
Lower-for-Longer Crude Prices Threaten Oil Sands Investment

How the shorter oil price cycle undermines expensive projects.

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Sandy Fielden
Director, Oil and Products Research
+1 512 431-8044
sandy.fielden@morningstar.com

Data Sources for This Publication

- ▶ Alberta Energy Regulator
- ▶ CME Group
- ▶ US Energy Information Administration

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Overseas Producers Retreat

WTI closed at \$48.40/Bbl on Monday, March 13, 2017—down \$5.61 since the end of February. Recent price weakness comes in response to market concerns about high U.S. inventories and rising shale output as well as doubts that OPEC production cuts are deep enough to balance supply with demand and shore up prices. The 10% price collapse in the past two weeks coincided with announcements from Shell and Marathon that they are selling oil sands production assets in Western Canada. These two companies are just the latest in a list of overseas investors reducing their exposure to oil sands production, including major reserve write downs by ExxonMobil and ConocoPhillips and Statoil's asset sale in December 2016. Canadian players that appear to be comfortable increasing their exposure to the oil sands have snapped up most of the liquidated assets. This note reviews the economics and future prospects for oil sands production in light of today's "lower-for-longer" crude price environment.

Vast Resource

The Western Canadian Sedimentary Basin or WCSB underlies much of the provinces of Alberta and Saskatchewan as well as the Northwest of British Columbia. Within the WCSB the oil sands deposits cover 54,000 square miles of northern Alberta—by some estimates the third largest oil reserve in the world. Yet this vast crude resource is expensive and complex to extract and transport to market, reducing its appeal for producers in today's low price environment where there is plenty of lower hanging fruit elsewhere—notably the shale beds of Texas.

As we described in a Note last May (see [Western Canadian Wildfire](#)), oil sands crude is a thick dark bitumen material mixed up with sand. Producers use two approaches to extract the crude. The first is strip-mining to retrieve oil-bearing sand closer to the surface that is then treated with hot water to wash out the bitumen. The second is to extract bitumen from below the surface—most often using a steam assisted gravity drainage (SAGD) process.

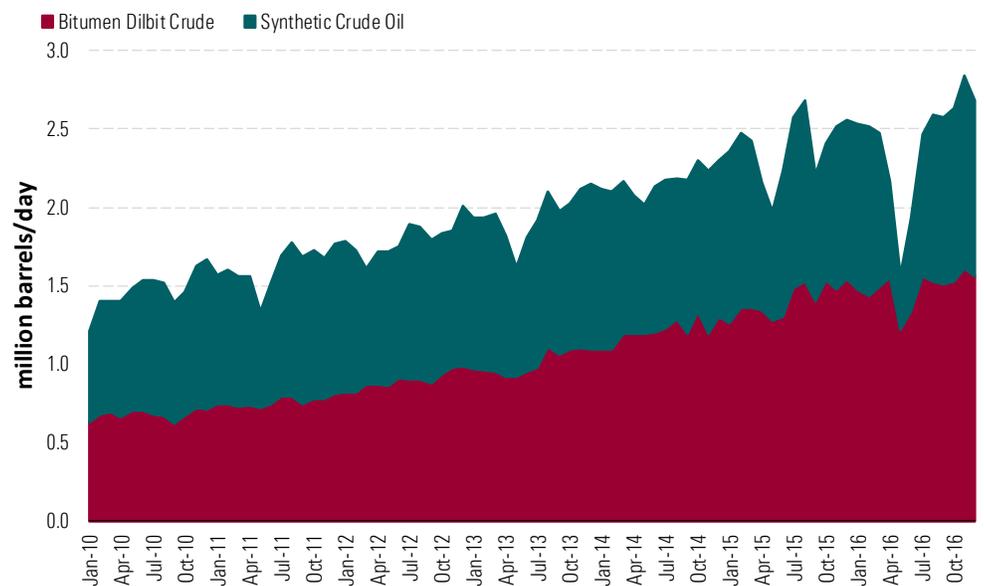
Once extracted from the sand, raw bitumen has the consistency of treacle and can't be shipped in pipelines at room temperature. The transportation challenge is addressed in one of two ways. The first is to process the raw bitumen in an upgrader plant (a kind of refinery) to produce a synthetic crude oil (SCO) that can be shipped in pipelines and is more valuable to refiners because it resembles the light sweet U.S. benchmark West Texas Intermediate (WTI). A second approach that avoids the more expensive upgrading process is to dilute the raw bitumen with lighter hydrocarbon material called diluent to make a crude known as "dilbit" that can flow in a pipeline. Both these processes require

