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Economic Impacts of Alberta's Oil Sands

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ECONOMIC IMPACTS OF ALBERTA'S OIL SANDS

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PREFACE

This study assesses economic impacts of Alberta's oil sands industry on economies at regional, provincial, national and international levels for the 2000-2020 period. The report is organized in two volumes. The first volume discusses the key results of the study; the second volume presents the data and detailed results.

The research team wishes to thank all sponsors of this study including both private and public sector organizations. Particularly, the research team is thankful to all members of the Steering Committee who contributed from the inception of the study to the preparation of this final report. Without the input from the members of the Steering Committee, this study would not be as insightful and valuable as it is.

The research team would like to express its gratitude to Dr. Daniel Czamanski, Senior Vice President and Dr. Phil Prince, President and CEO for their guidance and support. Karl Pinno, Senior Economist, deserves special thanks for his contribution in editing the report. We also thank Dinara Mutysheva and Janna Poliakov for contributing to this research.

Finally, the research team also wishes to give special thanks to Capri Gardener and Megan Murphy for formatting and publishing this Report.

EXECUTIVE SUMMARY

E.1 Background and Objective

In 2004, Alberta's Oil Sands were recognized by international media, for the first time, as part of global oil reserves. This established Canada as second only to Saudi Arabia in the hierarchy of potential oil producing nations. While oil sands extraction is more expensive than conventional sources, increasing world oil prices, rapidly growing demand, and continuing technological advances are reducing the importance of those cost differences. Moreover, conventional oil production in Canada is declining, underscoring the importance of the oil sands as a vital source of North American supplies. In response to current market conditions, the industry has announced an ambitious investment program. This investment and the ensuing production of crude bitumen and synthetic crude oil (SCO) will stimulate the economies of Canada and all its provinces, as well as economies abroad.

This study investigates the potential economic effects of development and production activities in Alberta's oil sands (hereafter 'oil sands activities') over the years 2000-2020 at the local, provincial, national and international levels. We employ an internally customized Input-Output model (I-O model) to assess economic impacts. The economic impacts are measured in terms of changes in three major indicators:

- gross domestic product (GDP),
- employment and labour income and,
- government revenues.

We conduct sensitivity analysis in order to evaluate the responsiveness of our findings to changes in the principle assumptions that underlie our research. In addition, we gauge our results against two previous oil sands studies, with a particular emphasis on the National Task Force on Oil Sands Strategies study carried out in 1995.

E.2 Key Findings

The study spans the years 2000-2020 yielding the following highlights.

- We anticipate significant levels of investment and production from the oil sands industry. Under our central scenario or base case, we see investment of just over \$100 billion through 2020, resulting in production of crude bitumen and SCO outputs valued at approximately \$531 billion.

- Oil sands activities will lead to significant economic impacts not only in Alberta but also in other parts of Canada and abroad. Based on our central scenario, the development and production activities lead to a total increase in GDP of some \$885 billion allocated as follows:

Canada:	\$789 billion	(89%)
Alberta:	\$634 billion	(72%)
Ontario:	\$102 billion	(11%)
Quebec:	\$8 billion	(1%)
Other provinces & territories:	\$45 billion	(5%)
Other Countries: ¹	\$96 billion	(11%)

For perspective, it may be helpful to note that the cumulative increment to Canadian GDP from oil sands activities over the 20-year period of the study would equal 61 percent of total Canadian GDP for 2004. We estimate the annual GDP impact of oil sands activities, in the case of Alberta, equalled 9 percent of the province's annual GDP in 2000. This percentage would rise to 20 percent of annual GDP by 2020. Similarly, the annual GDP impact in 2000 for Canada equalled 1.5 percent of national GDP. By 2020 this percentage would rise to 3 percent of national GDP.²

- The total economic impacts could be much larger than our central scenario suggests. This scenario assumes a moderate price forecast for SCO of US\$32 per barrel as well as resource constraints that cause production shortfalls and delays in announced schedules. If future SCO prices are US\$40 per barrel and currently announced projects are completed as planned, the total economic impact on GDP could be as high as \$1,369 billion, or 55 percent higher than our base case or central scenario estimate.
- Oil sands activities would generate almost as much employment outside of Alberta as they would within the province. The employment generated from oil sands activities would equal approximately 6.6 million person years and would be allocated broadly:

Canada:	5.4 million	(83%)
Alberta:	3.6 million	(56%)
Ontario:	1 million	(16%)
Quebec:	125 thousand	(2%)
Other provinces & territories:	612 thousand	(9%)
Other Countries: ³	1.1 million	(17%)

¹ Our analysis assumes that other countries possess similar economic structures as that of Alberta. This assumption is used to derive all of the impacts (i.e., impacts on GDP, employment, labour income and government revenues) for economies outside Canada.

