Investor Briefing

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GREENPEACE

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Flawed Fundamentals

Shell's and BP's stalled tar sands ambitions

While the circumstances for rapid expansion of the tar sands were favourable for the industry over the past two decades, there are clear signs that pro-expansion conditions such as unfettered market access, stable high oil prices, political and public support, growing U.S. demand and minimal regulatory constraints have shifted. Since 2014, 42 tar sands projects have been put on-hold, delayed, or cancelled. These include the cancellation of Shell's Carmon Creek project after the final investment decision, and the postponement of Phases 2A and 2B of the BP/Husky joint venture Sunrise project.

The matrix of risks that have stalled the predicted unchecked growth of the tar sands combine to suggest structural rather than cyclical changes in the oil industry and represent a significant setback to the IOCs' frontier driven growth model.

All tar sands projects that have not yet broken ground should be considered economically uncertain at best. Shell's plans for expanding its tar sands operations are now mere "ideas" according to CEO Ben van Beurden.[1] And BP CEO Bob Dudley stated in April 2016 that "[BP] have one oil sands project. It is very questionable whether we'll have any more".[2]

This briefing examines the combination of factors that have led to this reappraisal of once priority projects at BP and Shell. We encourage investors to scrutinise what those factors mean for the high-cost growth model of the IOCs. The briefing also examines the potential economic viability of Shell and BP's planned – but not yet under construction – tar sands projects. We suggest questions for investors to ask Shell and BP in order to understand their plans for their tar sands assets and to assess the companies' understanding of and preparedness for the wider impacts of shifting conditions in the oil industry. This briefing accompanies a report published by Greenpeace and Oil Change International available at: http://www.greenpeace.org.uk/climate/investor-briefings and we have indicated the relevant section of the report which expands on a particular point.

Business model under threat

(Section 1)

While the industry might wish to paint the oil price plunge since 2014 as a cyclical storm to be waited out, the reality is that there are fundamental structural problems with the IOC business model, which predated the price crash, and which the crash simply put into stark relief.

From 2000 to 2014 exploration expenditure increased fourfold, while discoveries followed a steady downward trend.[3] It's been noted that "*this inherent flaw in the oil companies' business model was disguised for the past 40 years by the fact that oil prices rose even faster than the costs of exploration and production*".[4] However, an analysis of 80 oil and gas companies by IHS Energy found that return on average capital employed (ROACE) fell from above 20% in 2006 to just 9% in 2013, while the oil price rose from about $70 to over $100.[5]

All of this comes on top of the existential threat posed to the industry by climate risk whether in the form of transition, regulatory, and/or liability risk. A significant source of uncertainty for the oil industry is the potential for disruptive technologies - such as electric vehicles - to transform the oil market.[6] Relying on tar sands means betting that there will be no serious climate policy or disruptive technology, not just in the next 10 years, but for decades to come.

Commentators are now discussing "*concern about the demise of the IOCs*"[7] and questioning whether their business model is "*fundamentally flawed*".[8] This has led to calls for oil majors including Exxon and Chevron to reweight corporate capital allocations towards increased dividends and share buybacks. Some have gone as far as suggesting that they largely give up on growth altogether.[9]

Questions for BP and Shell

- What proportion of the company's oil and gas reserves and resources require a break-even price in excess of $60bbl?
- In making final investment decisions for long-life projects what are your projections regarding long-term oil price?
- What assumptions underpin your projected oil price? e.g. level of electric vehicle and renewable energy penetration; climate policy; level of oil demand.
- Does the company stress-test the resilience of such projects against a range of demand and price scenarios including scenarios compatible with the goals of the Paris Agreement to keep global temperature increases to well below 2C with an ambition for 1.5C?

BP and Shell's tar sands operations

(Section 2)

BP and Shell currently operate tar sands assets. However, both companies also have planned projects which are currently stalled. While Phase 1 of BP's joint venture Sunrise project is producing, subsequent phases have not proceeded. The company describes its Pike project, operated by Devon Energy, as being at the design stage while Terre de Grace, which is planned to be BP-operated, is currently under appraisal for future development. As recently as December 2014, the company had hoped to see Sunrise Phase 2 and Pike producing by 2020 and was describing all three of its projects as growth opportunities to 2020 and beyond.[10] In addition to its cancellation of Carmon Creek,[11] Shell has placed its Pierre River project on indefinite suspension. The company also confirmed that it has no plans at this time to proceed with its intended Muskeg River expansion and Jackpine Mine extension projects.[12]

there are fundamental structural problems with the IOC business model, which predated the price crash

