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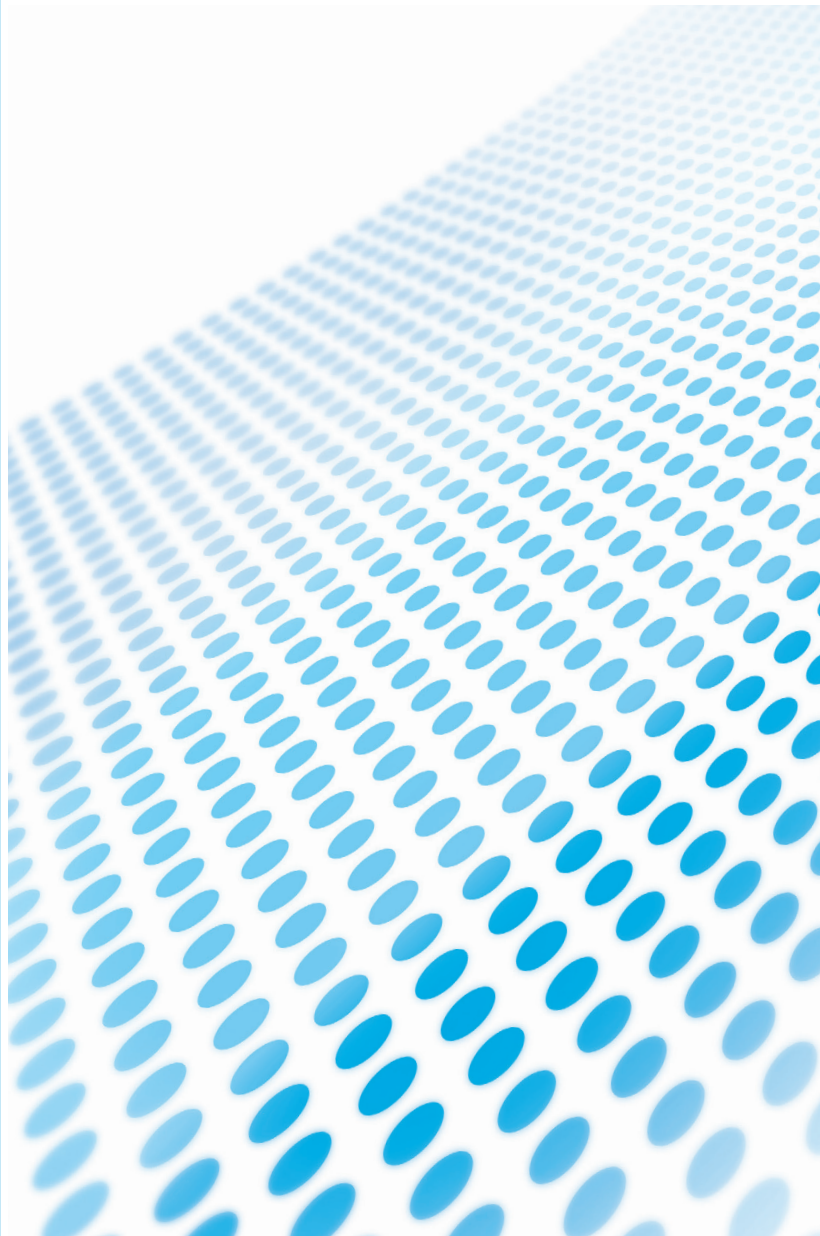
Special Report

# Oil Sands Economic Benefits

Today and in the future

January 2014

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## About this report

- **Purpose.** There is a debate in Canada about the level of benefits of oil sands development. Where does money generated from the oil sands flow go, what are the economic benefits today, and what could they be in the future? This report aims to provide facts and data about the scale of the benefits today and the future potential, including issues related to estimating economic benefits to help inform this discussion.
- **Context.** This report is part of a series from the IHS CERA Canadian Oil Sands Dialogue. The Dialogue convenes stakeholders in the oil sands to participate in an objective analysis of the benefits, costs, and impacts of various choices associated with Canadian oil sands development. Participants include representatives from governments, regulators, the oil and gas industry, academics, pipeline operators, and nongovernmental organizations. This report and past Oil Sands Dialogue reports can be downloaded at [www.ihs.com/oilsandsdialogue](http://www.ihs.com/oilsandsdialogue).
- **Methodology.** IHS CERA and IHS Global Insight conducted our own extensive research and analysis on this topic, both independently and in consultation with stakeholders. This report was informed by multistakeholder input from a focus group meeting held in Calgary, Alberta, on 6 June 2013 and participant feedback on a draft version of the report. IHS has full editorial control over this report and is solely responsible for the report's contents (see the end of the report for a list of participants and the IHS team).
- **Structure.** This report has an introduction, three sections, and a conclusion.
  - Introduction: Economic benefits are already here
  - Part 1: Where does money generated from the oil sands flow?
  - Part 2: Challenges in measuring oil sands economic benefits
  - Part 3: Economic benefits today and in the future
  - Conclusion: Greater economic benefits possible in the future

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# Oil Sands Economic Benefits

## Today and in the future

### Summary of key insights

- **Canada's oil sands generate economic benefits on a scale greater than Canada's fifth largest economy, the Province of Saskatchewan.** It is estimated that in 2012, oil sands contributed C\$91 billion to the Canadian economy, or 5% of GDP, and to 478,000 jobs, or 3% of all jobs in Canada—more than 5 out of 10 provinces.
- **Most of the gross revenue generated by oil sands stays in the oil sands, reinvested in operations.** In 2012, four-fifths of every dollar made by oil sands operations was reinvested into maintaining and moving oil sands production to market. One-tenth of revenues went to government coffers.
- **Oil sands development contributed \$28 billion to governments in Canada in 2012; more than half went to the federal government.** In 2012, oil sands investment generated C\$15 billion in federal tax revenues, C\$12 billion to Alberta, and over C\$1 billion to other provinces. The federal share represented 6% of government revenues and was equivalent to half of federal spending on health care transfers in 2012.
- **In a future where oil sands production reaches 3.8 million barrels per day in 2025, oil sands' contribution to Canadian GDP could nearly double, and a third more jobs could be expected.** Between 2012 and 2025, oil sands' contribution to Canadian GDP could grow from C\$91 billion to C\$171 billion. This would be like adding an economy the size of Saskatchewan today to Canada by 2025. Oil sands could also add over one-quarter of a million more jobs, contributing to 753,000 jobs in Canada in 2025.
- **The above numbers may well understate the economic impact to regions beyond Alberta: to other Canadian regions and the United States.** Comprehensive data on the geographic distribution of direct oil sands investment do not exist. As a result, a greater share of benefits is attributed to Alberta and too few to other regions. Current models are also not ideal for measuring the net effect of a large investment like the oil sands. Given the discussion over oil sands benefits to other regions, the development of more comprehensive tools and data is warranted.

—January 2014

## Introduction: Economic benefits are already here

Oil sands production has more than doubled in the past 10 years, reaching 1.9 million barrels per day (mbd) in 2013.<sup>1</sup> Alongside production growth, oil sands' contribution to the Canadian economy has also expanded. Economic benefits from oil sands development can be measured by the jobs it creates, the goods and services it purchases from other businesses, and the royalties and taxes paid to governments.

In the dialogue surrounding oil sands development, the economic benefits are often depicted as yet to come; however, with annual expenditures already greater than the GDP of 5 out of 10 of the Canadian provinces, the benefits are here.<sup>2</sup> We estimate that in 2012, oil sands contributed to 478,000 jobs in Canada and C\$91 billion in Canadian GDP, or about 3% of total Canadian employment and 5% of GDP.<sup>3</sup> This was on a scale greater than Canada's fifth largest provincial economy—the Province of Saskatchewan. Royalties and taxes collected from oil sands and spin-off activities exceeded C\$28 billion, or about C\$812 per Canadian in 2012.<sup>4</sup> Oil sands' contribution to Canada could be even greater, with production predicted to more than double to 3.8 mbd by 2025.

The objective of this report is to establish a common understanding of the benefits derived from oil sands spending today and in the future. Some economists contend that the potential costs from oil sands development (such as crowding out of other investments through inflation, impacts of a stronger Canadian dollar, or unaccounted for environmental costs) could offset part of the benefits. Tackling these questions is not within the scope of this report. Each of these questions is complex, difficult to quantify as well as qualify, and potentially thesis worthy.

In addition to this introduction, the report includes three parts and a conclusion:

- Part 1 studies how oil sands operations generate revenue today and where it goes.
- Part 2 investigates some limitations of commonly used data sources and models in measuring economic benefits.
- Part 3 compares the economic benefits of oil sands today to what they could be in 2025.