billions of dollars of up front investment and take many years to start producing. Such investments—made at a time when oil reserves were believed to be diminishing—were predicated on higher prices.

Production Still Increasing

Bitumen crude production has been increasing in the past seven years with most of the new output coming from SAGD plants that are less costly than mining and upgrading. Exhibit 1 shows Alberta dilbit bitumen and SCO production based on data from the Alberta Energy Regulator. Dilbit output increased by about 1 million barrels/day between January 2010 and December 2016 with SCO increasing by about 0.5 mmb/d over the same period. Combined oil sands output averaged 2.41 mmb/d in 2016. Production continues to expand despite the price crash that halved crude prices at the end of 2014. That's because of the long time horizon between initial investment and production. In fact, projects approved long before the crude price crash are still coming online, and output is forecast to continue expanding through 2020.

Exhibit 1 Alberta Oil Sands Production



Source: Alberta Energy Regulator

Shale Headwinds

Oil sands producers have battled against a number of adverse factors since the start of the U.S. shale oil boom in 2011. Back then, the future looked bright as producers invested in long-term SAGD plants. The heavy dilbit crude from these projects was favored by refiners because it was more plentiful and cheaper than lighter crude that is easier to refine, but becoming harder to find and more expensive. In response to oil sands production, U.S. Midwest refiners upgraded their facilities to process bitumen crude. Pipeline capacity from Western Canada to the Midwest was expanded to accommodate increased flows. Then in the latter half of 2011 a surge in light shale crude rapidly overwhelmed pipeline capacity in the Midwest—competing for space with heavy Canadian barrels. The resulting congestion

forced both U.S. and Canadian producers to swallow hefty price discounts to get their barrels to market. At the same time, protests undermined a border crossing permit for the 850 mb/d Keystone XL pipeline that was planned to relieve Canadian crude congestion. Since then, pipeline constraints have dogged oil sands producers—leading many to invest in more expensive rail transport options. As it turned out, transport disruption was the least of the worries that oil sands producers faced from surging shale crude production that, by the end of 2014, caused crude prices to collapse in an oversupplied market.

