

Deep-Sea Treasure: Build a Seven-Figure Portfolio with the Final Frontier for Oil & Gas Exploration

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1. The End of Easy Oil

A few years ago, the theory of peak oil became fashionable. Peak oil doesn't hold that the world is running out of crude oil in the ground; when the typical oilfield reaches its peak production capacity, less than one-third of the total hydrocarbons in place in have been extracted. Rather, peak oil holds that the global rate of production has reached its limit and can rise no further.

Although global oil output hasn't peaked yet and predicting this inflection point is always fraught with error, many of the world's major oil fields have passed or are approaching their maximum production rate. Check out this table of the world's 20 largest conventional oil fields, most of which are located in the Middle East.

Field Name	Country	Discovery Year	Production Start
Ghawar	Saudi Arabia	1948	1951
Greater Burgan	Kuwait	1938	1945
Safaniya	Saudi Arabia	1951	1957
Rumaila	Iraq	1953	1955
Bolivar Coastal	Venezuela	1917	1917
Samotlor	Russia	1961	1964
Kirkuk	Iraq	1927	1934
Berri	Saudi Arabia	1964	1967
Manifa	Saudi Arabia	1957	1964
Shaybah	Saudi Arabia	1968	1998
Zakum	Abu Dhabi	1964	1967
Cantarell	Mexico	1976	1979
Zuluf	Saudi Arabia	1965	1973
Abqaiq	Saudi Arabia	1941	1946
East Baghdad	Iraq	1979	1989
Daqing	China	1959	1962
Romashkino	Russia	1948	1949
Khurais	Saudi Arabia	1957	1963
Ahwaz	Iran	1958	1959
Gasharan	Iran	1928	1939

Source: [Rise of the State: Profitable Investing and Geopolitics in the 21st Century](#)

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As you can see, 1950 to 1970 was the Golden Age for major oil discoveries; only two of the entries on this list were discovered after 1920s. Not only have the world's giant oil fields reached maturity, but also no recent find comes close to Ghawar, Safaniya and other supergiants found during the Golden Age of oil and gas exploration.

The International Energy Agency estimates the base decline rate for global oil production at an average annual rate of a little more than 5 percent. That is, annual oil output would tumble by more than 4 million barrels per day if exploration and production companies didn't bring new fields onstream. This decline would accelerate if the energy sector didn't invest in measures to slow the inevitable fall in production that occurs as a field matures.

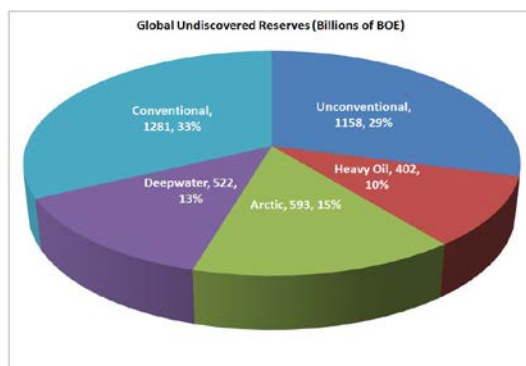
For aggregate oil output to grow, the oil and gas industry must offset waning production from existing fields. Producers have been up to the task thus far, with new developments leading to average annual output growth of 1.1 million barrels per day over the past decade. Of course, maintaining this growth is neither easy nor cheap.

Not only do the major oil and gas discoveries of recent years pale in comparison to the finds made during the 1950s and 1960s, but many of the biggest offshore fields are also located in water that's at least 10,000 feet deep.

Between 2000 and 2011, oil and gas producers discovered 380 billion barrels of oil equivalent (boe) reserves, roughly 170 billion boe of which were found offshore, including 90 billion in deep water.

According to Exxon Mobil Corp's (NYSE: XOM) [*2012 The Outlook for Energy: A View to 2040*](#), output from deepwater fields will more than double by 2040, making these complex plays the largest source of new oil supply. The oil and gas giant's forecast also calls for deepwater plays to grow from negligible levels only a decade ago to 10 percent of global oil output by 2020.

And the deep water is only one of the unconventional oil and gas plays that producers will tap in coming years. Though admittedly speculative, a recent [Energy Intelligence](#) study discussed in the September issue of the [Oil & Gas Journal](#) estimates that 4 trillion boe of hydrocarbon resources have yet to be discovered worldwide.