Some economic terms are used throughout this report to describe how oil sands development generates economic benefits. These are discussed in the box “Common economic concepts in this report.”

1. In 2002 oil sands production of synthetic crude oil (SCO) and nonupgraded bitumen was 707,000 barrels per day (bd). Source: IHS CERA.

2. GDP is a common measure of economic activity or standard of living.

3. Unless stated otherwise, all values are in constant Canadian dollars. Source: IHS CERA. Statistics Canada, Gross domestic product, expenditure-based, provincial and territorial, current market prices, Table 384-0038, [www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038](http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038), accessed 19 November 2013. Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, <http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024>, accessed 19 November 2013.

4. Source: Statistics Canada, Estimates of population, Canada, provinces and territories, Annual 2012 Estimate, Table 051-0005, [www5.statcan.gc.ca/cansim/a05?lang=eng&id=0510005](http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=0510005), accessed 29 August 2013.

## Common economic concepts in this report

The total economic benefit from an investment in an economy exceeds the initial spend, since the original investment results in additional spending cycles. This is called the multiplier effect. Like a rock dropped in a pond, an investment in the oil sands creates waves that travel out from the initial investment, interacting and reverberating off other industries and regions throughout the economy. As a consequence, the total effect of an investment is not limited to the size or shape of that initial “rock,” but also the interaction with the broader economy. In this regard, economists often refer to three types of economic impacts: direct (the initial investment or rock), indirect (the interactions along the supply chain among industries), and induced (workers who receive income, either from the indirect or direct effect, who in turn spend their earnings). Because of these three effects—direct, indirect, and induced—the total benefit to the economy surpasses the initial investment. Throughout this report we will refer to the sum of these three effects as the “total effect.”

- **Direct effect.** This is the direct impact of each new dollar spent in the economy. In the case of oil sands this includes people and companies hired directly by oil sands producers to build, maintain, market, and manage production. It includes employees, specialized labor (welders, pipefitters, engineers, geologists, ecologists, hydrologists, etc.), technical studies and services, as well as other inputs to production (capital expenditure) such as trucks, heavy equipment, drilling rigs, natural gas, and diluents.
- **Indirect effect.** This is the indirect or secondary impact caused by the initial operational and capital investment. It captures the interactions that occur between companies to meet the demands created by the direct effect. For example, companies hired by oil sands firms buy additional goods and services to support their oil sands contracts. One example is an oil sands operator’s purchase of new heavy equipment. To meet the demand, heavy equipment manufacturers have to hire more workers; purchase more steel; and acquire additional parts from their suppliers (other companies) such as tires, bearings, pistons, air filters, lubricants, hydraulic systems, and technology. In turn the companies supplying these parts generate demand for their own inputs to production, and so on. All of this spending is considered the indirect effect.
- **Induced effect.** The induced effect is also called the “income effect.” When an investment is made in an economy, employment results from both the direct and indirect effect. In exchange for their labor, workers are paid an income. When the workers’ wages are spent back into the economy on goods such as food, vehicles, houses, utilities, and financial services, these expenditures generate additional economic activity. Businesses respond to increased consumer spending by hiring new workers or purchasing additional inputs required to ramp up their capacity. All of this spending is considered the induced effect. Although it is perfectly sound that direct and indirect effects drive labor income, which induces activity in an economy, inclusion of induced effects for large, persistent investments such as the oil sands can be a source of criticism, since in the absence of the sustained oil sands investment, some part of the employment would still exist.

## Commonly used indicators for measuring economic benefits

In this report we used four indicators of economic benefit. These are defined here:

- **Gross domestic product (GDP).** GDP is a common indicator of economic performance or standard of living. It is estimated from the total value of goods and services purchased or the total income earned in an economy. GDP is often criticized as an incomplete measure of an economy, as it does not account for income equality, value of a nation's assets, quality of life, or environmental externalities.
- **Employment.** This measures the number of people or positions financially supported by an economic activity or investment.
- **Government revenue.** This quantifies the money received by governments from user fees, taxes, or royalties as a result of economic activity. In our analysis, we considered taxes from both provincial and federal government, including corporate taxes, consumptions-based taxes, and personal income taxes. Royalties were also included.

## Part 1: Where does money generated from the oil sands flow?

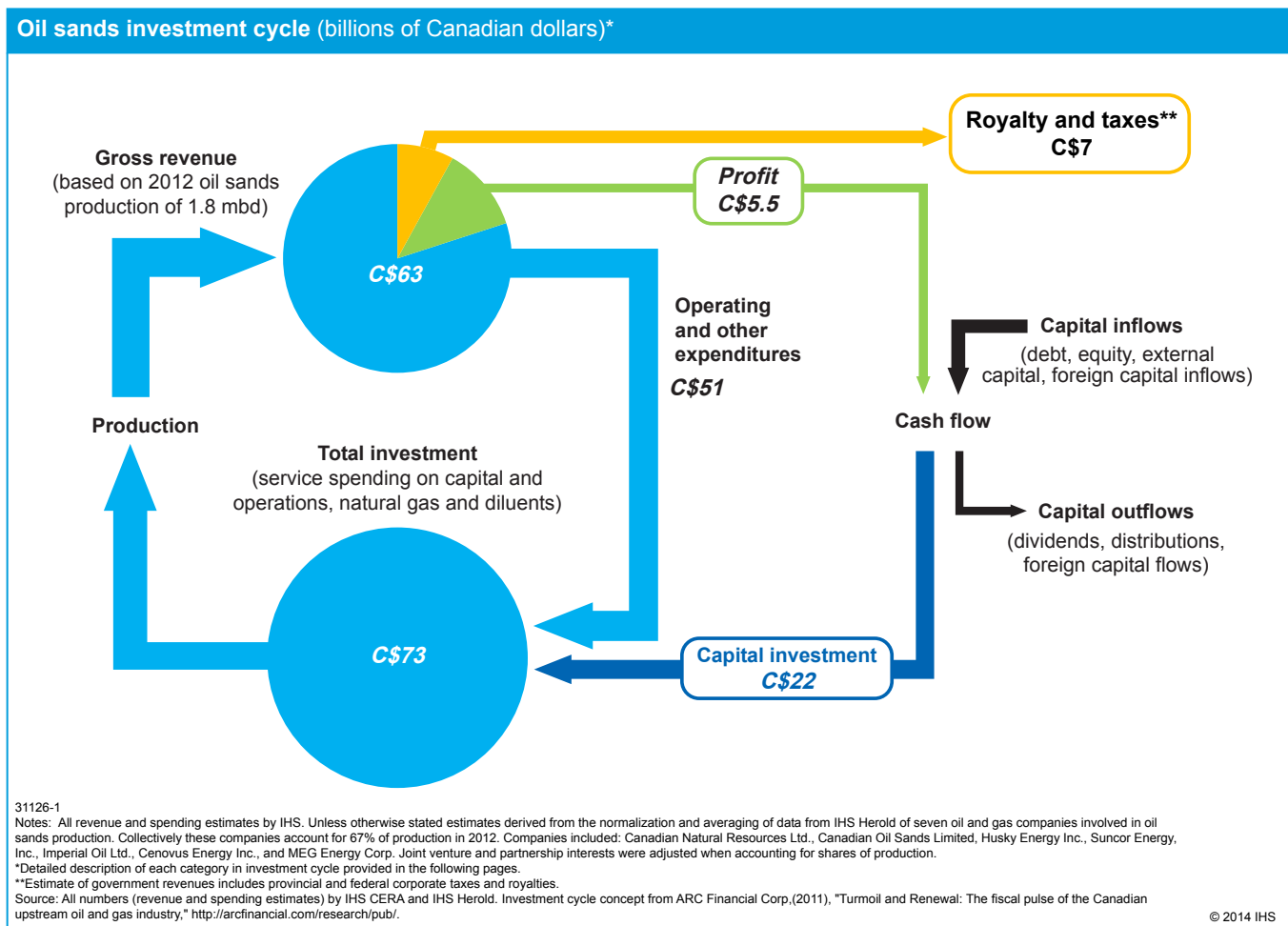
This part of the report explores how money is generated from oil sands and where it goes. It is subdivided into two parts. The first half takes a detailed look at oil sands investment in 2012: where and how the money flows into, through, and from operations. The second half examines the ownership structure of oil sands operations.

