TWO OF US - THE MULTI-BILLION-DOLLAR MERGER OF CANADIAN GIANTS CENOVUS AND HUSKY

November 10, 2020

On October 25, a major consolidation of two Canadian oil and gas companies was announced with the planned merger of Cenovus Energy and Husky Energy. The prospective consolidation will offer the opportunity for corporate-level synergies and, over the longer term, for the physical integration of some of the companies' operations, especially in Alberta's oil sands. In today's blog, we discuss some of the more nuanced elements of the consolidation, including potential improvement in crude oil market access and the larger presence of the combined company in PADD 2 refining, a sector that has taken a major hit during the pandemic. This blog also introduces a new weekly report from RBN and Baker & O'Brien: U.S. Refinery Billboard.

Cenovus Energy is an integrated oil and natural gas company headquartered in Calgary, AB. It was formed when Encana Corp. (now known as Ovintiv) spun-off its oil-based assets into a separate corporation in 2009, allowing Encana to — at the time — focus on its natural gas assets. Cenovus produces oil in Canada and has refining interests in the U.S. The production assets include oil sands facilities at Christina Lake and Foster Creek (blue dots in **Figure 1**) and conventional operations at Marten Hills and Deep Basin (blue triangles). Notably, Cenovus announced this week that they have entered into an agreement to sell their Marten Hills oil assets to Headwater Exploration. In the U.S., Cenovus has a 50-50 partnership with Phillips 66 in WRB Refining, which has refineries in Borger, TX, and Wood River, IL (blue refinery icons).

Husky Energy is also an integrated oil and natural gas company based in Calgary. The company was founded in 1938 in Cody, WY, but relocated to Canada in 1946. Since then, the company has grown organically and through acquisitions of companies such as Mohawk Oil, Renaissance Energy, and the Canadian unit of Marathon Oil, as well as the purchases of Valero Energy's Lima, OH, refinery and Calumet's refinery in Superior, WI. Today, the company is majority-owned by Hong Kong billionaire Li Ka-Shing, the 30th-richest person in the world. Husky's oil production assets include oil sands operations at Sunrise, Tucker, and Lloyd Thermal (green dots in **Figure 1**); conventional assets at Rainbow and Deep Basin (green triangles); and offshore production in the South China Sea (the Liwan project) and the Madura Strait in Indonesia (the Madura project; green offshore platform icons in inset map), and off the coast of Newfoundland & Labrador in eastern Canada (the White Rose project; green offshore platform icon on main map). Husky's refining assets include the Lloydminster Upgrader in Saskatchewan and asphalt refinery in Alberta; the Superior, WI, refinery (which is currently shut down and under repair after a major explosion/fire in 2018), and two refineries in Ohio (Lima and the BP-Husky JV refinery in Toledo; green refinery icons).