Source: *Oil & Gas Journal*, *Energy Intelligence*

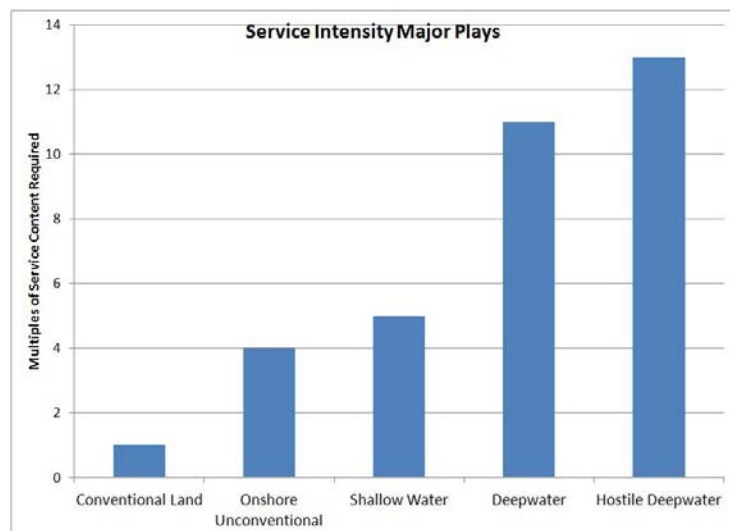
About one-third of these 4 trillion boe will be located onshore and in shallow water, while another 29 percent of future discoveries will occur in unconventional oil and gas fields such as the prolific shale basins in North America and Canada's oil sands. According to Energy Intelligence, deepwater fields account for 13 percent of these undiscovered resources and the Arctic holds another 15 percent.

Investors shouldn't overlook the coming upsurge in exploratory drilling and field development in the Arctic, particularly the Barents Sea, which has already yielded several major discoveries.

Chief among these finds is Snohvit, a natural-gas-bearing play operated by Statoil. In 2011 and 2012, the Norway-based energy giant announced a series of additional Arctic discoveries, including the Skrugard and Havis fields, which, taken together, are estimated to contain as much as 600 million boe in reserves.

What are the lessons from this exposition? Although global oil production has yet to reach its zenith, the supply of easy- and inexpensive-to-produce oil has likely peaked. To replace declining production from mature fields and grow output, producers increasingly must ramp up operations in technically complex plays that are much more expensive to develop.

The end of easy oil adds up to the start of easy profits for the oil-field services industry. As upstream operators accelerate exploration and field development in deep water and unconventional basins, the service intensity—or the amount of work required to bring a well into production—increases significantly.



Source: Bloomberg, Halliburton

Oil-field services outfit Halliburton (NYSE: HAL) estimates that unconventional oil and gas fields located onshore require three times to five times as much work as traditional wells.

Although the shale oil and gas revolution has taken the domestic energy market by storm from seemingly nowhere, geologists and oilmen long knew of the hydrocarbons trapped in these

formations. However, the technology and economic incentive to exploit these resources didn't exist until somewhat recently.

The reservoir rock in conventional fields exhibits enough porosity and permeability for the hydrocarbons to flow into the well. Shale formations, on the other hand, lack these pathways and must undergo hydraulic fracturing, a process that produces a network of cracks through which the oil and gas can flow. Hydraulic fracturing involves pumping large quantities of water and some chemicals into the formation until the reservoir rock cracks. The inclusion of a proppant—usually sand or ceramic material—ensures that these fissures remain open.

Hydraulic fracturing greatly increases production costs relative to traditional onshore wells. In the offshore market, even shallow-water developments—the source of 45 percent of all oil reserves booked in the last decade—require five times the services content as a conventional onshore field. Deepwater fields can require between 11 and 13 times this service intensity. At the same time, this increased expense is more than offset by the return: A single offshore well can produce 10 times the revenue of an onshore well.

The technical complexity of these projects limits the number of firms that compete in the deepwater market, while prices and profit margins tend to be superior to services provided at onshore developments.

As global drilling activity and oil output migrates from onshore fields to offshore and deepwater plays, demand for services increases exponentially.