### Where does money generated from and invested in the oil sands go?

To answer the question of how the oil sands generate wealth, we drew upon a method first devised by ARC Financial Corp. dubbed “the oil sands investment cycle.”<sup>5</sup> Figure 1 applies revenue and spending estimates derived solely by IHS to the ARC Financial Corp. method. A detailed description of each aspect of the oil sands investment cycle is explained in the paragraphs that follow.

As shown in Figure 1, in 2012 the industry spent about C\$73 billion, which was used to sustain production from existing oil sands operations and to fund new capital projects. Although the focus is typically on new capital investment, the majority of capital spending in 2012—about 70%—went to sustain production from

FIGURE 1



5. ARC Financial Corp (2011), “Turmoil and Renewal: The fiscal pulse of the Canadian upstream oil and gas industry,” <http://arcfinancial.com/research/pub/>.



existing operations.<sup>6</sup> Governments in Canada (provincial and federal) are also large beneficiaries, collecting about C\$7 billion in royalties and taxes directly from oil sands operators in 2012.<sup>7</sup>

Unlike oil sands production, which to date has been geographically restricted to the Province of Alberta, the spending depicted in Figure 1 is not.<sup>8</sup> For instance, engineering and administration services, equipment, and chemical manufacturing associated with oil sands development occur beyond Alberta in other Canadian regions, the United States, and elsewhere.

What follows is a detailed breakdown and description of the oil sands investment cycle depicted in Figure 1.

- **Gross revenues from production, C\$63 billion (2012).** Money is generated from oil sands development from the extraction and subsequent sale of crude oil. With growing production, industry revenues have more than doubled in the past five years. Gross revenues in 2012 were C\$28 billion more than in 2007.<sup>9</sup> Although revenues were substantial, the potential was greater. Had western Canadian crude oils not been subject to price discounts owing to export bottlenecks, oil sands revenues could have been C\$11 billion higher in 2012.<sup>10</sup> With expenses being covered, higher revenues would have contributed to greater profit and government royalties and taxes, as discussed below.
- **Royalties and taxes paid by oil sands producers, C\$7 billion (2012).** In 2012, Alberta received C\$4 billion in royalties from oil sands operations, and we estimate that oil sands operators paid about C\$3 billion in taxes to the Alberta and federal governments.<sup>11</sup> Similar to gross revenues, had oil sands crudes not been subject to a price discount in 2012, royalties and taxes would have been greater. In fact, price discounts contributed to a Government of Alberta deficit in fiscal year 2012/13.<sup>12</sup>
- **Profit from oil sands operations, C\$5.5 billion (2012).** We estimate that only one-tenth of oil sands revenues, or C\$5.5 billion in 2012, was profit. The rest of oil sands revenues went toward sustaining production or were paid to government for royalties and taxes. Profit and taxes are the only part of revenues that could move beyond oil sands operations. However, not all profit will necessarily leave oil sands development. Some may be reinvested into new capital projects to expand production. Profits that do exit from oil sands development can be used to pay down debt, be invested into capital projects beyond the oil sands (i.e., other oil production opportunities), or paid out as a dividend to shareholders as a return on investment. Where profit ends up, domestically or internationally, depends on where the capital is reinvested or where the debtor and shareholders originate. Details on oil sands ownership are presented later in this section.
- **Operating and other expenses (including employee wages), C\$51 billion (2012).** Four-fifths of every dollar generated by the oil sands went into maintaining production in 2012. This includes the cost

6. Referring to Figure 1, we estimated that oil sands operating and other expenditures were C\$51 billion of the total investment of C\$73 billion in 2012.

7. Royalties were C\$4 billion. Source: Government of Alberta, [http://www.energy.alberta.ca/about\\_us/1702.asp](http://www.energy.alberta.ca/about_us/1702.asp), accessed 7 November 2013. Source of tax estimate from IHS CERA and IHS Herold. For more information on IHS tax estimate, see Figure 1 footnotes.

8. Oil sands deposits are found principally in Alberta, with some overlap into the adjacent Province of Saskatchewan.

9. Based on crude oil supply and the annual average crude oil prices expressed in constant 2012 Canadian dollars for 2012 and 2007. In 2012: 1,291,000 bd of bitumen blend at an average Western Canadian Select (WCS) price of C\$72 per barrel and 862,000 bd of SCO at an average Syncrude Sweet Blend (SSB) price of C\$91 per barrel. In 2007: 714,000 bd of bitumen blend at an average WCS price of C\$49 and 652,000 bd of SCO at an SSB price of C\$75 per barrel. WCS is a western Canadian heavy crude benchmark price, and SSB is a benchmark price for SCO. Source: IHS CERA.

10. Estimate based on 2.1 mbd of oil sands supply consisting of 34% light SCO and 66% heavy bitumen blends, subject to reduced prices in 2012. Some SCO is present in bitumen blends as a blending agent. Adjusting for quality and transportation costs, light oil sands crudes were valued \$11 per barrel lower than on the US Gulf Coast (USGC), and heavy crudes were valued \$17 per barrel lower than the USGC.

11. Source: IHS Herold and IHS CERA. For more information see Figure 1 footnote. Source of royalty payments from the Government of Alberta. [http://www.energy.alberta.ca/about\\_us/1702.asp](http://www.energy.alberta.ca/about_us/1702.asp), accessed 7 November 2013.

12. Source: Government of Alberta, Alberta's Fiscal Challenge, <http://alberta.ca/fiscal-challenge.cfm>, accessed 2 October 2013.

of oil sands workers (direct oil sands employees and those employed by contractors, suppliers, and other service companies), maintenance and repair work, administration, cost for energy such as natural gas and power, and other expenses such as the purchase of diluent for pipelining bitumen. Without this reinvestment, production levels would not be sustained.

- **New capital investment, C\$22 billion (2012).** New capital investment in the oil sands funds future production growth. Figure 1 depicts the importance of access to capital for oil sands growth, since the current level of required investment greatly surpasses what is available from profits. IHS estimates that in 2012, new capital investment was four times higher than profit, topping C\$22 billion. Investments made in the past few years (or longer) contributed to supply growth of 245,000 bd in 2012.<sup>13</sup> Funds for new capital investment can come from the sale of new corporate debt and equity or from new business entrants (through acquisition, new partnerships, and/or joint ventures [JVs]).
- **Total investment (service spending), C\$73 billion (2012).** Total capital investment is the sum of new capital investment and operating and other expenditures by oil sands firms. In addition to operating expenditures discussed above, total investment can also include third-party companies involved in drilling, water treatment, engineering and design, transportation, welding, civil works, and pipelining, to name a few. In terms of scale, this spending was equivalent to about 4% of the Canadian economy in 2012.<sup>14</sup>

## North America is the largest source of oil sands investment

To deliver on oil sands production growth, significant amounts of capital are required. Owing to the scale of new investment (i.e., C\$22 billion in 2012), funds from beyond Canada are a necessity. Foreign investment is not new to the Canadian oil and gas sector. For example, US-based investment contributed to the first large-scale discovery of crude oil in western Canada in 1947 as well as the first oil sands mining operation in 1967 and the first in-situ operation in 1985.<sup>15</sup>

In 2012, Canadians invested C\$78 billion more abroad than they received in foreign direct investment (FDI).<sup>16</sup> Despite being net positive international investors, a number of high-profile acquisitions of Canadian oil sands companies have raised public concerns surrounding foreign ownership in the oil sands. Within the past five years (2008–12 inclusive) nearly US\$27 billion in foreign acquisitions occurred in the oil sands.<sup>17</sup> Although this brings new capital to develop the oil sands, it has also heightened public concern over whether oil sands benefits will accrue to foreign interests ahead of Canadians.

IHS Herold tracks merger and acquisition activity in the energy sector, including the oil sands, and even considering recent offshore acquisitions, oil sands production remains largely a North American-based venture.<sup>18</sup> Figure 2 depicts the share of oil sands production in 2012 and, as projected by IHS, in 2020,

13. Oil sands supply includes SCO and bitumen blends.

14. Source: Statistics Canada, Gross domestic product, expenditure-based, provincial and territorial, current market prices, Table 384-0038, [www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038](http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038), accessed 19 November 2013.

15. Early exploration by Imperial Oil, a Canadian-based subsidiary of then Standard Oil (ExxonMobil today), was responsible for the discovery at Leduc No.1 well. The first large-scale commercial oil sands mining operation began operations in 1967 near Fort McMurray, Alberta, under the banner of the Great Canadian Oil Sands with the support of Sun Oil Company. Later in 1985 Imperial Oil established the first commercial in-situ oil sands project near Cold Lake, Alberta.