Cancelled and postponed projects

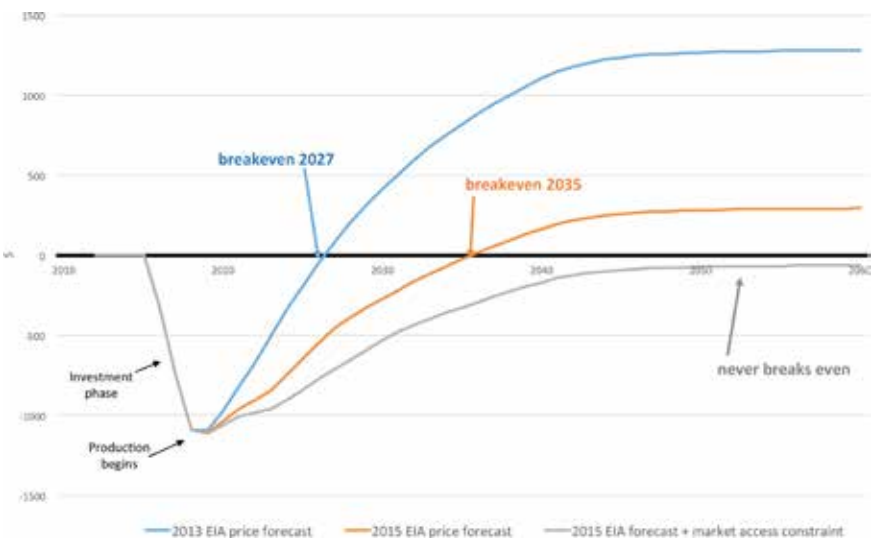
(Section 3)

Since 2014, 42 tar sands projects have been put on-hold, delayed, or cancelled. These include BP's Sunrise project phases 2A and 2B and Shell's Pierre River and Carmon Creek projects. The narrative in the media and among industry commentators is that this is due solely to the fall in oil prices, and that once prices recover the sector will bounce back. While oil prices are an important factor in capital expenditure decision-making, the current price environment has exposed more structural weaknesses within the tar sands industry, including the reality that pipeline access to new markets is critical for industry profitability.

Economic analysis shows the assertion that low oil prices are the only cause of tar sands project delays and cancellations, is inaccurate. More than half of the projects analysed could still have been viable under post-crash price expectations: it was lack of pipeline access that pushed them over the edge, as the additional cost of rail rendered these projects uneconomic.

Of the 42 cancelled, delayed or suspended projects, we analyse 27 (data is unavailable for the remaining 15).

Figure 1: Sunrise 2A project cumulative discounted cash flow (real, discount rate 10%) (source: Rystad UCube, Oil Change International model)



This assessment is based on three scenarios:

- a higher oil price forecast from before the crash
- post-crash price expectations but pipeline availability
- with post-crash price expectations and no new pipelines

For scenario 1, we use the Energy Information Agency (EIA) price forecast published in its 2013 Annual Energy Outlook, which had prices rising steadily throughout the period, reaching $133 per barrel by 2030. For scenarios 2 and 3, we use its forecast published in 2015, which accounts for the recent price crash and sees the price taking until 2028 to climb back to $100 per barrel.[13] We also factor in the price differentials at which tar sands crudes sell.

Of the 27 projects we assessed, we found that 14 - including BP's Sunrise and Shell's Carmon Creek - are rendered uneconomic by the combination of 2015 oil prices and the additional cost of rail. These projects are associated with over 60% of the reserves held in all 27 projects.

An additional eight projects are uneconomic under the current oil price scenario with or without additional pipeline capacity. In other words, these projects fit within the mainstream view that it is low oil prices alone affecting tar sands production growth rather than market access.

Finally, five of the projects were delayed for other reasons (the combination of lower prices and lack of pipelines did not push them into being uncommercial). For example, these might include a shortage of company cash flow, or a desire to prioritise other projects.

Industry projections - declining but continued growth

(Section 4)

As both limited market access and lower oil prices have taken hold, forecasts for future tar sands production have shifted. The Canadian Association of Petroleum Producers has reduced its projection for tar sands production in 2030 in its annual flagship publication for four years running.

Nevertheless, the 2030 number is nearly 65 percent higher than today's production level and would clearly require many new projects to be sanctioned by companies beyond that which is under construction.