2. Services Giant

With a market capitalization of \$96 billion, **Schlumberger** (NYSE: SLB) is the largest of the Big Four oil-field services companies and more than three times the size of Halliburton (NYSE: HAL). The firm is the No. 1 services outfit in every major oil- and gas-producing region, with the exception of North America, where it ranks second to Halliburton.

Although the Big Four all boast global footprints and diversified business lines, each has built a reputation for its expertise in specific product categories. Within the industry, Schlumberger is known for its commitment technological innovation, strong presence in international markets relative to its peers and leadership in services related to exploration for new oil and gas fields.

The company generates more than 90 percent of its annual revenue and net income from three primary business lines: drilling, reservoir characterization and reservoir production. In 2011 reservoir characterization accounted for a little more than one-quarter of Schlumberger's total sales and more than one-third of net income.

With a pretax operating margin of 28.2 percent, this division is by far the firm's most profitable business segment; drilling posted an 18.4 percent operating margin, while reservoir production's margins came in at 16.4 percent.

Within the reservoir characterization segment, Schlumberger's WesternGeco subsidiary has

driven results in recent quarters. Acquired in 2006, WesternGeco is the industry leader in marine geophysical services, a business line that's critical to oil and gas companies' exploratory efforts in the deep water.

By emitting sound and pressure waves and tracking their subsequent reflections, WesternGeco's fleet of specially designed vessels accumulates data about the positioning of subsurface rock formations to identify areas that are prospective for oil and natural gas.

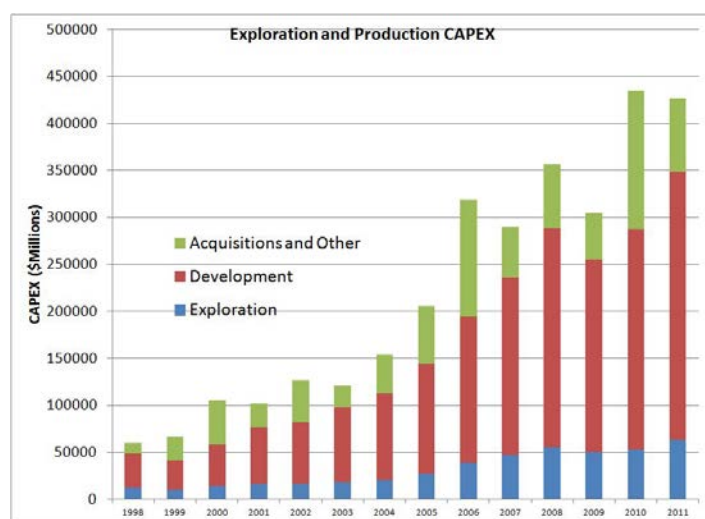
Schlumberger's most recent innovations in this space enable the firm to render highly detailed, three-dimensional models of geological formations. This data is highly prized by exploration and production firms, which rely on seismic information to determine the best locations to drill exploratory wells.

As an ancillary business, Schlumberger provides technology and software to analyze the raw seismic data and consulting services to help customers formulate their drilling and development plans. With prevailing charter rates on ultra-deepwater drillships exceeding \$600,000, high-quality geophysical data is critical to saving money and avoiding every oil company's nightmare: the dry hole.

Schlumberger's reservoir characterization division also offers a suite of wireline open-hole services, a product category that comes into play before a new well is completed. By lowering advanced sensors into the well at various depths, the wireline operator can collect a wealth of environmental data and identify the most productive zones.

Fortunately for Schlumberger's reservoir characterization division, we're entering the sweet spot for spending on exploration-related services.

In a typical cycle, spending by exploration and production companies picks up as commodity prices begin to recover. This pattern last played out in 2003-04, when oil prices began to rally in the wake of the 2001 recession.



Source: Bloomberg

Early in the recovery cycle, oil and gas companies allocate spending to their existing fields, as

this is the least expensive and risky way to grow production.

This pattern explains why spending on production-related services grew more quickly in the first two years of the industry's 2002-08 up-cycle and in 2010 and 2011, the first two years of the next bull market for oil-field services.

Schlumberger's management team noted that investment in exploration picked up significantly in the back half of 2011. That momentum has continued into 2012, fueled by promising discoveries offshore East and West African and in Norway's portion of the Barents Sea.