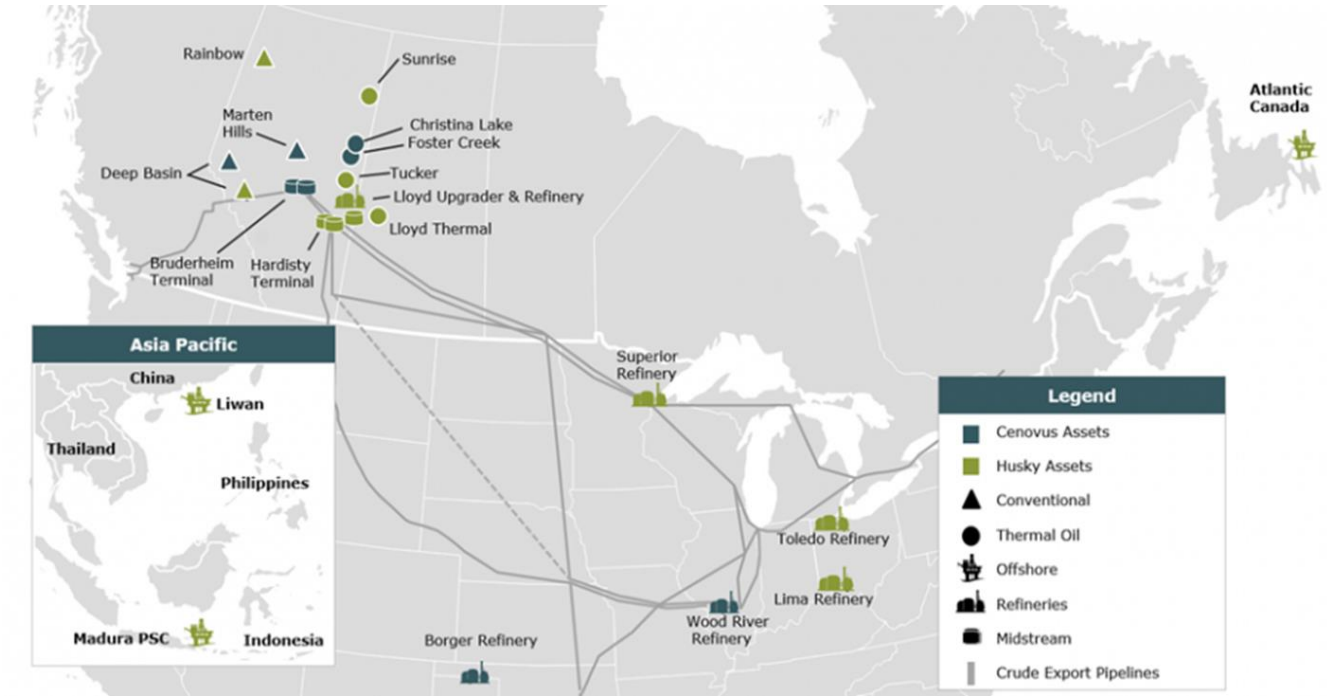

Figure 1. Combined Assets of Cenovus and Husky. Source: Cenovus

The combined company provides opportunities for corporate overhead consolidation, which Cenovus and Husky have estimated will provide CAD $600 million in annual savings. Additionally, they are looking at longer-term opportunities through the physical integration of the Foster Creek and Christina Lake oil sands assets with the Lloydminster upgrading and refining center.

In today's blog, we discuss our analysis of the potential opportunities associated with integrating the combined company's upstream assets in Canada and its refining assets, including whether the corporate merger might at least reduce exposure to Western Canadian Select (WCS) pricing at Alberta. The analysis is summarized in **Figure 2** below, but we'll walk through the numbers to make sure the analysis is clear. To start, we looked at Cenovus and Husky's Canadian heavy crude oil production. In 2019, Cenovus's production of heavy crude averaged 354 Mb/d and Husky's averaged 129 Mb/d, for a total of 483 Mb/d (red oval). We should note that all of Cenovus's heavy crude oil production is bitumen, which means that a diluent such as natural gasoline/condensate needs to be added to allow it to flow through a pipeline. All but 30 Mb/d of Husky's heavy crude production is also in the form of bitumen.

Next, we evaluated how much of the combined company's production potentially stayed in Canada. Cenovus does not have any local refining or upgrading capacity, so all of its 354 Mb/d of production in 2019 was destined to leave for the U.S. (mixed with an estimated 152 Mb/d of diluent if it was going by pipeline; aqua oval), unless it was sold to another local processor. Husky's production, on the other hand, had some local Canadian distribution options, so it's not as straightforward as the Cenovus analysis. As we mentioned, Husky has an upgrader at Lloydminster as well as an asphalt refinery. Upgraders take heavy oil or diluted bitumen and "upgrade" the streams into synthetic crude oil, which is still a refinery feedstock, but of higher quality. We estimate the upgrader processed about 52 Mb/d of bitumen to yield 55 Mb/d of syncrude. This syncrude stream would still be destined to leave Canada

for the U.S., but does not need diluent to be added to it for transfer by pipeline. The asphalt facility, in turn, had inputs of 28 Mb/d in 2019, which lowered the portion of crude oil destined for the U.S. by that volume. Grossing up Husky's remaining production for diluent means they had approximately 111 Mb/d of heavy production that was destined to leave Canada.

Husky / Cenovus Heavy Crude and Bitumen Production (2019), Mb/d			
Parent	**Cenovus**	**Husky**	**Combined**
Cenovus: Christina Lake (Bitumen)	195		195
Cenovus: Foster Creek (Bitumen)	160		160
Husky: Lloyd (Bitumen/Heavy Conv)		81	81
Husky: Sunrise (Bitumen)		25	25
Husky: Tucker (Bitumen)		24	24
Total	354	129	483
Canada Refinery Offtake			
Lloyd Upgrader	0	52	52
Lloyd Refinery	0	28	28
Outbound Canada			
Heavy + Bitumen	354	48	402
Diluent	152	8	160
Syncrude		55	55
Total	506	111	617
Pipeline Capacity			
Keystone	25	75	100
Enbridge	110	20	130
Unspecified		35	35
Phillips 66 - WRB	170		
Total	305	130	435
US Refinery Offtake			
BP-Husky Toledo		27	27
Superior		0	0
Lima		8	8
Wood River	155		155
Borger	15		
Total	170	35	205
Contracted Pipeline Capacity (Net of Refinery Offtake)	135	96	231
Production sold in U.S. (Net of Refinery Offtake)	336	76	412
Excess Pipeline Capacity	(201)	19	(182)

