a discovery may already have been made. Not in the Middle East or Russia, but in Brazil.

Just last week, Haroldo Lima, the head of Brazil's National Petroleum Agency, revealed the unofficial figures from a new reservoir, known as Carioca, which could hold 33 billion barrels of oil and gas. If true, Carioca would be the world's largest discovery in at least 32 years. Upon hearing the news, brokers and analysts rushed to tell their clients that Brazil, as one minister put it just months ago, was about to become the "new Saudi Arabia."

Of course, both [Jose Sergio Gabrielli](#), chief executive officer of Petroleo Brasileiro SA (PBR), or Petrobras, and Energy Minister Edison Lobao said at a press conference at Petrobras headquarters Thursday that they couldn't confirm Lima's estimate and reiterated that further drilling was needed before any estimate on volumes could be made.

Even if Lima is exaggerating, experts say even 10 billion recoverable barrels of oil (worth about \$1.2 trillion at today's prices) would be a remarkable find and enough to catapult Brazil into the world's oil-producing elite. Brazil currently has about 12 billion barrels of proven reserves, and could soon find itself nestled between Nigeria (with 36 billion barrels) and Venezuela (80 billion). **[See a related report in today's issue of *Money Morning* that details [why the price of oil still has much further to run.](#)]**

However, Petrobras has a history of playing down its discoveries and is infamous for leaking discovery data. The company downplayed the discovery of the Tupi oil field before announcing last November that the reserve contained between 5 billion and 8 billion barrels of light oil and gas.

Still the only certainty that comes with the Carioca discovery is that the oil, no matter how much there is, will be very hard to reach. The field is 170 miles offshore, more than 6,000 feet under the surface of the water trapped beneath a shelf of salt 500 miles long and 125 miles wide.

A decade ago, gaining access to such a field would have been a pipe dream (no pun intended). Just like Khurais, extraction will be a very costly process, even with today's technology.

Petrobras will have to ante up quite a bit of cash to expand its use of drilling rigs, which are in short supply. Right now, there are only 40 rigs on the planet capable of drilling into massive deep-sea salt deposits.

Petrobras has already awarded Norway's [SeaDrill Ltd.](#) contracts of up to \$4.1 billion for deepwater rigs and signed a letter of understanding with Texas' Noble for drilling contracts worth as much as \$4 billion.

Companies like Transocean Inc. ([RIG](#)) Diamond Offshore Drilling Inc. ([DO](#)), and Pride International Inc. ([PDE](#)) could also be taking orders soon, as another big Brazilian discovery and record high oil prices could lead to a massive rush on deep-sea drilling equipment. In addition to the coast of Brazil, sub-sea salt layers are also present off the coast of Africa and in the Gulf of Mexico.