World Well Stimulation Materials

Industry Study with Forecasts for 2017 & 2022

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World demand to rise 12% annually through 2017

World demand for well stimulation materials is projected to increase more than 12 percent per year to over 65 million metric tons in 2017, valued at $23 billion. Hydraulic fracturing and acidizing have both been used for decades to boost production, especially in aging or damaged oil and gas wells. However, in recent years the combination of multi-stage hydraulic fracturing with horizontal drilling technologies has enabled the development of resources previously considered technically or economically unfeasible.

Increased activity in these unconventional production areas has dramatically boosted sales of proppants and the fluids used to deliver them into downhole fractures. These fluids, comprised of gelling agents, friction reducers, specialty additives, and other chemicals, are generally formulated for specific wells. Demand in these and similar regions is driven by high oil prices, which spur drilling activity; and by the depth and challenging geology of these wells, which require greater amounts of proppants and chemicals to complete.

Although oil and/or natural gas are produced in most countries, four countries -- the United States, Canada, China, and Russia -- account for a large majority of well stimulation materials demand. These countries not only drill the most wells but also have large, older oilfields in which stimulation technologies have been proven to increase output. Outside the four major markets, acidizing is often the preferred stimulation method, particularly in carbonate formations.

Proppants to retain largest share of demand

Proppants will continue to account for the largest share of demand in volume terms, more than 80 percent in 2017. Uncoated sand accounts for the great majority of proppants used in the US and Canada. In these countries, ceramic proppants are used mainly in wells with higher closure pressures and other challenging environments. In contrast, ceramic proppants are the leading proppant type in the Chinese and Russian markets. In these countries, well depths and pressure often favor the use of ceramic proppants. Moreover, these countries do not have sufficient supplies of sand with the necessary performance properties to be used in hydraulic fracturing.

Trends in chemical consumption will be influenced by fluid formulation trends. Gelled fluids will continue to account for a large share of the market, which will sustain demand for such products as gelling agents, crosslinkers, and breakers. In the US and Canada, growing use of “slickwater” formulations that have lower overall ingredient loadings will boost demand for friction reducers, biocides, and corrosion inhibitors.
China has been investing heavily in oil exploration and development projects in other countries in recent years, in part to reduce their reliance on coal, which continues to account for a large majority of the country’s energy requirements. These initiatives have included onshore fields and deepwater resources offshore. A number of these investments are in politically and economically unstable countries such as Nigeria and Sudan, but they have also included such moves as the recent acquisition of Nexen (Canada), which was finalized in early 2013. China remains a net importer of oil, with Saudi Arabia, Angola, Iran, Iraq, and Oman the leading import sources. In addition to well publicized attempts to secure oil and gas pipelines from Russia and Kazakhstan, China has gained concessions in Azerbaijan, Canada, Iraq, Iran, Peru, and Venezuela.

Natural gas production in China is expected to increase almost 11 percent annually through 2017 to 6.3 trillion cubic feet. Historically, natural gas has had a limited role in China’s energy mix (less than four percent currently), but environmental concerns and the rapidly growing demand for electricity have substantially boosted demand and will continue to do so. China has embarked on numerous infrastructure expansion programs to enable increased natural gas production, most of which involve constructing pipelines from the western and northern producing areas in Xinjiang, Qinghai, and Shanxi to eastern cities. The Twelfth Five-Year Plan includes production objectives that would allow for natural gas to provide 10 percent of China’s energy needs when completed. Natural gas production along China’s coast is also expected to contribute to these production increases. Overall, it is hoped that 20 percent of China’s natural gas production will be from unconventional sources by 2030. Despite these production increases, China will remain dependent on imported natural gas in the short term.

In the longer term, unconventional resources such as coalbed methane (CBM) and shale gas production hold particularly strong prospects.
## COMPANY PROFILES

**FORES LLC**
21 Frunze Street
620142 Ekaterinburg
Russia
7-343-257-75-77
http://www.foresltd.com

- **Annual Sales:** $165 million (estimated)
- **Employment:** more than 2,000 (estimated)
- **Key Products:** ceramic proppants

FORES is a privately held manufacturer of ceramic proppants for use in the oil and gas industries. The Company also operates a chemical division to provide consulting services and supply pilot and custom formulated products.