Figure 2. Heavy Crude Production and Offtake Balance. Sources: Baker & O'Brien analysis, Company Reports

It gets even more interesting from here. Our analysis of public disclosures by Cenovus and Husky — plus data from the U.S. Energy Information Administration (EIA) and other sources — shows pipeline capacity out of Western Canada lined up in the following ways:

- For Cenovus, most of the heavy crude that was processed at the WRB Refining assets in Illinois and Texas (~170 Mb/d in 2019; brown oval) shipped under the Phillips 66 banner (gold oval),

where it's assumed that pipeline capacity had been retained. It looks like Cenovus also had about 135 Mb/d of pipeline capacity between the Enbridge Mainline system and Keystone (light green oval). That left approximately 200 Mb/d (pink oval) in 2019 to be sold subject to WCS pricing in Alberta through either rail or to other companies with line space on pipelines.

- Husky had access to about 130 Mb/d of pipeline capacity through the Enbridge and Keystone systems (dark green oval), which was more than the 111 Mb/d of total capacity needed to ship their 2019 equity barrels out of Canada. An estimated 35 Mb/d of those barrels went to their refineries in Toledo and Lima (yellow oval), with the remainder capable of being marketed in the U.S.

Assuming pipeline capacity rights were to stay the same, the combined company will allow the 19 Mb/d of excess Husky capacity held in 2019 to be utilized by the Cenovus production or by potential production that has been curtailed by both companies, which will alleviate the number of barrels subject to Alberta pricing. Overall, the merger would appear to give Cenovus access to some additional pipeline capacity, but it still leaves at least 180 Mb/d of production (black oval) subject to Alberta crude pricing — definitely not a slam dunk in improving access to higher-priced markets.

Increased takeaway-pipeline capacity and more refinery placement of barrels are certainly benefits of the merger. But it also needs to be said that Cenovus is picking up refining assets in PADD 2 (the U.S. Midwest), and, like most other aspects of the oil industry, refining has not been so rosy this year.

[As we mentioned previously, Cenovus has a 50/50 JV with Phillips 66 for WRB Refining, which includes the Wood River refinery in Illinois (plus the Borger refinery in Texas), and Husky has the 50/50 JV with BP in Toledo, plus 100% of the Lima and Superior refineries. The Superior refinery has been shut down since April 2018 due to a major fire that damaged a portion of the facility; the refinery is expected to come back online sometime in 2021, but progress on repairs slowed in 2020 due to COVID-19.]

Refineries in PADD 2 historically have benefitted from advantaged access to Canadian production as well as inland U.S. shale production from the Bakken, Niobrara, and Permian. But the discounts that these crude oils offered have evaporated in 2020 due to the crude price decline from the OPEC+ price war and COVID-induced demand destruction. Making matters worse, the Toledo and Lima refineries are both located in Ohio, in the eastern part of PADD 2, which in addition to having some of the highest-cost access to crude within PADD 2, has limited offtake opportunities for excess refined product production when demand is low, like it is now.

U.S. Refinery Billboard, a new weekly report developed jointly by Baker & O'Brien and RBN, evaluates indicative gross refinery margins by facility based on 5-year average quarterly yields, among other things. As shown by the red line in **Figure 3**, gross margins at refineries in eastern PADD 2 (Ohio, eastern Michigan, southern Indiana, Kentucky, and Tennessee) averaged an estimated $4.62/bbl in 2020, considerably lower than the average gross margins at Chicago-area refineries ($7.73/bbl; black line), and refineries in the westernmost Plains portion of PADD 2 ($6.94/bbl; green line).

