BACKGROUND AND STUDY SCOPE

Each year the Canadian Energy Research Institute (CERI) publishes its long-term outlook for Canadian oil sands production and supply in conjunction with an examination of oil sands supply costs. This is the thirteenth edition of CERI’s oil sands supply cost and development projects update report. Similar to past editions of the report, several scenarios for oil sands development are explored. In addition, given the assumptions for the current cost structure, an outlook for future supply costs is provided.

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Supply cost is the constant dollar price needed to recover all capital expenditures, operating costs, royalties and taxes and earn a specified return on investment. Supply costs in this study are calculated using an annual discount rate of 10 percent (real), which is equivalent to an annual return on investment of 12.0 percent (nominal) based on the assumed inflation rate of 2.0 percent per annum.

Based on the assumptions presented in Chapter 2, the supply costs of crude bitumen for a greenfield steam assisted gravity drainage (SAGD) project and an expansion phase SAGD project are presented in Figure E.1. The plant gate supply costs, which exclude transportation and blending costs, are C$40.61/bbl for a SAGD project and C$27.60/bbl for an expansion phase SAGD project. A comparison[1] of field gate costs from the 2018 update with this year’s supply costs indicates that, after adjusting for inflation, the supply cost for a greenfield SAGD producer has decreased by 11 percent, and by 6 percent for an expansion SAGD.

After adjusting for blending and transportation, the WTI equivalent supply costs at Cushing are US$52.84/bbl and US$45.88/bbl for a greenfield and expansion SAGD, respectively. At current WTI prices of around US$60/bbl,[2] these projects are decidedly economic. The relative position of oil sands projects against other crude oils is comparatively competitive, and as oil prices are expected to increase, so will the profitability of oil sands projects. There are risk factors that might affect project economics, such as market access, exchange rate, future oil prices, project costs, etc. Some of these impacts were evaluated through a sensitivity analysis in Chapter 2.

[1] Direct cost comparison is not recommended and only shown to illustrate the direction of change. Because some changes were made in the project assumptions regarding carbon policy as well as project economics, a direct comparison of costs is not favoured.
[2] At the time of writing, WTI prices traded at US$60.83/bbl
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Figure E.1: Total Field Gate Bitumen Supply Costs

Production Forecast – Three Scenarios

Figure E.2 illustrates the possible paths for production under the three scenarios. For an oil sands producer, a project’s viability relies on many factors such as, but not limited to, the demand-supply relationship between production, operating and transportation costs (supply side) and the market price for blended bitumen and SCO (demand).

Total production from oil sands areas reached a significant milestone of a 3 million-barrel-per-day (MMBPD) level in 2018, surpassing 2017 production by 210 thousand barrels per day (MBPD). Oil sands bitumen production is comprised of in situ (thermal and cold bitumen) production of 1.6 MMBPD and mining production of 1.5 MMBPD within the boundaries of oil sands areas. Total production in 2017 was 2.84 MMBPD, meaning oil sands production grew 7 percent year-over-year. Production from oil sands includes an increasing share of Alberta’s and Canada’s crude oil production. In 2018, non-upgraded bitumen and SCO production made up two-thirds of total Canadian crude production and 87 percent of Alberta’s total production.

In the future, under the High Case Scenario, production from mining and in situ projects (thermal and cold bitumen) is set to grow to 3.3 MMBPD by the end of the decade and reach 4.9 MMBPD in 2030, peaking at an all-time high of 5.8 MMBPD by 2039. In the Low Case Scenario production grows at a slower rate, rising to 3.1 MMBPD in 2020, 3.3 MMBPD by 2030 and to 4.1 MMBPD by the end of the forecast period. CERI’s Reference Case Scenario provides a base case of oil sands production. Projected production volume will increase to 3.2 MMBPD by 2020 and 4 MMBPD in 2030, peaking at 4.7 MMBPD by 2039 (see Chapter 3 for more details).

(a) Return on capital included. Source: CERI

[3] Totals may not add up due to rounding. Historical production is sourced from the Alberta provincial regulator.
Bitumen production in CERI’s Reference Case grows by an annual average of approximately 80 MBPD or just over 2 percent per year. This growth rate is downgraded from last year’s estimate of 3 percent. The slight decline in 2016 is the result of wildfires in northern Alberta that happened mid-2016 affecting oil sands projects. The 2019 estimated drop is due to mandated production curtailment implemented by the Alberta government and enforced in January 2019 to counteract the increasing price differential between WTI and WCS.

**Capital Investment**

Oil sands capital spending is expected to stay weak in the near term of the forecast, continuing a downward trend. A majority of oil sands companies keeps deferring new projects in the short term, focusing instead on sustaining existing facilities and lowering costs of production.

From 2019 to 2039, it is projected that almost C$126 billion (initial and sustaining) will be invested into mining projects and C$200 billion into in situ thermal and solvent as well as primary and EOR cold bitumen projects. Upgrading projects see the least amount of capital spent, amounting to C$22 billion.