FORES participates in the world well stimulation materials industry through the manufacture of ceramic proppants to boost hydrocarbon production and recovery rates in oil and gas well fracturing applications. FORES is among Russia’s leading proppant suppliers. The Company’s proppants are available under the FOREPROP, FORES MGLIGHT, and FORERCP brand names. FOREPROP high strength ceramic proppants are produced in mesh sizes of 10/14, 12/18, 16/20, 16/30, and 20/40. These proppants are sold primarily in Russia, although certain mesh sizes are available in North America. The Company’s FORES MGLIGHT intermediate strength ceramic proppants are specifically designed for the North American market and encompass mesh sizes of 20/40 and 30/50. FORERCP resin-coated proppants comprise FOREPROP and FORES MGLIGHT products with a resin coating. These products are offered in North America.

### TABLE VII-3

**CHINA: PROPPANT DEMAND**

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<th>Item</th>
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<td>Well Stimulation Material Demand</td>
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**Shale Gas & Tight Oil: Products & Services**
This study analyzes the US shale gas and tight oil product and service industry. It presents historical demand data for 2002, 2007 and 2012, and forecasts for 2017 and 2022 by product (e.g., tubular goods, downhole tools, drill bits and reamers, stimulation products, drilling fluids), service (e.g., pressure pumping, drilling, completion and production), region and play (e.g., Haynesville, Marcellus). The study also considers market and demand factors, details industry structure, evaluates company market share and profiles industry players.
#3112 ............... February 2014 ............... $5200

**Oilfield Chemicals**
US demand for oilfield chemicals is forecast to increase 2.1 percent annually through 2017 to $10.5 billion. EOR products and drilling fluid products will grow the fastest. Gains in value terms will be strong for commodity and specialty chemicals as well as gases, while demand for polymers will decline. This study analyzes the $9.5 billion US oilfield chemical industry, with forecasts for 2017 and 2022 by application and product. The study also considers market environment and technology factors, evaluates company market share and profiles industry players.
#3065 ............... November 2013 ............... $5100

**World Oil & Gas Pipe**
World oil and gas pipe demand will rise 5.3 percent annually to 51.8 million metric tons in 2017 as high oil prices and growing energy demand spur new development. Gas pipe will grow at nearly four times the rate of oil pipe demand. Central and South America and the Asia/Pacific region will grow the fastest. This study analyzes the 40.1 million metric ton world oil and gas pipe industry, with forecasts for 2017 and 2022 by material, diameter, world region, and for 23 countries. The study also evaluates company market share and profiles industry participants.
#3060 ............... October 2013 ............... $6100

**Proppants in North America**
North American proppant demand will grow 11.6 percent annually to over 100 billion pounds in 2017. Raw sand will remain the dominant type and will grow the fastest. Ceramic proppants will be limited to areas requiring high performance products. The US will continue as the dominant market while Canada will grow the fastest. This study analyzes the 59.1 billion pound proppant industry in the United States and Canada, with forecasts for 2017 and 2022 by type, region, state and province. The study also evaluates company market share and profiles proppant suppliers.
#3048 ............... August 2013 ............... $5100

**World Oilfield Chemicals**
World demand for oilfield chemicals is expected to increase 8.9 percent annually to $28 billion in 2016. The US will remain the largest market based on its many mature wells and rapid growth in horizontal drilling and hydraulic fracturing. Brazil will be the fast-est growing market. Drilling fluids and completion and workover fluids will lead gains. This study analyzes the $18 billion world oilfield chemical industry, with forecasts for 2016 and 2021 by product, world region and for 44 countries. The study also evaluates company market share and profiles industry participants.
#2973 ............... December 2012 ............... $6200

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