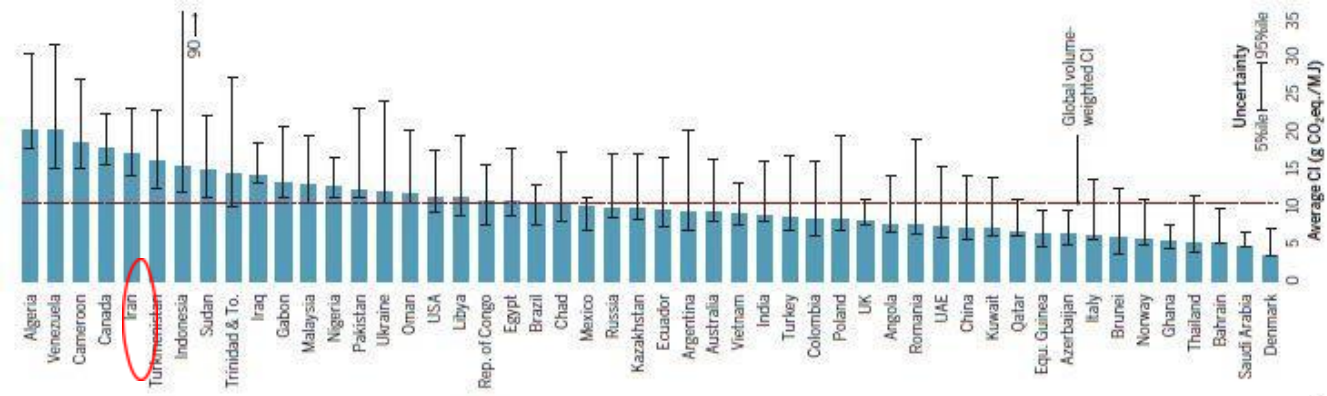
Oil Sands Transition - Competitiveness

The oil and gas industry has seen continual growth for generations. Demand destruction is now paving the way towards peak oil. This decline will have a profound impact on the oil and gas industry as a plateauing and declining market will create volatility and uncertainty as cost, carbon intensity, geopolitical clout, and other variables enable some producers to succeed and others to fail. Oil sands producers will need to evaluate their ability to compete for a share of a shrinking market that will penalize high carbon intensity and high-cost barrels of oil.

Canada Oil & Gas: Competitiveness on Carbon Intensity

Oil sands (OS) production is amongst the highest emitting upstream oil development projects in the world. This is due primarily to the fact that bitumen is an energy intensive resource to extract and requires additional steps to upgrade the product[1]. As shown in figure 1 below crude oil from Canadian upstream projects has, as an aggregate, one of the highest average carbon intensities (CI) among global sources. The average CI for Canadian oil production is significantly higher than the global average and countries including Saudi Arabia, Norway, Kuwait, and Qatar have far lower average GHG emissions per barrel.

Figure 1: National volume-weighted average crude oil upstream GHG intensities (2015)[2]



Source: Masnadi et al (2018)[3]

Carbon Capture and Storage (CCS) technology has become a key strategic pillar for oilsands companies trying to reduce CI and features prominently in their carbon reduction plans. Deploying CCS technology will come with considerable abatement costs which will require many years to amortize and will add considerable costs to production. Options for reducing GHG emissions for other O&G producers in both Canada and internationally have considerably lower abatement costs and lower additional costs to production. This results in oilsands having a GHG abatement disadvantage relative to its peers (both within and outside of Canada) elevating the risk profile even more for oil sands operators attempting to remain competitive in a carbon constrained world.

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[1] Once extracted OS requires extra processing (adding diluent, synthetic crude, etc.) all of which contributes to higher per barrel emissions intensity relative to their peers.

[2] The global volume-weighted carbon CI estimate is shown as a red line (~10.3 g CO_2eq./MJ). Error bars reflect 5th to 95th percentiles. Canada has the fourth highest average CI among countries examined.