The most recent industry forecasts for long-term growth are based on three questionable assumptions:

Market Access: At least one of the major pipeline proposals receive approval and are built providing additional capacity within the next three to five years.

Price Recovery: It is generally assumed that after remaining low for the next one to three years, oil prices will see a gradual and continuous rise for the remainder of the forecast period.

Modest Regulatory Changes: While it is recognized that the Albertan government is seeking tighter environmental regulations, it is generally assumed that neither it nor the new Federal government will impose measures that would substantively impact production growth.

The assertion that low oil prices are the only cause of tar sands delays is inaccurate

Market Access Constraints

(Section 5)

The tar sands in Northern Alberta are located a long distance from major crude oil markets. In order to proceed with a new project, companies need to feel confident that they will have affordable access to these markets. Until 2010, pipeline expansions and refinery conversions had marched in lockstep with tar sands production growth. However, no new pipelines have been built out of Alberta since 2010.

As well as Keystone XL, three other major new tar sands pipelines were proposed. With Prime Minister Trudeau's opposition to Northern Gateway, just two major pipeline proposals (Kinder Morgan's Trans Mountain Expansion and Energy East) remain, and both are also facing significant political, legal and public obstacles. In parallel with these efforts to build new pipelines, Enbridge has pursued incremental expansions to its existing Mainline system. While some expansions have occurred in recent years, new incremental additions too are now facing growing public opposition, especially in the U.S. Midwest. Much of this opposition is driven by concern for the climate and environmental impacts of tar sands expansion, as well as concern for the direct impacts on communities on the frontlines of development.

If no new pipelines are built there will be no pipeline space available for tar sands production growth beyond that which arises from the projects already under construction.

Due to this locked-in growth, the existing export system could reach its limit as soon as 2018. If proposed expansions of the Enbridge system are completed, this would add up to 300 kbd to the system, accommodating the committed growth but leaving no significant room for further growth beyond that.

Sending tar sands crude by rail is an option. But it is not an option that producers can depend on enough to justify multi-billion dollar investments in new tar sands production. While the transport of tar sands by rail has grown in recent years, its potential is severely hampered by high costs and unreliable logistics.[14]

Will producers invest in new production if rail is the only available transportation option, i.e. if pipeline capacity is full and no new pipelines are being built. While there may be a few exceptions, where project costs are very low, and/ or where an integrated company can play upstream margins against refining, generally the additional cost of rail eats too far into already tight netbacks.

Impact specifically on BP's and Shell's future tar sands projects

(Section 6)

If no new pipelines are built, there will be no pipeline export capacity for tar sands projects that have yet to break ground. We use cash flow analysis to examine whether BP's and Shell's potential future projects might be able to proceed if rail is the only option available. We calculate the breakeven oil price – the flat West Texas Intermediate (WTI) price at which a project would achieve 10% IRR – for each of BP and Shell's projects, in two scenarios: with the Kinder Morgan pipeline and with no pipelines built.

Even with a pipeline, breakeven prices are so high that while it is not implausible that oil prices could reach such a range in the coming years the projects would carry high risks of making losses if those prices do not persist. Over the long timeframes of tar sands projects, this leaves investors very exposed. In the event that no more pipelines are built, it is hard to imagine circumstances in which these BP and Shell projects could proceed.

Aside from the outliers of the cheaper Pike 1 and Terre de Grace pilot and the expensive Jackpine projects, BP and Shell's future projects generally have breakeven prices in the range of $75-85, even if the Kinder Morgan pipeline is built. This is significantly higher than the vast majority of the world's proven oil reserves.

If forced to rely on rail, the projects' economics become even more stark. Apart from Pike 1 and Terre de Grace pilot, the breakeven price range increases to $95-110 - around the levels reached during the high price years of 2008-14.