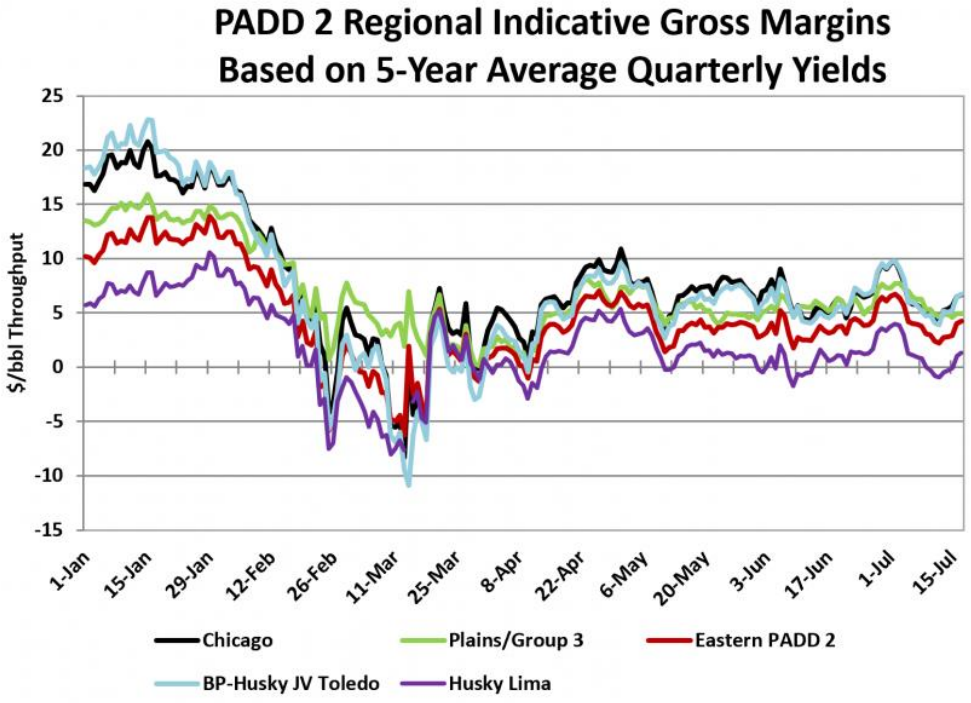

Figure 3. Gross Refinery Margins for PADD 2 Sub-region and Husky's Ohio Refineries, October 2020. Source: U.S. Refinery Billboard

As you can see, the BP-Husky JV refinery in Toledo (light blue line) has likely been one of the better performers in the eastern part of PADD 2 on a gross margin/barrel basis this year, while Lima (solid purple line) has potentially been one of the lower performers. One observation on Husky Lima is that it has historically processed a crude slate that consists primarily of light crude oils, which price at a premium to heavy crude oils. Late last year, Husky completed a project that increased Lima's heavy oil processing capability from 10 Mb/d up to 40 Mb/d. Given that the indicative margins in the graph are based on 5-year average yield sets, that adjustment is not fully captured in the performance shown in the graph, but this would increase Lima's margin slightly. The Toledo refinery co-owned by Husky and BP, in turn, likely benefits from its heavier and more sour crude slate, much of which is sourced from Canada. We do expect the lower margins across the refining sector to improve as demand for refined products rebounds, but the timing of the improvement is less certain, which is never where you want to be when you're an investor and building out a discounted cash flow (DCF) model.

So, while we think the recently announced Cenovus and Husky merger is interesting, the synergies seem to be concentrated in the corporate overhead reduction and potentially the upstream side of their businesses in Canada. But the merger seems to offer only limited changes to the operations of the offtake capacity to the U.S. Additionally, Cenovus is expanding its PADD 2 refining presence in a big way, and refining is an area where some investors have demonstrated caution this year due to the COVID-induced demand destruction — at least until Monday, when positive news on a vaccine was released.

One more note about our new U.S. Refinery Billboard: In addition to ongoing analysis of refinery margins, the weekly report provides the latest refinery-related news, as well as data and analysis

regarding refinery utilization; heavy crude differentials and location differentials; indicative margins by region; regional arbitrage opportunities; estimated crude oil netbacks; and regional summaries of refinery performance. For more information on U.S. Refinery Billboard, click here.

Note: The article was authored by Amy Kalt of Baker & O'Brien and published on RBN Energy's Daily Energy Post on November 10, 2020.

"Two of Us" was written by Paul McCartney, and credited to the songwriting team of Lennon/McCartney. Recorded in January 1969 at Apple Studio in London, the song appeared as the third song on side two of The Beatles 12th and final studio album, Let It Be. It was Lennon doing the spoken word intro to the song, with a reference to Charles Hawtrey, who was a British comic actor. Personnel on the record were: Paul McCartney (lead vocal, lead acoustic guitar), John Lennon (co-lead vocal, rhythm acoustic guitar), George Harrison (bass line on Fender Telecaster guitar), and Ringo Starr (drums, percussion).