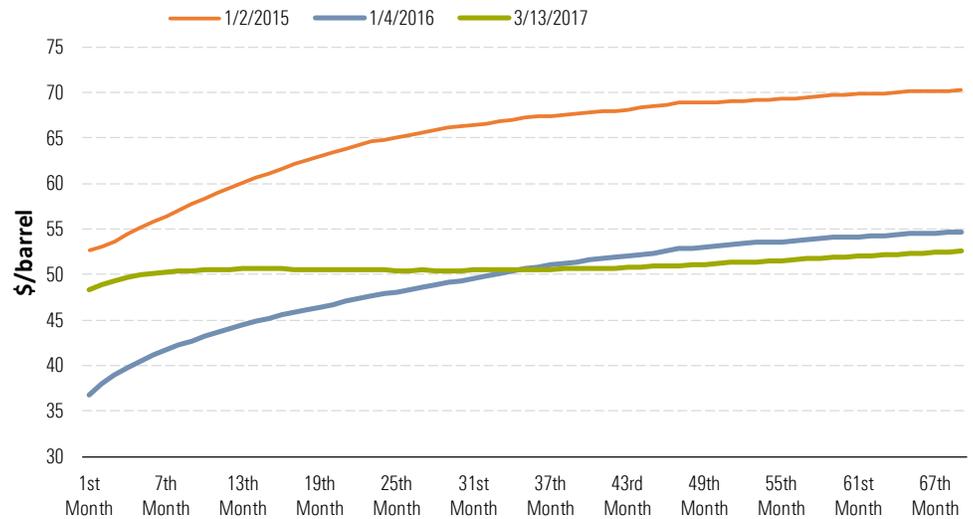
Break-Even

Lower crude prices in the past two years have undermined the economics of oil sand production. In February, the Canadian Energy Research Institute published its annual estimate of break-even costs for oil sands producers. The analysis showed a WTI equivalent break-even cost including processing and transportation of \$60.52/barrel for SAGD crude. The equivalent for mined crude was \$75.73/barrel. Even though these costs are 15% lower than the equivalents for 2015, they do not compare favorably with this year's average WTI price of \$52.75/barrel or the average \$44.70/barrel for benchmark Western Canadian Select dilbit crude delivered to Cushing, Oklahoma.

Some new investments do still make sense. At the end of 2016, Cenovus Energy and Canadian Natural Resources (the company that purchased Shell's assets) approved investments adding significant new production to existing oil sands projects. In January 2017, oil sands producer MEG Energy announced plans to spend \$400 million over the next two years on a brownfield expansion to its Christina Lake project. These producers are expanding existing projects rather than investing in new production—considerably reducing up-front costs by leveraging existing infrastructure. While brownfield investment continues for the moment at least, no company is advancing green field projects.

When Will the Price Be Right?

Producing oil is a long-term game—particularly in the oil sands where projects have a multi-decade lifespan. With today's low oil prices discouraging new investment, supplies will inevitably tighten in the future as output from existing wells declines, pushing prices higher again. And the battle between heavy oil sands crude and lighter shale is not about market share. The two grades compete for different refineries configured to process specific crude types. There is still a significant potential market for oil sands crude at Gulf Coast refineries that on average in 2016 imported 1.86 mmb/d of non-Canadian heavy crude according to the Energy Information Administration. That heavy crude comes from countries like Venezuela and Mexico where production is declining. The question for oil sands producers is whether and when future oil prices will rally enough to justify new investment to support production in 10 years' time. Right now, the WTI forward curve reflects expectations that future prices will only increase slightly over today's level (green line in Exhibit 2). This flat curve contrasts markedly with higher forward expectations in the curves at the start of 2015 (orange line) and 2016 (blue line).

Exhibit 2 Evolution of WTI Forward Curve

Source: CME Group, Morningstar

Shorter Cycle

Today's flat curve reflects a post-shale realization that any crude price rise due to increased demand or lower supply will rapidly spur new shale production, keeping a lid on higher prices. This "boom and bust" cycle is not new for oil prices—it is just shorter now—because shale producers can respond more rapidly to price signals. We believe that expectations that this shorter cycle will become the norm lie behind decisions by international oil companies to exit or write down their investments in oil sands production. There is now a mismatch between the long investment cycle in oil sands (and other similar expensive projects) and the belief that long-term prices will increase in the face of scarce supplies. This mismatch makes it safer for major oil companies to invest in shorter cycle projects such as shale production in the Permian Basin.

Meanwhile, remaining Canadian producers will continue to produce oil from existing SAGD plants, having sunk the initial investment cost. They will also invest in brownfield expansions where break-even costs justify them. However, their survival in the long term relies on bringing down green field break-even costs to competitive levels—most likely through new extraction and treatment technologies. ■■

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+1 800 546-9646 North America

+44 20 3194 1455 Europe

commoditydata-sales@morningstar.com



22 West Washington Street
Chicago, IL 60602 USA

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