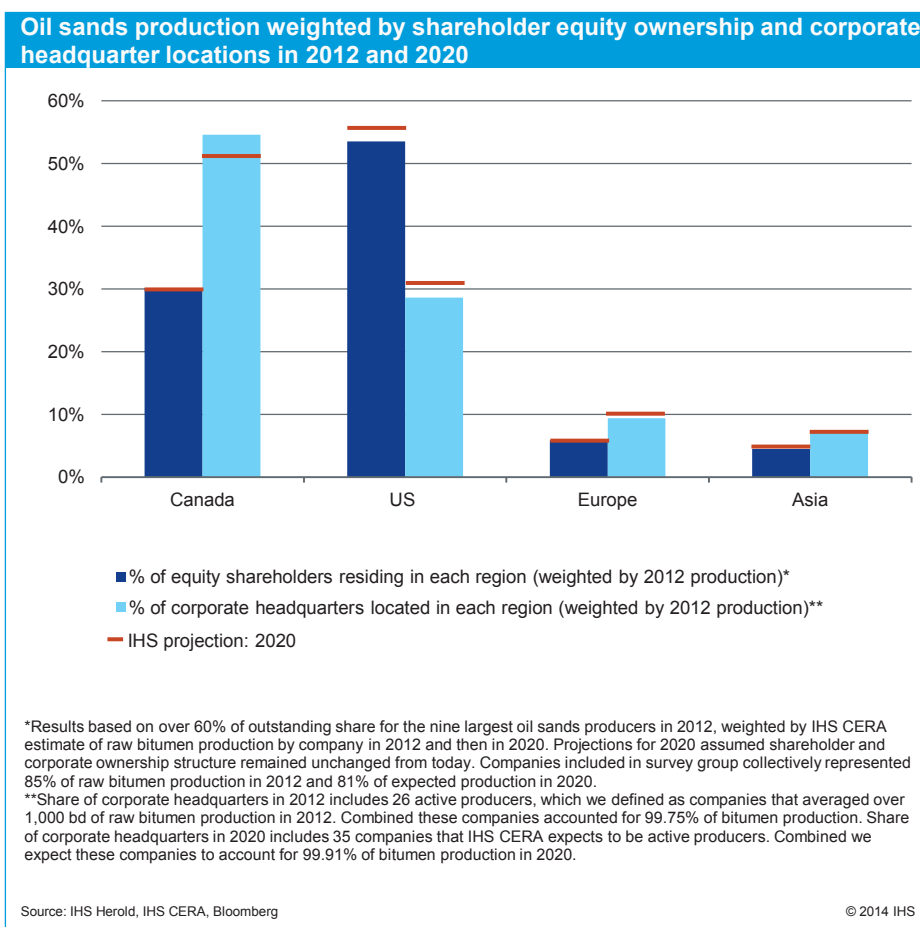
16. FDI occurs when individuals or businesses in one country buy businesses or expand existing operations in another company. FDI differs from indirect foreign investments, which include purchases of equity or debt that has little impact over the influence or control of business operations in the targeted nation. In 2012, inward FDI in Canada was C\$634 billion and outward FDI was C\$712 billion. Source: Department of Foreign Affairs, and Trade Development Canada, Foreign Direct Investment Statistics, [www.international.gc.ca/economist-economiste/statistics-statistiques/investments-investissements.aspx](http://www.international.gc.ca/economist-economiste/statistics-statistiques/investments-investissements.aspx), accessed 19 November 2013.

17. Includes 16 large transactions from companies headquartered in six nations. For acquisitions of companies that had assets beyond the oil sands, the non-oil sands assets were not differentiated from the total. One exception was Nexen Inc., where the value of the China National Offshore Oil Corporation transaction was weighted by the oil sands' share of Nexen's total reserves. Source: IHS Herold.

18. For more information on IHS Herold see: <http://www.ihs.com/products/herold/index.aspx>.

by both the location of corporate headquarters and the majority of equity shareholders.<sup>19</sup> In 2012, over 80% of oil sands production was controlled by firms headquartered in and backed by equity shareholders in North America. A closer look at North American ownership highlights the integrated nature of Canada and US investment. In 2012, 55% of oil sands production was controlled by firms headquartered in Canada with 30% of equity (weighted by production) held by Canadian interests. US citizens were the single largest investors in the oil sands, holding 54% of oil sands equity (weighted by production), and US-based corporations accounted for 29% of production. Looking at projects expected to come online between now and 2020, we expect production increases by North American firms to be balanced by offshore-based firms. Barring further, unseen, large-scale acquisitions of Canadian-based oil sands companies, we expect North American-based corporations and investors to maintain their dominant interest in oil sands production for the foreseeable future—beyond 2020.<sup>20</sup>

FIGURE 2



### Foreign government-owned interests are a small share of oil sands production

There have been additional concerns in Canada about the role of foreign government-owned corporations, known as state-owned enterprises (SOEs), with particular attention being paid to Chinese SOEs.<sup>21</sup> However, China is not unique in having SOEs active in the oil sands. In 2012, SOEs from Japan, Norway, South Korea, and Thailand all had interests in the oil sands. Combined, all SOE interests, including Chinese, accounted for 6% of oil sands production in 2012. On their own, Chinese SOEs accounted for 5% of production.<sup>22</sup> Going forward, as a result of the stated policy of the Government of Canada to limit further acquisitions of controlling interests by SOEs in Canadian-based oil sands companies to “exceptional circumstances,” we

19. Source: IHS CERA, IHS Herold, and Bloomberg. For more information see footnote for Figure 2.

20. Assuming ownership and shareholder structure in 2012 and IHS project level production outlook.

21. SOEs involved in oil production are also often referred to as national oil companies.

22. Source: IHS CERA.

expects future investments by national corporations to take the form of JVs, noncontrolling interests, and investments in non-Canadian-based oil sands businesses.<sup>23</sup>

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23. Source: Prime Minister's Office (2012), "Statement by the Prime Minister of Canada on Foreign Investment," 7 December 2012, [pm.gc.ca/eng/news/2012/12/07/statement-prime-minister-Canada-foreign-investment](http://pm.gc.ca/eng/news/2012/12/07/statement-prime-minister-Canada-foreign-investment), accessed 19 November 2013.

## Part 2: Challenges in measuring economic benefits

It is generally accepted that oil sands development generates economic and employment benefits, and numerous studies, including this one, quantify them. However, there is some debate on the magnitude and geographical reach of the benefits. Limitations in current data and models contribute to this debate. The following section highlights a few areas of confusion in measuring economic benefits.

### Employment benefits—Greater than commonly used sources may indicate

The impacts of oil sands investment on the Canadian economy are greater than commonly used data sources may indicate. In the debate around the employment benefits associated with oil sands, two sets of numbers are often reported. One set represents direct jobs at oil sands companies—people who work at Suncor or Syncrude, for example. The other set comes from complex models of the economy, as we used for Part 3 of this report. These represent the total effect of employment associated with an investment in the economy—including the direct, indirect, and induced jobs across all sectors of the economy.

Employment numbers from these two sources differ because they measure different things. For example, using data from Statistics Canada, Canada's national statistical agency, oil sands companies directly employed around 18,000 people in 2012.<sup>24</sup> In a nation with about 15 million people employed, this is just over one-tenth of 1% of total Canadian employment in 2012.<sup>25</sup> However, employment impacts extend well beyond oil sands companies. Oil sands development relies on a multitude of industries, such as construction, engineering, geology, finance, manufacturing, environmental analysis, and hospitality, to maintain and grow production. For example, in 2012 work camp populations in the primary oil sands region had an estimated population of 39,000, an indication that employment impacts extend beyond oil sands firms.<sup>26</sup>

The only way to measure the broader employment impact of an investment, such as in oil sands, across the Canadian economy is to estimate it using sophisticated models of the economy. In Part 3 of this report we use one of these types of models, an input/output (I/O) model, to estimate the impact of oil sands investment on the Canadian economy. Across all sectors, and including direct, indirect, and induced employment, we estimate that oil sands investment contributed to 478,000 jobs in Canada in 2012. This is just over 3% of Canada's total employment—much larger than oil sands company-specific employment.<sup>27</sup>

The question of which employment number is best depends on what is being measured. If the question is how many people oil sands companies employ directly, Statistics Canada is likely the best source. However, if the question is about the total effect of oil sands investment on employment in Canada, then a picture that includes the broader employment impacts on the economy is more appropriate.