Figure 2: Breakeven WTI price for future potential BP and Shell tar sands projects, with and without pipeline availability

	Product	With Kinder Morgan pipeline	No pipelines
BP			
Terre de Grace pilot	bitumen	$67	$88
Terre de Grace 1	bitumen	$75	$95
Terre de Grace 2	bitumen	$73	$93
Sunrise 2A	bitumen	$74	$93
Sunrise 2B	bitumen	$75	$95
Pike 1	bitumen	$62	$81
Pike 2	bitumen	$78	$98
Shell			
Carmon Creek 1	bitumen	$80	$100
Carmon Creek 2	bitumen	$84	$103
Muskeg River Expansion & Debottlenecking	SCO	$87	$98
Jackpine 1B	SCO	$94	$106
Jackpine Extension	SCO	$98	$109

Sources: Oil Change International model, Rystad UCube

Questions for BP and Shell

- What is the company's assessment of the breakeven price of its, as yet unconstructed, tar sands projects with and without pipeline access?
- On which pipelines has the company contracted volumes?
- Does the company consider pipeline access as a prerequisite to the projects proceeding?
- What is the company's hurdle rate for approving these projects?
- Does the company anticipate making final investment decisions on any or all of these projects in the foreseeable future? If not, does the company anticipate relinquishing the relevant leases and equipment or will it continue to incur some costs?

Regulatory Challenges

(Section 7)

While higher global oil prices could offset increased transport costs or reduced local prices, stronger regulations could shift the economic balance back. Furthermore, they create additional time for legal efforts by First Nations and directly impacted communities in Northern Alberta to object to infrastructure projects.

No tar sands producer to date has been successful in meeting stated goals for managing tailings waste.[15],[16]

In November 2015, the Alberta Government announced a new climate plan.[17] The plan includes a 100 megatonne per year (Mt/y) cap on tar sands emissions, over the period 2020-30. Assuming constant emissions intensity, the cap would allow a further increase in tar sands extraction of 250 thousand barrels per day (kbd) - the equivalent of a large mine - beyond what is already under construction.[18] However, if industry is able to get halfway to achieving already stated goals for emissions intensity,[19] the cap could allow for more than 720 kbd of additional new production.[20] If it achieved these targets completely (applying a 20% intensity-reduction target to all existing and under-construction projects, not just the largest ones), it would allow over 1.7 mbd of further growth.[21] It appears then that the cap will place a limit on further expansion; as for how much of a limit, it remains to be seen what changes occur in emissions intensity.

However, significant tar sands production growth beyond what is already under construction would require the adoption of new transformative technologies to reduce emissions intensity. There is little evidence that emissions reductions on the required scale will be possible. The industry often repeats a misleading statistic: "Emissions per barrel have been reduced by 26 per cent between 1990 and 2011." However, all notable reductions happened before 2005 and average emissions intensity has stayed flat.[22],[23]

Questions for BP and Shell

- In light of Shell's track record of failing to meet specific targets for capturing fine particulates in tailings, can the company provide an update on its current compliance with requirements to manage tailings waste? Does Shell Canada still consider the costs of compliance in current industry conditions to be an obstacle to meeting the requirements?
- What specific measures are the companies taking to reduce GHG emissions in their operations?
- What emissions intensity do you project for the company's proposed projects, and what is the basis for this estimate?
- How do you foresee the company's projects fitting within the 100 Mt emissions cap, given the small amount of space for all new projects?
- The cap applies until 2030, and after that will need to be rapidly decreased to meet global climate targets. If the company's projects go ahead, can their emissions be significantly reduced after they have been built?
- Given the failure to improve emissions intensity significantly in the last 10 years, how confident is the company that emissions reduction can now be accelerated to meet the newly introduced requirements and indeed any future strengthening of them?

Conclusion

Institutional shareholders, worried about the economic viability of Shell's and BP's tar sands plans, filed resolutions for the 2010 shareholder meetings calling for greater disclosures on the companies' planning assumptions. They were rebuffed by over-confident boards of directors. Shareholder concerns have been vindicated. It's vital that the correct lessons are learned by the companies and investors.

Those lessons extend beyond tar sands projects to the centre of the IOC business model.

Industry conditions - including the US shale boom and Saudi Arabia's assertive moves to protect market share - highlight the vulnerability of projects such as Canadian tar sands which sit at the wrong end of the cost curve. The rejection of essential market access infrastructure for tar sands specifically on climate grounds highlight industry vulnerability to increasingly ambitious climate policy, and the coordinated grassroots opposition which demanded that decision highlights the growing opposition facing oil projects across the world.

