

In Canada, Miniature Heavy-Oil Sites Overcome Slump in Crude Prices

THE WALL
STREET
JOURNAL

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Oct. 6, 2015 5:30 a.m. ET

EDAM, Saskatchewan—In a muddy field where rows of canola stood just three months ago, a miniature oil-sands plant is rapidly being assembled by a small crew of workers.

What's unusual about this project is the speed with which it is being built—in a matter of months—and its compact, football field-size. Oil-sands sites typically take years to build and require hundreds or thousands of acres of land. At a time when slumping crude-oil prices have shelved most new oil-sands projects in neighboring Alberta and halted drilling for all but the most productive shale oil wells in the Bakken formation on both sides of the border, pint-size sites are proliferating in Saskatchewan's oil patch.

About a mile away from the construction site, down a rural highway in western Saskatchewan, three other similarly size heavy-oil projects are rising on a landscape filled with cattle pastures and duck ponds.

The miniboom along Highway 26 is upending the long-standing logic that this type of extraction needs to maximize economies of scale to provide the best return on capital.

While Saskatchewan's oil reserves are a fraction of those in neighboring Alberta companies developing small-scale sites in the province say they are profitable, even with crude prices at six-year lows. That is due to advances in modular construction, ample rail and pipeline takeaway capacity and an attractive regulatory environment.

Like their larger oil-sands brethren in Alberta—home to the majority of Canada's oil production—these newer sites in Saskatchewan extract crude by drilling horizontal wells and then pumping in steam from natural gas-fired generators to loosen up the thick oil deposits.

Typical steam-powered oil-sands plants produce from 30,000 to 100,000 barrels a day, but smaller-scale thermal heavy oil facilities produce as few as 2,000 barrels a day. Both use a technology called steam-assisted gravity drainage, or SAGD, to tap subterranean deposits of molasses-like crude oil. Smaller operations benefit from lower construction and operating costs,

faster production ramp-ups and higher prices for their crude than traditional supersize oil-sands projects. That means they can make money below the roughly \$65 a barrel needed for most new larger-scale projects to break even.

“Oil at \$40 a barrel doesn’t scare us the way it scares oil-sands producers,” said Chad Harris, the founder and chief executive of startup firm Serafina Energy Ltd., which expects to produce 6,000 barrels a day starting in the first half of next year at its roughly 180 million-Canadian-dollar (US\$134 million) plant in Edam. That facility is to be the first of several small SAGD plants that Serafina, funded by U.S. and Canadian private-equity investors, plans to own and operate.

That is just a drop in the bucket compared with [ConocoPhillips](#)’s newest SAGD oil-sands plant in Alberta, which has a capacity of 118,000 barrels a day. The company’s giant Surmount II facility, a joint venture with France’s [Total](#) SA, began production on Sept. 1—nearly five years after it broke ground.

In nearly that same time frame, [Husky Energy](#) Inc., a major Canadian oil and gas producer, will have seen its combined output from small-scale plants grow from 20,000 barrels a day four years ago to an expected 80,000 barrels a day by next year. The Calgary-based company started up a 10,000 barrel-a-day operation in July and plans to bring three more sites in western Saskatchewan online in 2016—ranging from 4,500 barrels a day to 10,000 barrels a day—for a total of 10 such plants.

Heavy oil is thicker and denser than other grades, making it harder to unearth, more expensive to transport and less valuable than benchmark crudes. The vast majority of Canada’s untapped oil reserves are in northern Alberta, and many of the world’s largest energy companies see those deposits of extra heavy crude as critical for supplying future global demand.

In Western Saskatchewan, the crude is slightly less dense than in Alberta, which means it requires less steam to extract and doesn’t need to be processed into a lighter grade or diluted as much when shipped by pipeline. That allows oil from these projects to command a premium of close to \$10 a barrel over Albertan oil-sands crude, according to Calgary-based investment bank FirstEnergy Capital Corp.

“The economics are significantly better than almost all thermal oil-sands projects in Alberta,” said Mike Dunn, FirstEnergy’s head of institutional research.

Husky, which also has oil-sands and conventional well operations in Alberta, has “dialed back” investments in other assets to speed up development of its small-scale Saskatchewan sites, a senior executive told investors at a conference in New York in September. “What’s really important about this transition is that these projects [earn] good returns, even in the low price environment that we’re seeing today,” said Rob Symonds, who oversees Husky’s western Canadian production.

[Canadian Natural Resources](#) Ltd., one of the largest oil and gas producers in Canada, has long focused on projects producing more than 15,000 barrels a day, but has begun studying a push into developing small-scale sites. “We do have some smaller projects that we’re looking at and

working on, but we're not announcing anything at this point in time," CEO Steve Laut said in an interview.

Oil-sands output in Alberta is forecast to increase over the next five years as horizontal wells and mines already being built come online, but growth may slow after 2020 as a result of indefinite suspensions at a number of planned oil-sands projects, according to a recent report by Peters & Co.

Oil production in western Saskatchewan dates back decades, but until recently has focused on conventional vertical wells. That method is cheaper but leaves a lot of heavy oil in the ground, with recovery rates of oil in place in the single digits. Using steam to warm up these reservoirs can boost the oil recovery ratio to 50%, but until recently the small size of Saskatchewan's reservoirs made it hard to justify investment in thermal extraction.

Technological innovation has helped unlock this oil through greater use of standardized parts and assembly line-style manufacturing. Modules can be assembled quickly on site with little guesswork, cutting labor and design costs and making smaller projects more economic.

Husky, Serafina and other smaller scale producers such as BlackPearl Resources Inc. use similar modules made by privately held fabricator Propak Systems Ltd. That Airdrie, Alberta-based firm has used its experience building turnkey gas-processing plants to expand into contracting cookie cutter-type thermal heavy-oil projects.

Propak, which also is building the Edam facility for Serafina, first test-assembled the modules at its fabrication plant some 350 miles away before shipping them out via a truck convoy. That way, the kits of heat exchangers, water-filtration equipment and generators—all welded on top of movable steel pallets—can be welded and wired together quickly in the field at a fraction of the cost and time of constructing a traditional thermal well project.

"The technological advancements that are allowing thermal [recovery] to happen in Saskatchewan heavy oil have unlocked a volume of oil that wasn't on the radar a decade or two ago," said Tim McMillan, president of the Canadian Association of Petroleum Producers and a former Saskatchewan energy minister.