24. Industrial statistics reported by Statistics Canada are compiled according to the North American Industry Classification System (NAICS). Employment statistics for oil sands development are reported as part of the broader oil and gas sector (NAICS 211). However, GDP is available at a more detailed level, including “non-conventional oil extraction”—principally oil sands (NAICS 211114). Weighting employment by oil sands' share of oil and gas GDP provides an estimate of 17,676 full-time positions in 2012. Source: Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024), accessed 19 November 2013. Statistics Canada, Gross domestic product (GDP) at basic prices, by NAICS, 2012 Estimate, Table 379-0031, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790031](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790031), accessed 19 November 2013.

25. This includes all employees, salaried employees paid a fixed salary, and employees paid by the hour. Source: Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024), accessed 19 November 2013.

26. Source: Regional Municipality of Wood Buffalo, Municipal Census 2012, [www.woodbuffalo.ab.ca/Municipal-Government/Municipal-Census.htm](http://www.woodbuffalo.ab.ca/Municipal-Government/Municipal-Census.htm), accessed 31 July 2013.

27. Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024), accessed 19 November 2013.

## Benefits beyond Alberta are larger than estimates

The estimates of how the economic benefits of oil sands development are shared across Canada and beyond, including the United States, attribute too much of the benefit to Alberta and too little to other regions. Studies using I/O models, including this report, typically attribute greater than 85% of the economic benefit (as measured by GDP) of oil sands developments to Alberta.<sup>28</sup> In our report we estimate that of the C\$91 billion oil sands contributed to Canadian GDP in 2012, only C\$12 billion of this benefit occurred beyond Alberta (see Part 3). This result is driven in part because, like other studies in this area, ours lacked comprehensive data on the geographic distribution of direct oil sands investment. For example, not all equipment manufacturing or engineering takes place in Alberta; some is done elsewhere in Canada or is imported. The problem is the lack of comprehensive data on such non-Alberta investments. Because of this lack of data, we assumed that all direct spending occurred in the province. As a result, the I/O model allocates all the direct benefit associated with oil sands development to Alberta. Any direct benefits that may be occurring in other regions are therefore not accounted for appropriately.

Although comprehensive data do not exist, oil sands companies are making large direct investments beyond Alberta. For example, in 2011, Suncor reported spending C\$1.6 billion in Ontario and Quebec, and Syncrude Canada spent over C\$1 billion in Canadian regions other than Alberta. In the same year, Canadian Natural Resources Ltd (CNRL) spent C\$770 million at 350 Ontario companies in support of a new oil sands facility called Horizon.<sup>29</sup> There are also other examples of direct spending in the United States. One example is of the impact of oil sands companies' purchases from a US supplier of steam boilers, resulting in expansion of the manufacturer's facilities in the United States.<sup>30</sup>

Spending patterns can also change over time. For instance, as oil sands activity expands, more direct investment could occur in other regions. In the absence of these data, too much of the investment and therefore the economic benefit is attributed to Alberta and too little to the rest of Canada and beyond.

Another factor that can bias estimates is the static nature of typical I/O models. In the real world, the economy will evolve and change as it reacts to impacts such as local cost inflation or regional shortages, or as production methods become more efficient. The I/O model's static assumptions do not adjust for these changes. As a result, the size and distribution of future benefits across regions can be less certain than estimates of the current level of benefits. This is discussed in more detail in the box "Using input/output models to estimate economic impacts of oil sands development."

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28. Based on work by IHS CERA and IHS Global Insight.

29. Source: Oil Sands Question and Response (OSQAR) Blog, "Are oil sands opponents tilting at windmills?" 6 June 2012, <http://osqar.suncor.com/2012/06/are-oil-sands-opponents-tilting-at-windmills.html#more>, accessed 11 July 2013. Source: Syncrude Canada, Syncrude Sustainability Report, [http://syncrudesustainability.com/2011/economic#operational\\_economic\\_economic-contribution](http://syncrudesustainability.com/2011/economic#operational_economic_economic-contribution), accessed 27 August 2013. Source: CAPP, "The Oil Sands: Growing Ontario's Economy," <http://www.capp.ca/GetDoc.aspx?DocID=176826>, accessed 9 July 2013.

30. Source: JournalStar.com, "Oil sands demand will expand Cleaver-Brooks in Lincoln," [http://journalstar.com/business/local/cleaver-brooks-to-expand-lincoln-plant/article\\_fa2dd8b7-f60d-5d6c-89af-a4e3dc7bbc98.html](http://journalstar.com/business/local/cleaver-brooks-to-expand-lincoln-plant/article_fa2dd8b7-f60d-5d6c-89af-a4e3dc7bbc98.html), accessed 15 November 2013.

## Using input/output models to estimate economic impacts of oil sands development

A well-known approach to quantifying the economywide impacts from a large investment like the oil sands is with social accounting models. A common version of these models is the input/output or I/O model.

I/O models are useful policy tools for measuring the effect of an investment or an increase in spending on the economy because they can capture the total effect on the economy: the direct, indirect, and induced impacts. These models are best suited to measuring marginal impacts (such as the impact of a relatively small investment for a short period) but can provide illustrative estimates of impacts of a large, sustained investment like the oil sands across an economy. I/O models are data intensive, requiring information from across an economy. I/O models have been around for nearly three-quarters of a century, and their structure and principles are well understood. However, all models hinge on their assumptions, which include not only data fed to them but also how the models themselves are constructed.

All economic benefit results should be interpreted as estimates; measuring an economy as diverse as Canada is a complex undertaking. Below we discuss some limitations or implications of the structure of the typical I/O model, such as we used in Part 3.

### Impact of key I/O model assumptions on our results

I/O models are constructed with fixed assumptions about the economy based on what we know today. Over time these assumptions can become out of step with the real world as the economy evolves. This can occur more rapidly for larger investments like the oil sands, as they have a more pronounced impact on the economy. This requires that models are updated regularly; however, when the models are used to make projections, they are based on today's environment, which cannot fully anticipate how the economy may change over time.

Key assumptions behind I/O models are fixed prices and a fixed ratio of inputs to outputs. This means in an I/O framework there is no scarcity and no inflation. So as production ramps up, there are infinite inputs available for production at the same price. In reality, an increase in demand for goods and services can lead to higher prices as the goods in demand become harder to find or more scarce. Larger projects, like the oil sands, are more likely to lead to price increases. In fact, this dynamic has occurred in the oil sands. Prior to the recession, oil sands developers faced labor inflation that at times exceeded 8% per year, and although cost increases subsided during the recession, by 2012 cost inflation was around 5% per year.\* Given that I/O models do not incorporate the effects of price inflation or scarcity, there is less certainty surrounding future estimates of benefits and the allocation of benefits across regions. This is discussed in more detail below.

- **Uncertainty of future benefit estimates.** Outlooks and projections are predicated on what we know today. However, economies evolve, and the more distant the outlook, the less certain estimates become. This is true of all outlooks. However, there are specific uncertainties associated with estimating future benefits using I/O models. A key issue is the absence of price inflation from the model. Inflation can contribute to higher production costs. As things get more costly, production economics weaken, and over time the level of production and the associated

\*IHS North America Crude Oil Markets: Canadian Fundamentals Data tracks the cost of building oil sands projects. For more information see: [www.ihs.com/oilsands](http://www.ihs.com/oilsands). IHS Capital Costs Forum also maintains industry-specific cost escalation information. For more information see [www.ihsindexes.com](http://www.ihsindexes.com). For more information on our cost escalation assumptions see footnote for Table 1.

## Using input/output models to estimate economic impacts of oil sands development (continued)

economic benefit can be lower than an I/O model would normally predict. I/O models also preclude the potential for efficiency improvements from economies of scale, learning by doing, and technological change over time. Efficiency improvements can work in the opposite direction as inflation, because they can lower production costs. Lower costs can encourage growth, which over time can contribute to higher production and the associated economic benefit. This too would not be captured by the typical I/O model. Although there are factors that can both overestimate and underestimate the benefits, there is a greater potential toward overestimation. For these reasons, the more near term an I/O model estimate is, the more certain it will be.

- **Misallocation of the estimate of the benefits among regions.** Price inflation can also encourage producers to outsource work to lower-cost regions. With demand from oil sands investment exceeding local capacity, more design, engineering, manufacturing, and even prefabrication of modules has moved beyond Alberta. This includes investment in other Canadian regions, the United States, and beyond. This effect is also not captured by the typical I/O model.