² The Average Annual Growth Rate (AAGR) of Canadian GDP for the 1990-2002 period, which is 2.84 percent, is used to forecast GDP until the year 2020. The same methodology was employed to forecast provincial GDP.

³ Again, we assume similar economic structure in other countries in deriving these estimates.

- The federal government would be the largest recipient of revenues generated due to oil sands activities. Total government revenue from oil sands activity in Canada would approach \$123 billion. Moreover, other countries could generate \$14 billion in tax revenues.⁴ The allocation of government revenue generated in Canada is set out below:

Federal Government:	\$51 billion	(41%)
Alberta Government:	\$44 billion	(36%)
Other Provincial & Territorial Governments:	\$12 billion	(9%)
Municipalities (including Alberta municipalities):	\$17 billion	(14%)

- The sources of the total government revenue of \$123 billion are personal income tax, 25 percent; royalty which is generated only in Alberta, 22 percent; corporate income tax, 20 percent; property tax, 18 percent and indirect taxes (e.g., GST & PST) 15 percent.
- The oil industry (including oil sands and service and supply incidental to the oil industry) has the largest impact on the economy, generating 52 percent of the incremental GDP and 18 percent of the incremental employment. Other industries, particularly manufacturing, FIRE (Finance, Insurance and Real Estate), gas utility, retail services and business services also contribute significant economic impacts related to oil sands activities.

E.3 Methodology and Data

As the central component of our analysis, we developed Input-Output models for Alberta, Ontario, Quebec and the Rest of Canada (RoC). Each model is composed of 19 sectors and 19 commodities and segments the upstream energy industry as follows: coal mining, natural gas and crude oil & oil sands. Projections and allocations used standard input output techniques. Numerous data sources were reviewed as potential sources. We chose Statistics Canada and the Canadian Association of Petroleum Producer's Statistical Handbook as our sources for historical data (2000-2004) and CERI's recently updated Oil Sands Supply Outlook as our source for forecasts of investment and production in the oil sands industry.

⁴ Again, assuming similar economic structures.

E.4 Main Results

The economic impacts measured in this study relate to GDP, employment and labour income, and government revenue.

Impacts on GDP

Table ES.1 presents the estimates of impacts on GDP for Alberta, Ontario, Quebec, the Rest of Canada and outside Canada.

Table ES.1
Cumulative GDP Impacts by Sector and Jurisdiction for the years 2000-2020
(Million 2004 dollars)

Sector	Alberta	Ontario	Quebec	Rest of Canada	Canadian Total	Outside Canada	Grand Total
Agriculture	3,222	403	99	1,478	5,202	3,011	8,212
Forestry	533	121	51	876	1,581	518	2,099
Other Mining	440	817	42	366	1,665	299	1,963
Crude Oil & Oil Sands	404,573	34,219	325	9,464	448,581	8,361	456,942
Natural Gas	15,645	119	1	1,226	16,992	10,134	27,126
Coal Mining	1,266	0	0	258	1,524	680	2,204
Manufacturing	27,492	12,253	2,628	7,330	49,703	29,351	79,054
Construction	2,076	867	73	327	3,343	600	3,943
Transport & Communication	7,584	2,861	408	1,952	12,806	3,279	16,084
Electricity Utility	5,679	1,912	237	1,072	8,900	1,454	10,354
Gas Utility	60,322	955	48	360	61,684	1,009	62,693
Wholesale Trade	7,139	3,524	402	2,131	13,196	3,312	16,508
Retail Trade	12,541	3,925	374	2,349	19,189	2,965	22,154
Finance, Insurance & