



CHINA'S SHALE GAS: 5 Big Winners in a Growing Industry

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One of the ongoing political and social considerations in the US has long been energy security and independence. Almost anyone who cares to take a look at the world today will have no problem realizing why this issue is, and will remain, so important.

Like the US, China also aims to improve its energy security as its economy continues to grow. The relatively latest iteration of this strategy has been the country's increased attention to shale-gas projects, with the government setting ambitious growth targets for this particular sector of the energy industry.

Oil, for now, remains the primary source of energy in China, with the country expected to import ten percent of annual global oil production sometime in the next seven years. Since most of this oil comes from abroad, the Chinese authorities aim to avoid being totally dependent on foreigners for natural-gas supplies, too.

Currently, gas plays a minor role in China's primary energy use, representing about four percent of the total. It has been estimated that without shale production, China could be 50-percent dependent on imported gas by 2020, something the Chinese prefer to avoid.

If China does not substantially increase its domestic gas production, then it is expected to have a gas shortage of about 60-billion cubic meters per year by 2020. And this will be a drag on its economy.

The country's five-year plan calls for China to accelerate the exploration-and-appraisal phase for domestic shale-gas production. The hope is that this will translate into an aggressive production ramp-up during 2016-20.

According to the US Energy Information Administration, China's technically recoverable shale-gas resources may be 36-trillion cubic meters (1,267tcf). But according to China's National Energy Administration estimates, the recoverable reserves are about 25tcm.

Technically recoverable shale gas resources (tcm)	
China (EIA)	36
China (NDRC)	25
USA	24
Argentina	22
Maxico	19
S. Africa	14
Canada	11
Libya	8
Algeria	7
Brazil	7
Poland	5
France	5

source: EIA, NDRC

China's government set ambitious targets for the industry by aiming for between 60-billion and 100-billion cubic meters of production from shale by 2020. If these targets are met, then import gas dependency is expected to fall to 20-30 percent.

The view here is that although 100-billion cubic meters by 2020 is an unrealistic target, the country could achieve the low-end goal of 60-- cubic meters. Such an achievement requires extremely strong growth after 2016 and hitting the interim target of 6-billion to 7-billion cubic meters of shale-gas production by the end of 2015.

The above targets can be missed easily, but the important point from an investor's perspective is that China is serious about shale-gas production and will channel money toward it.

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As a result, companies involved in these efforts should reap long-term benefits. Nevertheless, the process is expected to be a long one, meaning investors will do best by putting their money in the real beneficiaries of the shale-gas boom in China. In other words, stock selection is of paramount importance. All the while, investors must stay positioned on the right side of the trend and not be distracted by the time required for the investment trend to fully develop.

Shale-Gas Technology

Shale gas is natural gas extracted from gas-rich rocks known as shale. Shale is often found in layers in the ground and at a greater depth than conventional gas and coal-bed methane (CBM).

For example, the average depths of Sichuan (in the south) and Tarim (in the west) basins, which are two of the most promising for shale gas, are 3,000-4,000 meters (10,000-13,000 feet).

There are three main technologies used in shale-gas exploration: Horizontal drilling, hydraulic fracturing (fracking), and micro-seismic technology.

Horizontal drilling enables the well to have more touch points with the shale formation. Shale formations can lie under hundreds of square kilometers of surface area. The thickness of the formation may be only 300 to 1,000 feet, but horizontal wells can stretch up to 10,000 feet along the formation. This added reach allows for an increase in the recoverable gas.

Hydraulic fracturing, or fracking, is the process where millions of gallons of water are pumped into a well at high pressure. More than 98 percent of the frack fluid is water, but other chemicals may be mixed with it. The high pressure induces cracks in stages along the well. Sand or ceramics are used to keep the cracks open, allowing the gas to flow into the well.

Micro-seismic technology provides a 3D view of the work that takes place during fracking. The technology can measure the seismic waves generated when fractures form, detect how fractures spread, and whether oil and gas are present. Micro-seismic technology has proven to be a superior way to monitor fracking operations.

Furthermore, compared to the traditional way of using "down-hole" tools, the new technology allows for a better understanding of the potential of the well. And at the same time, it is less invasive and less expensive.

The Challenges

The biggest, if not short-term, challenge regarding China's shale-gas industry is the fact that until today, relatively few wells have been drilled: During the past three years,

35,000 shale wells were drilled in the US, while the number China drilled is closer to 100.

As a result, there is a relatively low level of knowledge, for both domestic and foreign companies, to the peculiarities of China's shale resource base. Consequently, ramping up production could prove a little more difficult than envisioned. But as geological knowledge increases, a better understanding of China's shale resource base will be gained.

A second potential problem is water. The US experience shows that a multi-stage horizontal well requires 4-million to 5-million gallons of water. China's main shale-gas basins are in low-precipitation areas. Of the three major prospective shale-gas basins, only Sichuan is in a "mild-precipitation" area, while Tarim and Ordos basins are in "low-rainfall" areas.

Looking toward the end of the decade, keep in mind that the Chinese will have to find ways to secure sufficient water supply for multi-stage fracturing as shale-gas production in the country increases.

Finally, China lags behind the US in terms of gas-pipeline reach. Currently, China's has about 30,000 miles of gas pipelines, while the US is closer to 250,000 miles. If the Chinese are to make shale gas a viable form of energy, then they need to extend their pipeline system to at least 100,000 miles before 2020.

So, while investing in the upcoming shale-gas boom in China, keep in mind that Chinese infrastructure will need to continue to improve and expand to encompass larger areas of the country.