### More-complex models can overcome the shortcomings of I/O models

To overcome the shortcomings of the typical I/O model, more powerful estimating tools can be deployed that allow price and production inputs to fluctuate. This type of model may also allow for the measurement of potential crowding-out effects, which have been expressed in the debate around oil sands development and which cannot be captured by the typical I/O model. However, greater precision requires more data, computational complexity, and assumptions. For example, to incorporate technological change, a whole range of new questions must be answered and imputed into the model, such as at what rate should technology reduce costs, how much should technology cost, and should technology evolve at a fixed rate or differently for different industries. Likewise, to improve the understanding of regional impacts, a geographic understanding of oil sands spending is required. This level of analysis would be a very large undertaking, requiring extensive data, consultation, and an intensive review of a plethora of assumptions. However, given the anticipated scale of development planned and the debate over the level of economic benefits to Canada, further analysis is warranted.



## Part 3: Economic benefits today and in the future

This section provides estimates of GDP, employment, and government revenue to help quantify the economic impact of oil sands development on Canada's economy today and in 2025. The section is divided into two parts: first we outline the methodology and key assumptions behind our analysis and then present our results. More detailed results are available in the appendixes.

### Methodology and assumptions

As discussed in Part 2, IHS Global Insight in collaboration with IHS CERA estimated the total effect of oil sands investment on the Canadian economy (including the direct, indirect, and induced effects). Our estimates compare the annual benefits from oil sands in 2012 and in 2025. The benefits are not cumulative summations of future potential benefits; rather they are a snapshot in time of potential annual flows. We chose to present annual estimates, as opposed to summations of multiple years of benefits, since annual estimates provide more context to the change in benefits. It is important to acknowledge that production from an oil sands facility can provide multiple decades of revenue and economic benefit. In fact, with ongoing investment, some facilities are expected to operate for more than 40 years.

Our analysis used the latest version of Statistics Canada's interprovincial input/output model, updated in 2013, to more accurately measure the effects of oil sands development on the Canadian economy.<sup>31</sup>

What follows is a brief description of the assumptions that underlie our estimate of the economic benefits from oil sands in 2012 and 2025. A summary of the key assumptions for each scenario is presented in Table 1.

- 2012 estimates.** In 2012, oil sands production reached nearly 1.8 mbd, which generated about C\$63 billion in gross revenues (see in Figure 1). We estimated C\$41 billion of direct capital was invested in 2012. This number differs from what we show in Figure 1 because it includes only the operating costs to extract bitumen and new capital project spending. Other spending such as general and administrative expenses that are included in total investment in Figure 1 are estimated as an output of the I/O model.<sup>32</sup>

TABLE 1

Key scenario assumptions		
	2012	2025
Production (barrels per day)		
Synthetic + nonupgraded bitumen	1,772,976	3,751,160
Gross revenues (billions of constant \$2012)		
Gross revenue from oil sands production	\$63	\$136
Expenditures (billions of constant \$2012) <sup>1</sup>		
New capital project expenditures	\$21	\$15
Operating expenditures (for extraction only)	\$20	\$41

1. New capital expenditure estimate based on per-barrel costs of production for mining, in-situ and upgrading derived from the IHS North America Crude Oil Markets Service. Operating or sustaining capital expenditure includes separate costs for mining sustaining capital, mining turnaround capital, in-situ sustaining capital, in-situ turnaround capital, upgrader sustaining, and turnaround capital. Expenditures included cost estimates on a range of expenditures, including overburden removal and site clearing, mine equipment, drilling, process equipment (i.e., vessels and towers, exchangers, compressors, and pumps), solids handling equipment, labor (skilled and nonskilled), steel and pipe, construction and civil works, engineering and project management, electrical and instrumentation (i.e., electrical bulks, electrical equipment, and control systems), transportation (truck hauling), and contingency/risk. For more information on the IHS North America Crude Oil Markets see [www.ihs.com/oilsands](http://www.ihs.com/oilsands).

Source: IHS CERA. Production and price outlook based on IHS CERA Planning Scenario outlook. For more information see: IHS Global Scenarios, <http://www.ihs.com/products/global-scenarios/energy.aspx>. Expenditures used capital cost assumptions from IHS North America Crude Oil Markets: Canadian Fundamentals and IHS Capital Costs Forum. For more information see: [www.ihs.com/oilsands](http://www.ihs.com/oilsands) and [www.ihsindexes.com](http://www.ihsindexes.com). © 2013 IHS

31. In 2013, Statistic's Canada updated its I/O model to differentiate the unconventional oil and gas subsectors from the broader oil and gas sector. The current version of Statistics Canada's model includes data up to 2009 and features 234 business or industrial sectors from across 14 regions of Canada, as well as trade balances. For more information on the Statistic's Canada Interprovincial Input-Output Model Simulations see: [www5.statcan.gc.ca/bsoic/olc-cel/olc-cel?lang=eng&catno=15F0009X](http://www5.statcan.gc.ca/bsoic/olc-cel/olc-cel?lang=eng&catno=15F0009X).

32. Estimates of oil sands capital costs are based on production levels and capital cost estimates from the IHS North America Crude Oil Markets service. For more information see footnote for Table 1.

- 2025 estimates.** The IHS CERA planning scenario was used for production and price outlook assumptions.<sup>33</sup> Using this scenario, oil sands production more than doubles from 1.8 mbd in 2012 to nearly 3.8 mbd in 2025. On a cumulative basis from 2012 to 2025, the scale of the build-out required to achieve this level of production would require an investment of over one-quarter of a trillion dollars. For 2025 new and operating expenditures are estimated at C\$56 billion and annual oil sands revenues at C\$136 billion. To reduce the potential for overestimation of the future economic benefit in 2025 (as outlined in Part 2, the box “Using input/output models to estimate economic impacts of oil sands development”), our outlook for oil sands-specific cost inflation was incorporated into our capital costs estimates. We expect between 2012 and 2025, on average, a 1.9% annual rate of oil sands capital costs escalation (above the economywide rate).<sup>34</sup> No one knows exactly how the economy (or oil sands inflation) will ultimately develop. However, there is more certainty in predicting these factors over the next decade (the scope of our outlook) than over longer time frames.

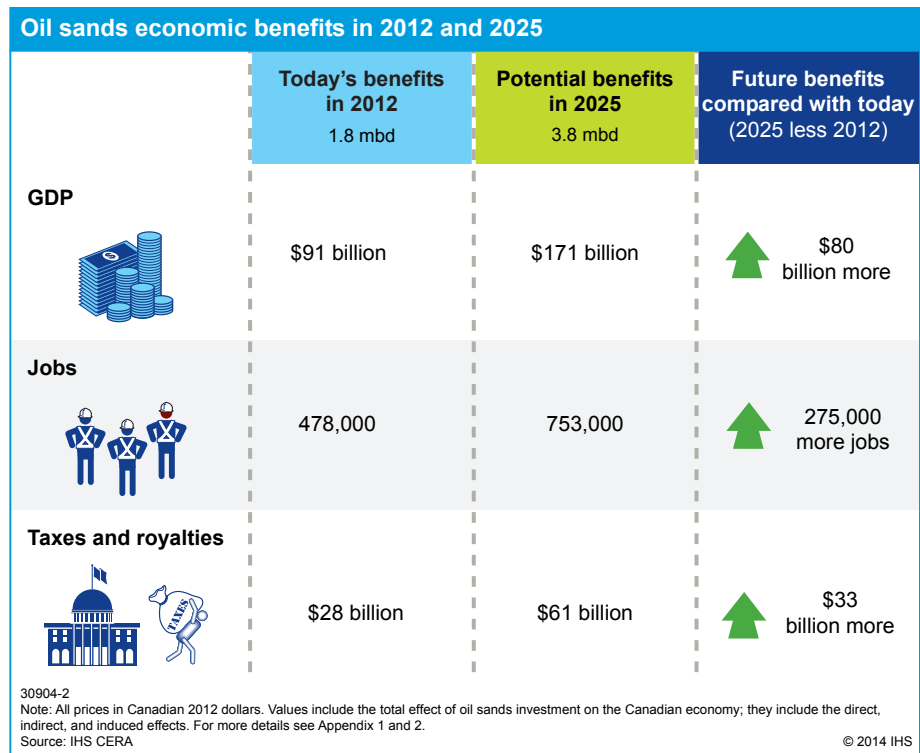
In the next section, all results show the total effect of the economic benefits from oil sands today and in 2025. More detailed results, including the breakout of benefits by type (direct, indirect, and induced) and by region, are available in Appendixes 1 and 2.

### Oil sands are already a major contributor to Canadian economy

Often, the economic benefits of oil sands are depicted as a future aspiration; however, our results, as shown in Figure 3, demonstrate that in 2012 oil sands already made a significant contribution to Canada’s economy, as measured by GDP, employment, and government revenues.