Historical and forecast capital expenditures from 2007 to 2039 are shown in Figure E.3. As evidenced in the industry, capital expenditures on oil sands projects have been on the decline since 2014, coinciding with a decrease in oil prices. Investment fell by 10 percent to C$13.8 billion in 2017 as compared to 2016 levels and a further estimated 6 percent in 2018. The 2014 peak spending of almost $34 billion is not projected. For the next 5 years, the investment will remain less than C$15 billion.

Going forward, overall capital expenditures average $16.5 billion per year in the 2019-2039 forecast period and decline at one-tenth of a percent per year on average. There are lingering risk factors that could impact the capital outlay outlook – further deferral of projects; successful deployment of cost-reduction strategies; uncertainty on a 100 MT cap on oil sands emissions; and uncertainty over export pipeline development projects. Expenditures in the oil sands are expected to be invested in new thermal projects or primarily aimed at sustaining capital and expanding existing projects.
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Oil Sands Economic Contribution

Canadian Impacts

The industry is projected to contribute $1.01 trillion to the Canadian GDP over the next 11 years (Table E.1). Most of the impacts will be felt in Alberta, but Saskatchewan is a growing contributor as oil sands projects from that province are coming online. Governments will collect tax revenues in the form of corporate taxes and royalties. Those are estimated to be $16.7 billion in overall tax revenues for Canada; of that, $11 billion will be collected in Alberta.

Table E.1: Total Economic Impacts of Oil Sands Development, 2019-2029

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Region</th>
<th>2019-2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (million $CAD)</td>
<td>Alberta</td>
<td>886,667</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>1,012,502</td>
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<tr>
<td>Employment (person-years)</td>
<td>Alberta</td>
<td>3,468,300</td>
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<tr>
<td></td>
<td>Canada</td>
<td>4,688,261</td>
</tr>
<tr>
<td>Tax (million $CAD)</td>
<td>Alberta</td>
<td>11,003</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>16,675</td>
</tr>
</tbody>
</table>

Source: CERI
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The annual GDP growth for Canada will average approximately C$92 billion, growing from C$71.3 billion in 2019 to C$117 billion in 2029. Alberta will account for 88 percent of the total impact, averaging C$80 billion per year.

Total employment (direct and indirect) in Canada will amount to 4,688 thousand-person years, translating to growth from 332,847 jobs in 2018 to 532,673 jobs in 2029. Direct and indirect employment in Alberta grows from 247,144 jobs in 2019 to 391,187 jobs by 2029. Over 70 percent of jobs are filled in Alberta.

Total tax revenues generated from oil sands development to the government will amount to almost C$17 billion over the 2019-2029 period (Table E.1). On average, annual tax revenues (federal and provincial) will be C$1.5 billion, increasing from C$1.2 billion in 2019 to C$1.9 billion in 2029. Given that the majority of oil sands projects are located in Alberta, the province will generate the highest shares of both federal and provincial tax revenues at 66 percent.

US Impacts

Investments and operations of Canadian oil and gas projects make important contributions to the United States economy as well. The US benefits not only from importing oil and gas from Canada but also from supplying goods and services used by the Canadian oil and gas industry. Prior to the 2014 oil price collapse, the Canadian oil and gas production sector imported C$6.5 billion worth of products and services from the US in 2013. Supply of those products and services spur economic activity and create or preserve jobs in respective US states.

For the forecast period of 2019-2029, it is estimated that the total impact on the US gross state product (GSP)[4] will amount to almost US$15 billion or C$20.3 billion (using the exchange rate of US$0.75 per CAD$1). The total employment impact is measured in creating or sustaining around 133,000 full-time equivalent jobs over the 11-year period.

The top ten states that benefit the most from Canadian oil sands development are, in descending order, Texas, California, Illinois, Oklahoma, Ohio, Colorado, Pennsylvania, Wisconsin, and Florida (Figure E.4). Together, the top ten states make up 70 percent of the total GSP impact and 67 percent of total employment impact. Texas, by far, the largest beneficiary in terms of gross state product (GSP) and employment, totalling almost US$5 billion over the 11-year forecast or 30 percent of total GSP impact. Growing employment in Texas that is created or sustained will more than double, totalling 36,698 jobs over the 11-year period.

Emissions

Figure E.5 illustrates total emissions projection for the Reference Case production forecast. The on-site emissions projection includes emissions from existing upgrading, electricity or fugitive emissions and flaring. Current on-site emissions are projected to grow from 68 MT/year in 2018 to 94 MT/year in 2039, not reaching the emissions cap of 100 MT. In comparison to last year’s update, the 100 MT level was reached in 2030. The difference is explained by a lower production forecast and is not reflective of technological changes to reduce emissions.

[4] In the US, the definition of the gross state product (GSP) is similar to the provincial gross domestic product in Canada.
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Figure E.4: Oil Sands GSP Impacts for Top US States

Figure E.5: Oil Sands Emissions by Project Type

Source: CERI, CanOils

View the full study at www.ceri.ca/studies