

In Fracking, Sand Is the New Gold

Energy Boom Fuels Demand for Key Ingredient Used in Drilling Wells; 100 Sand Mines in Wisconsin

By Alison Sider and Kristin Jones
Dec. 2, 2013 7:49 p.m. ET

The race to drill for oil in the U.S. is creating another boom—in sand, a key ingredient in fracking.



A conveyor at a Pattison Sand Co. mining operation in Iowa. Stephen Mally for The Wall Street Journal

Energy companies are expected to use 56.3 billion pounds of sand this year, blasting it down oil and natural gas wells to help crack rocks and allow fuel to flow out. Sand use has increased 25% since 2011, according to the consulting firm PacWest, which expects a further 20% rise over the next two years.

In Wisconsin, the source of white sand perfectly suited for hydraulic fracturing, state officials now estimate more than 100 sand mines, loading, and processing facilities have received permits, up from just five sand mines and five processing plants operating in 2010.

And the stocks of publicly traded companies that deal in sand have soared. Shares of Houston-based [Hi-Crush Partners HCLP -0.50%](#) LP have jumped 59% since it began trading in August 2012. Shares of [U.S. Silica Holdings Inc., SLCA +2.10%](#) based in Frederick, Md., have doubled since it went public in 2012, giving it a stock market value of \$1.9 billion.

Less than a decade ago, U.S. Silica focused on sand for industrial and consumer products—plate glass for windows and, more recently, glass for [iPhone](#) and iPad screens. Now those uses account for just half the sand the company digs out of its open pits and even less of revenue.

During the first nine months of this year, the more than \$245 million in sand sold to energy companies accounted for 62% of U.S. Silica's sales, up from 53% during the same period in 2012 and 33% during the first nine months of 2011.

Hydraulic fracturing is the process of pumping a mixture of sand, chemicals and water down a well at high pressure to break up dense rock formations so that oil and gas can flow to the surface. The sand left behind in the fracking process props open those tiny pathways so trapped fossil fuels can escape.

Railroad operators are carrying boxcars filled with sand to shale fields including the Permian Basin of West Texas and New Mexico, the Bakken formation of North Dakota and the Marcellus Shale of Pennsylvania.

While some of these places might seem to have plenty of sand of their own available, many fracking outfits prefer Wisconsin white sand, which is bigger and has rounder grains better suited for holding open larger pathways.

Union Pacific Railroad shipped 94,000 railcars of frack sand in the first half of the year—a 20% increase over the same period of 2012.

Canadian National Railway Co. is spending \$68 million over three years to upgrade and restore more than 100 miles of track in Wisconsin so it can boost sand shipments out of state.

U.S. Silica and BNSF Railroad are building a sand distribution hub south of San Antonio, at the edge of the oil-rich Eagle Ford shale. U.S. Silica will ship more than 1 billion pounds of sand each year there from Ottawa, Ill., 85 miles southwest of Chicago, and Sparta, Wis., about 250 miles to the north.

"It takes 25 railcars of sand, on average, to frack one well," said Bryan Shinn, U.S. Silica's chief executive.

Companies are starting to experiment with using even more sand. Pumping 8 million pounds of sand into a well instead of the more typical 4 million pounds could add around \$600,000 to the cost of an oil well, but in some cases can double its output, said Wells Fargo analyst Matt Conlan.

Demand for sand was so high last year that prices hit an average \$75 per metric ton. The new mining boom in Wisconsin has helped push those prices back to about \$50 at the mine, according to PacWest.

Oil-service companies that fracture wells mark up the sand and add transportation costs to the final bill, which can triple the price of sand paid by operators.

That has shale-oil producers like EOG Resources Inc. getting deeper into sand as a way to keep its costs per well in check. At the end of 2011, the company opened a plant in Chippewa Falls, Wis., about 100 miles east of Minneapolis, Minn., to process sand from mines it operates.

Prepping sand to be used in fracking involves sifting it for the right-sized crystals, separating out contaminants, washing it and drying it.

But the sand boom is creating worries about worker safety as well as local opposition over the clouds of airborne dust from heavy-duty trucks hauling the sand from mines to processing plants and rail depots. Pattison Sand Co. in Clayton, Iowa, has faced particular scrutiny.

The U.S. Centers for Disease Control and Prevention calls the fine granules unleashed from sand mining respirable crystalline silica—or silica dust—and says it is linked to silicosis and lung cancer.

"There's a tendency to say it's just dust and people have always been exposed to dust," said David Kriebel, an epidemiologist at the University of Massachusetts. "Crystalline silica is an extremely hazardous substance. Every little piece of crystalline silica that reaches the lungs causes scarring."

In Trempealeau County, Wis., where a number of new sand mines have opened, officials recently imposed a one-year ban on issuing new permits.

"We were looking at hundreds of permits being taken out, dozens of proposed mines that could become operational within a year," said Sally Miller, a member of the county's board of supervisors. "I didn't want us to be 20 years from now saying we wish we had known."

Even so, some state lawmakers worry a much needed job-creating sector is under threat, and hope to shift regulatory control to the state.

"We've always paid out to the oil producing states," said Sen. Tom Tiffany, a Republican. "To have the oil producing states pay us for our natural resources is really a good thing."

Write to Alison Sider at alison.sider@wsj.com and Kristin Jones at kristin.jones@wsj.com