- What proportion of the company's oil and gas reserves and resources require a break-even price in excess of $60bbl?
- In making final investment decisions for long-life projects what are your projections regarding long-term oil price?
- What assumptions underpin your projected oil price? e.g. level of electric vehicle and renewable energy penetration; climate policy; level of oil demand.
- Does the company stress-test the resilience of such projects against a range of demand and price scenarios compatible with the goals of the Paris Agreement to keep global temperature increases to well below 2C with an ambition for 1.5C?
- What is the company's assessment of the breakeven price of its, as yet unconstructed, tar sands projects with and without pipeline access?
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- Does the company anticipate making final investment decisions on any or all of these projects in the foreseeable future? If not, does the company anticipate relinquishing the relevant leases and equipment or will it continue to incur some costs?

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Endnotes

1 Royal Dutch Shell plc CEO, Ben van Beurden (2016, May 24). In response to question at 2016 shareholder meeting

2 BP Plc CEO, Bob Dudley (2016, April 14), in response to a question at 2016 shareholder meeting.

3 Bousso, R. (2016, July 10). "Global oil exploration nears $1 trillion - where are the finds?" Reuters. Accessed August 9 2016 at: http://www.reuters.com/article/oil-explorers-idUSL6N0PL2VD20140710

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8 Crooks, E. and Adams, C. (2016, February 14), "Oil majors' business model under increasing pressure." Financial Times. Accessed August 9: http://www.ft.com/cms/s/0/cbbf5a16-d17d-11e5-92a1-c5e23ef99c77.html#axzz4C7P4k3ZX

9 Bickis, I. (2016, June 1). "Critics call on oil industry to pay out profits through dividends, buybacks". The Canadian Press. Accessed August 9 at: http://www.ctvnews.ca/mobile/business/critics-call-on-oil-industry-to-pay-out-profits-through-dividends-buybacks-1.2925970#_gus&_gucid=&_gup=twitter&_gsc=CNIOVkP

10 Op. cit., no.4

11 Royal Dutch Shell plc. (2015, October 27). "Shell to halt Carmon Creek in situ project." Accessed August 9 2016 at: http://www.shell.com/media/news-and-media-releases/2015/shell-to-halt-carmon-creek-in-situ-project.html

12 Royal Dutch Shell plc CEO, Ben van Beurden (2016, May 24). In response to question at 2016 shareholder meeting

13 It should be noted that we do not endorse the EIA Reference Case or its use for making decisions on energy policy or investment. It is a business-as-usual scenario that assumes U.S. energy policies remain as they are today. U.S. GHG emissions associated with it are at least 190 percent higher in 2040 than they should be if the U.S. was making progress towards its stated climate goal of constraining climate change to 2 Degrees Celsius. Using the Reference Case implies a failure to address climate change. We have used this forecast here because this approximates the assumptions currently used by the industry.

14 Oil Change International. (2014, September). "Wrong Side of the Tracks: why rail is not the answer to the tar sands market access problem." Accessed August 9 2016 at: http://priceofoil.org/content/uploads/2014/09/OCI-Wrong-Side-of-the-Tracks_Final.pdf

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17 Alberta Government. "Climate Leadership Plan: A summary of Alberta's new policy response to climate change." Accessed August 9 2016: http://www.alberta.ca/climate-leadership-plan.aspx

18 Expansion space at existing intensity = 100 - 92 = 8 Mt. Within the remaining 8 Mt (assuming no change in efficiency) 250 kbp is calculated as follows: 8/70 x 2.2

19 Alberta Energy Regulator. "Directive 074: SUSPENDED- Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes." https://www.aer.ca/rules-and-regulations/directives/directive-074
Under the Specified Gas Emissions Regulation of 2007, large emitters (above 100,000 t/y of CO2e) were required to reduce their emissions intensity (eg per barrel of oil) by 12% by 2014. In 2015 the regulation was extended, requiring 15% intensity reduction by 2016, and 20% by 2017.

20 Expansion space at existing intensity = 100 - 92 = 8 Mt 10% reduction in intensity of existing projects = 10% x 70 = 7 Mt 10% reduction in intensity of under-construction projects = 10% x 22 - 2.2 Mt. Total expansion space = 8 + 7 + 2.2 = 17.2 Mt. New production emissions with 25% intensity improvement = 17.2 / 70 x 2.2 / 0.75 = 0.72 mbd.

21 Total expansion space = 8 + 14 + 4.4 = 26.4 Mt. New production emissions with 50% intensity improvement = 26.4 / 70 x 2.2 / 0.5 = 1.7 mbd.

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23 Israel, B. (2016, August). "Measuring oilsands carbon emission intensity." Pembina Institute. Accessed August 9 at: https://www.pembina.org/reports/measuring-carbon-emission-intensity.pdf