If the current up-cycle for oil-field services plays out in a similar fashion to 2002-08, spending on exploration should exceed capital expenditures on production for at least two to three years—a boon for Schlumberger.

Consider that from the end of 2003 to the end of 2006, shares of Schlumberger returned 138 percent, compared to the 115 percent gain posted by the Philadelphia Stock Exchange Oil Service Sector Index and the S&P 500's 35 percent return.

The drilling segment offers a robust suite of products and services, from drill bits to deepwater cementing, and accounts for about one-third of Schlumberger's annual revenue and slightly less than one-third of its net income.

The company's M-I SWACO subsidiary specializes in drilling fluid, a critical component when drilling a new well. Drilling fluid, often called drilling mud, is pumped into the well to counteract the well pressure and prevent hydrocarbons from gushing into the environment. Faulty drilling mud can be disastrous for an exploration and production company. If the mixture is too dense for the application in question, the drilling process may be impeded. In a worst-case scenario, the mud could enter the formation and clog the pores and fissures through which the hydrocarbons flow. On the other hand, drilling mud that lacks sufficient heft can lead to a blown-out well.

Reservoir production accounts for the remaining third of Schlumberger's annual revenue. This unit includes pressure-pumping services and coiled tubing, a spooled pipe that's used to conduct well maintenance, repair and optimization.

In addition to Schlumberger's exposure to deepwater exploration and development, we also like the firm's geographic footprint; the company generates a little more than one-third of its revenue in North America, compared to 58 percent for Halliburton, 46 percent for Weatherford International (NYSE: WFT) and 55 percent for Baker Hughes (NYSE: BHI).

With the permitting process finally returning to normal in the Gulf of Mexico, offshore drilling activity should continue to accelerate, bolstering Schlumberger's margins and offsetting pricing pressure in the onshore market.

Schlumberger's business mix and geographic diversification make it the best-placed of the Big Four oil-field services companies to profit from the cyclical upturn in exploration spending and

the end of easy oil. Please consult the *Energy & Income Advisor* [website](#) for our most up-to-date buy target on Schlumberger.

3. Drilling for Dollars

Contract drillers own fleets of drilling rigs—equipment used to sink oil and gas wells—and lease these units to exploration and production companies under term contracts that guarantee a daily fee.

We prefer contract drillers that specialize in offshore drilling, as these rigs are usually more complex and expensive to produce than units designed for onshore operations.

SeaDrill (NYSE: SDRL) boasts one of the world’s largest fleets of modern, high-specification offshore drilling rigs. The Norway-based firm owns 66 rigs, 48 of which are operational and 18 of which are under construction. By far, the company’s most important assets are its 14 deepwater semi-submersible rigs and its 10 drillships.

Rig Name	Type	Year Built	Water Depth	Available for Contracting
West Alpha	Semi	1986	2,000	Aug-17
West Venture	Semi	2000	2,600	Jul-15
West Phoenix	Semi	2008	10,000	Jan-15
West Eminence	Semi	2009	10,000	Jul-15
West Hercules	Semi	2008	10,000	Nov-17
West Aquarius	Semi	2009	10,000	Jun-17
West Sirius	Semi	2008	10,000	Jul-14
West Taurus	Semi	2008	10,000	Feb-15
West Orion	Semi	2010	10,000	Jul-16
West Capricorn	Semi	2011	10,000	Aug-19
West Pegasus	Semi	2011	10,000	Aug-16
West Leo	Semi	2012	10,000	May-16
West Mira	Semi	Q1 2015	10,000	No Contract
West Rigel	Semi	Q1 2015	10,000	No Contract
West Navigator	Drillship	2000	7,500	Jun-14
West Polaris	Drillship	2008	10,000	Oct-17
West Capella	Drillship	2008	10,000	Apr-17
West Gemini	Drillship	2010	10,000	Sep-17
West Auriga	Drillship	1Q 2013	12,000	Sep-20
West Vela	Drillship	2Q 2013	12,000	Dec-20
West Tellus	Drillship	3Q 2013	12,000	No Contract
West Saturn	Drillship	2Q 2014	12,000	No Contract
West Neptune	Drillship	2Q 2014	12,000	No Contract
West Jupiter	Drillship	3Q 2014	12,000	No Contract

Source: *SeaDrill*

Including SeaDrill’s order book, the company’s deepwater rigs have an average age of two years, compared to seven years for Ensco’s (NYSE: ESV) deepwater fleet and 15 years for Transocean (NYSE: RIG).