This realization makes investing in related sectors a very interesting alternative, as well, but the major leverage will be achieved by allocating some funds into the following companies.

What to Buy

■ **Schlumberger (NYSE: SLB)** is the world's largest provider of oilfield services and equipment. The company has the top spot across most of its product lines and earnings almost double its closest competitor.

The company derives 70 percent of revenues from overseas, and it is the biggest foreign player in the Chinese market with more than two-percent revenue share of the local oil-services market.

SLB has been a major player in China for the past ten years and employs 1,700 people there. According to industry reports, SLB has fracked the majority of the roughly 60 shale oil and gas wells drilled in China so far.

The company integrated itself even further into the Chinese market when it recently bought a 20-percent stake in Anton Oilfield Services, a Beijing-based



oil-services company. SLB has worked with Anton since 2010, when the companies signed a cooperation agreement on drilling fluids and well-cementing services.

That said, the view here is that, overall, China's domestic service providers are not mature enough to carry out large-scale shale-gas development. In areas such as long-distance horizontal wells and exploration, China still relies on international service companies like SLB.

Given its relatively long and successful presence in China, Schlumberger is well positioned for a potential shale-gas boom in China, although this should be viewed as a long-term positive for the company.

› Schlumberger is a buy up to USD85

■ **Anton Oil (HK: 3337)** is a leading independent oilfield service provider in China. The company provides multi-stage fracturing services to its customers, along with other services such as well-completion and drilling technology.

In 2011, Anton Oil completed one multi-stage fracturing service to CNPC's shale-gas horizontal well in Sichuan, which was one of two shale-gas horizontal wells drilled in China last year. This year, Anton secured one horizontal-well fracturing contract with Sinopec.

Anton reported first-half net profit of USD20 million, an increase of 145 percent on a yearly basis. Anton has secured new orders from Sinopec, as mentioned above, and Yanchang Petroleum, as well as several other high-value contracts in China. Outside China, Anton has entered the Iraqi and South American markets.

As with Schlumberger, owning Anton offers the opportunities to participate in China's efforts in the unconventional and generally more challenging types of oil and gas development and the demands of modern oilfield services and equipment.

A domestic independent company such as Anton is a more leveraged play on this investing theme, as well as on the rise of smaller energy-related companies that participate in China's energy game.

› Anton Oil is a buy in the Hong Kong market up to HKD7

■ **China Petroleum & Chemical - Sinopec (NYSE: SNP)** is one of China's major energy companies and Asia's biggest refiner. It plans to become one of the major local players in the shale-gas business in China. The company's upstream capex budget for 2012 has most of the money going toward unconventional gas development.

Sinopec owns three shale-gas blocks that cover 17,000 square kilometers, in addition to blocks overlapping with its oil and conventional gas blocks.

The company announced in June 2012, that it started development of its shale-gas project in the Peiling block in Sichuan, aiming to produce 0.3-billion to 0.5-billion cubic meters of shale gas by the end of 2012 and one-billion cubic meters by 2013. It also plans to increase its shale-gas output to at least two-billion cubic meters a year by the end of 2015, which would account for about one-third of the country's targeted production.

As Sinopec has the weakest upstream business among all Chinese majors, its involvement in the shale oil and gas business is of big importance due to management's focus on restructuring and improving the company's oilfield-services division.

This division, once it becomes strong enough, could even become a separate entity and listed on the stock market, becoming a high-growth energy company.

› Offering a 4.5-percent yield, Sinopec is a buy up to USD130

■ **Honghua Group (HK: 0196)** is the largest listed land-rig manufacturer in China, and one of the world's largest in terms of capacity, producing about 120 rigs per year.

Although the majority of Honghua's land-rig production is made for conventional oil and gas drillings, the company has the technology and expertise to produce rigs for shale-gas exploration and drilling. Last year, Honghua sold three shale rigs to Shell for shale exploration in Sichuan.

The stock has had a strong run this year, from depressed levels, up 115 percent and offers a 2.4-percent dividend yield. Given that foreign operating companies are encouraged and many times required to source some of their needs from local companies in China, a well recognized Chinese player like Honghua should be one of the big beneficiaries.

› Buy Honghua in Hong Kong up to HKD4

■ Besides, **Royal Dutch Shell plc (NYSE: RDS A), BP (NYSE: BP), Total (NYSE: TOT), Exxon (NYSE: XOM), Statoil (NYSE: STO), and ConocoPhillips (NYSE: COP)** are some of the other major energy companies in the race for securing a piece of the shale-gas business in China.

But Shell is the world's major oil company and currently is in the best position to benefit from the shale-gas business growth in China. The company plans to invest up



to USD5 billion in China's unconventional gas during the next three years.

Shell is working to convert its agreement with PetroChina (NYSE: PTR) into a Production Sharing Contract (PSC) for the Fushan-Yongchuan shale-gas area in Sichuan. Currently, it's awaiting final approval.

So far, 15 shale wells reportedly have been drilled, with Yang 101 + 102 each producing an average of 100,000 cubic meters per day (3.5-million cubic feet per day) on the 3,500 square kilometers Fushan block. Shell has said the drill program is for 500 to 1,000 wells. The company already has purchased three shale-gas rigs from Honghua and is expected to use 30 fracking units in the Fushan block.

Shell also works with CNOOC in the Anhui province. The two companies signed a joint study agreement (JSA) that has Shell providing technical assistance to CNOOC to explore for shale gas. Shell also signed a trial agreement in Henan for the Xuishan block of shale gas.

› **With a dividend yield of 5 percent, Royal Dutch Shell is a buy up to USD75**