In terms of scale, for GDP and employment, the most commonly used indicators of economic benefit, oil sands contributed C\$91 billion to Canadian GDP and 478,000 jobs in Canada in 2012. This is equivalent to 5% of Canadian GDP and 3% of total employment in Canada.<sup>35</sup> For comparison, the GDP benefit is greater than 6 out of 10 Canadian provinces, and the

FIGURE 3



33. IHS maintains long-term and short-term global and energy planning scenarios that include capital costs and energy price projections. For more information see IHS Global Scenarios, <http://www.ihs.com/products/global-scenarios/energy.aspx>.

34. Capital costs estimates are based on production from the IHS Global Scenarios planning scenario adjusted for oil sands-specific cost escalation from the IHS North America Crude Oil Markets. Oil sands-specific cost escalations incorporated into capital costs are more pronounced in the early years, tapering off as production moves over time toward in-situ development, which lowers the demand for labor and reduces the rate of escalation. For more information see footnote for Table 1.

35. Source: IHS CERA. Statistics Canada, Gross domestic product, expenditure-based, provincial and territorial, current market prices, Table 384-0038, [www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038](http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038), accessed 19 November 2013. Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024), accessed 19 November 2013.

employment contribution is on a scale greater than 5 out of 10 Canadian provinces. Together this is on a scale greater than the fifth largest provincial economy in Canada—the Province of Saskatchewan.<sup>36</sup>

Other indicators, such as transfers to governments in the form of taxes and royalties, were also large. Together, government revenues, including federal and provincial corporate, consumption, and personal income tax, from the total effect of oil sands investment (across all sectors including direct, indirect, and induced) of the Canadian economy amounted to C\$28 billion. Government revenues break down as follows:

- **Federal government, C\$15 billion in tax revenue.** The Government of Canada received an estimated \$15 billion as a result of the total effect of oil sands development in 2012. This was 6% of the federal revenues in federal tax year 2011–12.<sup>37</sup> This share of federal revenues equates to about C\$437 per Canadian and in the federal fiscal budget period 2011/12 was nearly equivalent to federal spending on unemployment insurance or to half of what the federal government spent on health care transfers to provincial and territorial governments.<sup>38</sup>
- **Alberta, C\$7.7 billion in tax revenue and C\$4 billion in royalties.** The Government of Alberta was the second largest tax recipient. Including royalties, Alberta received nearly C\$12 billion in 2012. This constituted almost one-third of Alberta government revenues in 2012.<sup>39</sup> This income was more than Alberta’s total spending on all levels of education (K-12, adult education, and post-secondary), infrastructure, and transportation—or about three-quarters of what the government spent on health services.<sup>40</sup>
- **Other provinces, \$1.3 billion in tax revenues.** Other provinces received C\$1.3 billion in revenues from the total effect of oil sands development on the Canadian economy. As discussed previously, it is likely that this value is underestimated owing to data limitation, while the Alberta revenues are overestimated.

## Oil sands development contributes to economies beyond Canada

Economic benefits associated with oil sands development can reach beyond Canada by generating demand for goods and services from other nations. The United States is Canada’s largest trading partner and vice versa. The two economies are highly integrated. In 2012, the United States accounted for 51% of all goods and services, not just oil, imported to Canada and received 75% of all Canadian exports.<sup>41</sup> Conversely 14% of all goods and services imported to the United States came from Canada, and 16% of all US exports went to Canada.<sup>42</sup> In our model, we estimate that when the total effect is considered, oil sands investment resulted in the import of C\$16 billion worth of goods and services from other countries. This was equivalent to 3.5%

36. In 2012, estimated GDP impact of oil sands was greater than six provinces and three territories in Canada. Estimated employment impact was greater than five provinces and three territories in Canada that year.

37. Total federal revenues in tax year 2011–12 were C\$245 billion. Source: Finance Canada (2012), “Annual Financial Report of the Government of Canada: Fiscal Year 2011-2012,” Table 1, <http://www.fin.gc.ca/afr-rfa/2012/report-rapport-eng.asp>, accessed 29 December 2013.

38. In fiscal year 2011/12 the Canadian federal government spent C\$17.6 billion on unemployment insurance and C\$27.2 billion on health care transfers to provincial and territorial governments. Source: Department of Finance Canada, (2012), “Your Tax Dollar,” [www.fin.gc.ca/tax-impot/2012/2012-eng.pdf](http://www.fin.gc.ca/tax-impot/2012/2012-eng.pdf), accessed 18 June 2013. Source: Statistics Canada, Estimates of population, Canada, provinces and territories, Annual 2012 Estimate, Table 051-0005, [www5.statcan.gc.ca/cansim/a05?lang=eng&id=0510005](http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=0510005), accessed 29 August 2013.

39. In Budget 2012, Alberta revenues were C\$40 billion. Source: Government of Alberta, Budget 2012, [budget2012.alberta.ca/highlights](http://budget2012.alberta.ca/highlights), accessed 31 July 2013.

40. In 2012, Alberta planned to spend over C\$17 billion on health and wellness and C\$11.5 billion on “Securing Alberta’s Economic Future,” which included education, finance, infrastructure, transport, and other operating expenses. Source: Government of Alberta, Budget 2012, 3rd Quarter Supplementary Estimates, <http://www.finance.alberta.ca/publications/budget/budget2012/fiscal-plan-overview.pdf>, accessed 16 July 2013.

41. Source: Industry Canada, Import, Export and Investment, 2012 Total Imports and Total Exports by Specific Country, [https://www.ic.gc.ca/eic/site/icgc.nsf/eng/h\\_07052.html](https://www.ic.gc.ca/eic/site/icgc.nsf/eng/h_07052.html), accessed 9 December 2013.

42. Source: US Census Bureau, “U.S. Goods Trade: Imports & Exports by Related Parties, 2012,” [http://www.census.gov/foreign-trade/Press-Release/2012pr/aip/related\\_party/](http://www.census.gov/foreign-trade/Press-Release/2012pr/aip/related_party/), accessed 9 December 2013.

of total Canadian imports in 2012.<sup>43</sup> By 2025, the total effect of oil sands investment could demand C\$25 billion in imports.<sup>44</sup>

### **Oil sands economic benefits in 2025 could nearly double today's level**

In a future where oil sands grow as anticipated, reaching 3.8 mbd in 2025, the economic benefits in terms of GDP and government revenues could be nearly double the current level (as shown in Figure 3). Oil sands' contribution to jobs could also be over 50% higher.

- **GDP.** Oil sands' contribution to Canadian GDP could reach \$171 billion in 2025—just shy of double today's level. This would be like adding another economy the size of Saskatchewan today to the Canadian economy by 2025.<sup>45</sup>
- **Employment.** Between 2012 and 2025, the total effect of oil sands investment alone across all sectors of the Canadian economy could add over one-quarter of a million more jobs. By 2025, oil sands' total contribution to employment in Canada could reach 753,000 jobs. This is comparable with 5% of total employment in Canada in 2012 and would be on a scale equivalent to nearly half of all the people working in Canada's health care service sector today.<sup>46</sup>
- **Taxes and royalties.** Government revenues from the total effect of oil sands investment in Canada could nearly double what they are today, moving from C\$28 billion to C\$61 billion in 2025—the federal share of this being C\$28 billion in 2025, and roughly equivalent to federal spending on health care transfers to provinces in 2012.<sup>47</sup> The Alberta government's share of taxes and royalties from oil sands is estimated at C\$31 billion in 2025, with about C\$16 billion from royalties. For reasons discussed in Part 2, it is likely that the nonroyalty share of Alberta government revenues is overestimated at the expense of the estimate to other regions.

43. Source: IHS Global Insight and Statistics Canada.

44. In the growth scenario, direct and indirect oil sands investment results in oil sands-related imports worth \$18.5 billion and induced imports of C\$7 billion.

45. Statistics Canada, Gross domestic product, expenditure-based, provincial and territorial, current market prices, Table 384-0038, [www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038](http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=3840038), accessed 19 November 2013.

46. Source: Statistics Canada, Survey of Employment, Payrolls and Hours, Table 281-0024, [www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024](http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810024), accessed 19 November 2013.

47. Federal Health Care Transfers was C\$27.2 billion in 2012. Source: Department of Finance Canada, (2012), "Your Tax Dollar," [www.fin.gc.ca/tax-impot/2012/2012-eng.pdf](http://www.fin.gc.ca/tax-impot/2012/2012-eng.pdf), 18 June 2013.