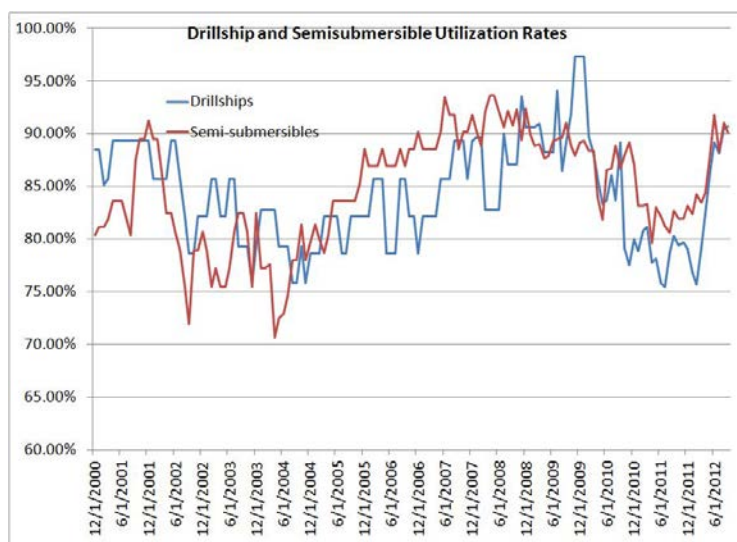
SeaDrill’s modern fleet is a major competitive advantage. Not only does the company’s fleet require less downtime for costly maintenance and upgrades, but the state-of-the-art equipment housed on its newer rigs can also handle the rigor of drilling wells that are 30,000 feet long in water depths of almost 2 miles. SeaDrill’s management team estimates that 21 percent of

deepwater rigs are more than 25 years old; these rigs lack the capabilities needed to operate in complex deepwater projects plays.

Moreover, the massive oil spill that occurred in the Gulf of Mexico in summer 2010 prompted producers to favor rigs with modern blowout preventers (BOP), a critical piece of equipment that shuts down a well that's gushing uncontrollably. The industry is also gravitating toward newer vessels that can accommodate two BOPs, a redundancy that can help to limit downtime.

SeaDrill's in-demand deepwater fleet has amassed a \$15.1 billion backlog of signed contracts, some of which extend to the end of 2020. The majority of these fixtures are with major international and national oil companies, which reduces the risk of default.

The supply-demand balance for deepwater rigs remains sanguine; for the first time in almost three years, the utilization rates (the percentage of the global fleet that's working) on drillships and semisubmersible units exceed 90 percent.



Source: *Bloomberg*

Ultra-deepwater rigs are extremely expensive to build, which should ensure that the supply-demand balance for these units remains tight.

Rising demand coupled with constrained supply means that day-rates contract drillers earn on their high end rigs will continue to climb. Although SeaDrill has booked all its available capacity for 2013, the firm has six vessels that are under construction and are slated for delivery in 2014 and 2015. The fixtures for six of the firm's existing deepwater rigs will expire in the next two years.

Recent contract terms suggest that SeaDrill's available capacity will be able to secure elevated day-rates. The company recently inked an agreement for two of its undelivered drillships that promises an average day-rate of \$565,000 and runs through 2020. Management teams throughout the industry have indicated that operators are seeking to secure capacity well in advance of vessels' availability dates.

We also expect a tightening supply-demand balance in the market for premium jack-up rigs--shallow-water units with advanced capabilities--to drive additional upside for SeaDrill. With 21 of these units in its fleet, the company boasts the largest, youngest fleet of these rigs. SeaDrill has a \$2.5 billion backlog of contracts for its jack-up fleet.

The Norway-based contract driller also controls more than half the global market for tender rigs, or support vessels for offshore exploration and development. These ships have a contract backlog of about \$2.5 billion.

SeaDrill remains our favorite play on rising day-rates for ultra-deepwater rigs because of its high yield, growing quarterly dividend and predictable stream of cash flow. **Consult the *Energy & Income Advisor* [website](#) for our most up-to-date buy target on SeaDrill.**