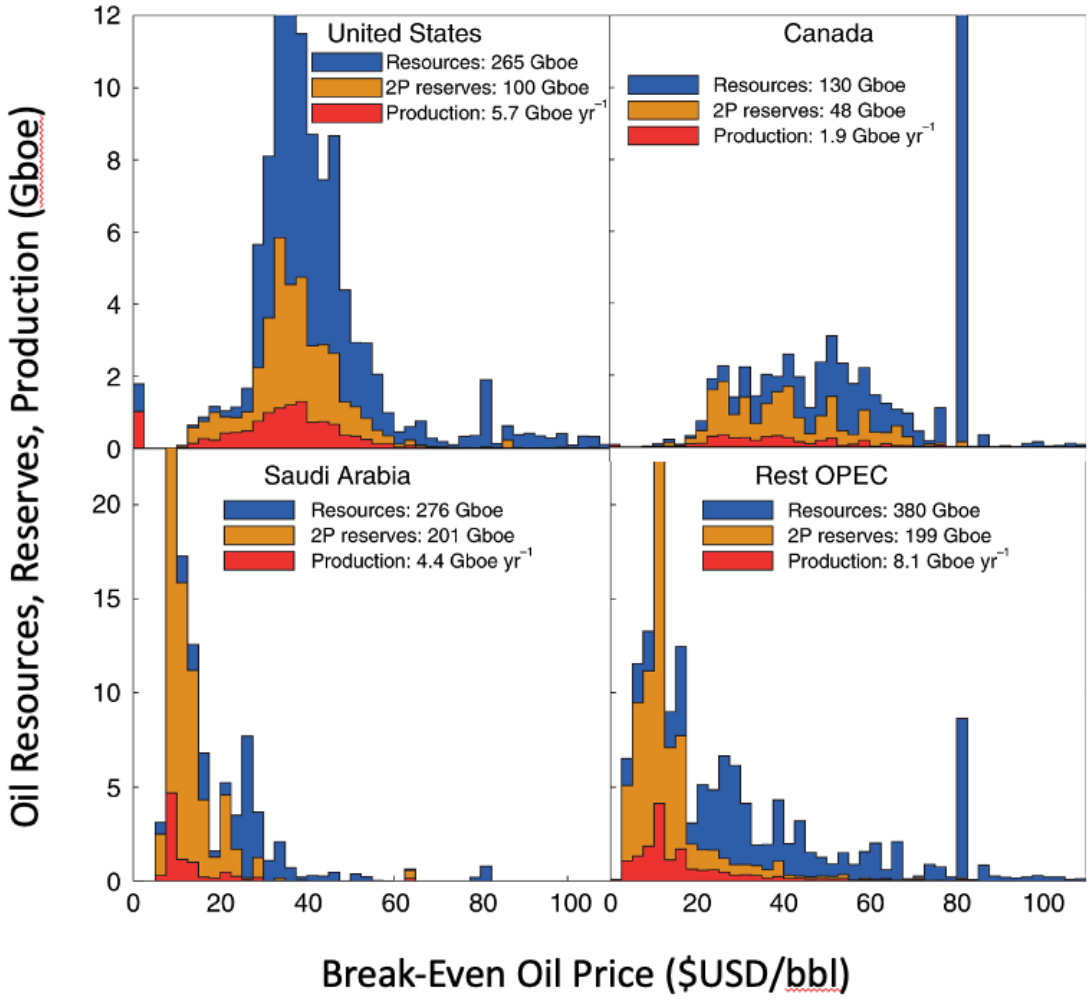
[3] Masnadi, Mohammad, S, et al. Global Carbon Intensity of Crude Oil Production. Science, **361** (6405), August 31, 2018.

For oilsands producers, regardless of the path taken and the technology deployed, it will be impossible to reduce CI without increasing the cost per barrel significantly.

Canada Oil & Gas: Competitiveness on Cost

In addition to the high average carbon intensity of Canada domestic crude oil production relative to other global sources, Canadian upstream production has significantly higher break-even costs to produce. As shown in Figure 2 below, Canada has a per barrel production cost of $20-50, and a slightly higher break-even cost for reserves and resource. This is similar in comparison to the United States, while the majority of production costs for Saudi Arabia and the rest of OPEC are less than $20 per barrel. Saudi Arabia and OPEC also have significantly larger reserves of lower cost oil positioning them to take advantage of a shrinking market with sustained price declines.

Figure 2: Oil world resources, reserves and production distributed along their break-even prices[4].



[4] Prices at which they are profitable to extract and be processed.

If the above represents the current state baseline, the future state is even more problematic. To this end, while many Canadian oil sources are still able to break-even under a range of different price scenarios, this cost environment is unlikely to remain static. C.D. Howe's recent report *Last Barrel Standing? Confronting the Myth of High-Cost Canadian Oil Sands Production* claims "The oil sands sector will continue to weather short-term price dips as long as the expected price doesn't dip persistently below C$40 per barrel". This conclusion assumes some volatility but asserts there will only be short-term dips. While this assessment is in line with current state market dynamics, demand destruction is anticipated to lead to peak oil within the next decade, having a profound impact on the demand for Canadian oil. Even external shocks that, historically, increased demand for short periods of time such as wars will be attenuated as countries electrify their transportation sector and transition to new energy sources. Ultimately, and as we move past the plateau/peak demand for oil, market forces will differentially support lowest cost production with the highest cost sources feeling the greatest pressure. Finally, and perhaps most significantly, there's an assumption that the carbon policy and regulatory environment within Canada will not change. As described above, and in more detail in the GHG reductions backgrounder, the carbon compliance costs associated with Alberta's large emitter program (TIER) are not currently material to OS producers, however, the introduction of an emissions cap is likely to increase their costs significantly.

In the end, the introduction of a more stringent regulatory environment combined with global market forces pushing for lower CI products will make OS production less and less cost competitive with time. Failure to include these cost drivers in break-even scenario analysis paints an unrealistic picture as not all Canadian upstream oilsands projects will be competitive once emission abatement technology costs are factored in.