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## Conclusion: Greater economic benefits are possible in the future

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The oil sands are already an economic engine for Canada. In 2012, C\$73 billion was invested in maintaining and growing oil sands production. This was more than the industry made in generating \$63 billion in gross revenues. Of the money the industry made, most of these funds remained within the oil sands. Four-fifths was reinvested into maintaining production, and another 10% went to the Canadian government for royalties and taxes.

Oil sands benefit to Canada exceeds the direct capital invested. Each dollar invested in oil sands spurs additional spending in other sectors of the economy and as employee wages are spent. As a result, considering only the direct impacts to the economy is an incomplete measure of the total benefits. We estimate that in 2012 the total effect of oil sands development contributed 478,000 jobs and C\$91 billion to GDP in Canada. This is approximately equivalent to 3% of total employment and 5% of Canadian GDP in 2012. Greater potential benefits exist. In a future where oil sands production reaches 3.8 mbd in 2025, the benefit in terms of GDP could be nearly two times greater than today.

The collective understanding of the full extent of the future potential benefits of oil sands to the Canadian economy is not complete. Current data and models make future benefits estimates less certain and at the same time can misallocate benefits between regions—attributing too little of the benefit to other regions of Canada (or even beyond). What is needed is a more complete understanding of oil sands investment, including more powerful models and more detailed data. These models would include the ability to measure concerns that oil sands growth (and the resulting inflation and currency impacts) could affect investment elsewhere in the economy. Given the importance of oil sands to Canada's economy—both today and the future potential—and the ongoing debate surrounding oil sands economic benefits, more research is warranted.

## Appendix

TABLE A-1

<b>Model results: Economic effect Canada-wide and on Alberta</b> (Results should be interpreted as annual contribution in the year reported. Where applicable all dollars in billions of 2012 constant CDN).				
	2012		2025	
	Direct + indirect	Total effect <sup>1</sup>	Direct + indirect	Total effect <sup>1</sup>
<b>Gross/total effect on Canada</b>				
GDP	\$76,888	\$91,197	\$147,658	\$171,076
Jobs	352,239	478,440	546,053	752,987
Taxes	\$24,123	\$28,323	\$54,416	\$61,300
Federal	\$12,524	\$15,241	\$23,766	\$28,211
Provincial	\$7,570	\$9,053	\$14,533	\$16,972
Royalties	\$4,029	\$4,029	\$16,117	\$16,117
<b>Total economic effect on Alberta only</b>				
GDP	\$69,710	\$78,941	\$134,965	\$149,846
Jobs	276,844	348,898	413,342	529,502
Taxes	\$22,201	\$24,897	\$51,019	\$55,364
Federal	\$11,331	\$13,161	\$21,651	\$24,600
Provincial	\$6,841	\$7,708	\$13,251	\$14,648
Royalties	\$4,029	\$4,029	\$16,117	\$16,117

1. Total benefit is also defined as upper bound in the report and includes the total effect from the direct, indirect, and induced activity from oil sands investment in the given year.

Source: IHS CERA, IHS Herold, and Government of Alberta

TABLE A-2

<b>Model results: Economic effect on Canadian regions</b> (Results should be interpreted as annual contribution in the year reported. Where applicable all dollars in billions of 2012 constant CDN).				
	2012		2025	
	Direct + indirect	Total effect <sup>1</sup>	Direct + indirect	Total effect <sup>1</sup>
<b>British Columbia</b>				
GDP	\$1,367	\$2,411	\$2,476	\$4,218
Jobs	14,383	26,605	25,147	45,409
Provincial taxes	\$116	\$218	\$212	\$383
<b>Saskatchewan</b>				
GDP	\$662	\$944	\$1,032	\$1,486
Jobs	5,169	7,894	8,189	12,586
Provincial taxes	\$84	\$121	\$130	\$190
<b>Manitoba</b>				
GDP	\$285	\$494	\$495	\$843
Jobs	3,484	6,007	6,022	10,204
Provincial taxes	\$25	\$48	\$44	\$81
<b>Ontario</b>				
GDP	\$3,597	\$6,122	\$6,487	\$10,770
Jobs	38,356	63,821	68,856	111,988
Provincial taxes	\$322	\$609	\$581	\$1,072
<b>Quebec</b>				
GDP	\$1,042	\$1,903	\$1,804	\$3,246
Jobs	11,443	20,829	19,878	35,606
Provincial taxes	\$158	\$304	\$275	\$519
<b>Atlantic Canada<sup>2</sup></b>				
GDP	\$190	\$332	\$335	\$575
Jobs	2,258	3,932	4,059	6,877
Provincial taxes	\$22	\$43	\$39	\$75
<b>Northern Territories<sup>3</sup></b>				
GDP	\$34	\$51	\$63	\$93
Jobs	302	453	562	816
Provincial taxes	\$1	\$2	\$3	\$4

1. Total benefit is also defined as upper bound in the report and includes the total effect from the direct, indirect, and induced activity from oil sands investment in the given year.

2. New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador.

3. Northwest Territories, Nunavut, and Yukon.

Source: IHS CERA, IHS Global Insight

## Report participants and reviewers

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IHS CERA hosted a focus group meeting in Calgary, Alberta (6 June 2013), providing an opportunity for oil sands stakeholders to come together and discuss perspectives on the potential economic benefits from oil sands development. Additionally, a number of participants reviewed a draft version of this report. Participation in the focus group or review of the draft report does not reflect endorsement of the content of this report. IHS CERA is exclusively responsible for the content of this report.

Alberta Department of Energy

Alberta Innovates, Energy and Environmental Solutions

Alberta School of Business, University of Alberta

American Petroleum Institute

BP Canada

Canadian Association of Petroleum Producers

Canadian Oil Sands Limited

Cenovus Energy Inc.

Conoco Philips Company

Canadian Natural Resources Ltd.

IBM Canada

Imperial Oil Ltd.

In Situ Oil Sands Alliance

Mowat Centre, School of Public Policy and Government, University of Toronto

Natural Resources Canada

Nexen Energy ULC

School of Public Policy, University of Calgary

Shell Canada

Statoil Canada Ltd.

Suncor Energy Inc.

Total E&P Canada Ltd.

TransCanada Corporation

## IHS team

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**MOHSEN BONAKDARPOUR**, Managing Director, IHS Energy Insight, is responsible for directing advisory projects and industry analysis product development in the Economic and Public Sector Consulting practice of IHS Global Insight. Mr. Bonakdarpour has more than 25 years of experience in energy, global industry, and macroeconomic analysis. He has worked with a wide range of clients, helping them to size their markets, predict product demand, and better target their marketing efforts. Before joining IHS, he worked at PNR & Associates and at the Center for Social Policy and Community Development. Mr. Bonakdarpour holds a Bachelor of Science and a Master of Arts from Temple University.

**JACKIE FORREST**, Senior Director, IHS Energy Insight, leads the North American Crude Oil Markets service with IHS and heads the research effort for the IHS CERA Oil Sands Energy Dialogue. She actively monitors emerging strategic trends related to oil sands and heavy oil, including capital projects, economics, policy, environment, and markets. Recent contributions to oil sands research include reports on the life-cycle emissions from crude oil, the impacts of low-carbon fuel standards, effects of US policy on oil sands, and future markets for Canadian oil sands. Ms. Forrest is a professional engineer and holds a degree from the University of Calgary and an MBA from Queens University.

**KEVIN BIRN**, Associate Director, IHS Energy Insight, is the principal researcher for the IHS CERA Oil Sands Energy Dialogue. Recent contributions to oil sands research include analysis of the marine transport of oil sands crude, upgrading economics, and the future markets for oil sands. Prior to joining IHS, Mr. Birn worked for the Government of Canada as the senior oil sands economist at Natural Resources Canada, helping to inform early Canadian oil sands policy. He has contributed to numerous government and international collaborative research efforts, including the 2011 National Petroleum Council report *Prudent Development of Natural Gas & Oil Resources* for the US Secretary of Energy. Mr. Birn holds undergraduate and graduate degrees from the University of Alberta.

**MIHAELA SOLCAN**, Consultant, IHS Energy Insight, is with the Economic Impact Analysis group at IHS Global Insight. Her main areas of expertise are in applied macroeconomics and econometrics, and her background is in quantitative modeling and economic analysis. At IHS she has worked on a wide array of projects, including a recent project with an international manufacturing company to project sales and revenue growth for select industries, and building a comprehensive macroeconomic model to develop and formulate energy policy for an Asian country which encompassed all relevant sectors of the economy. Prior to joining IHS, Ms. Solcan was a teaching assistant and a research fellow at the Department of Economics at the University of Delaware. She holds a Bachelor of Science from the University of Lyon, France, and a PhD from the University of Delaware.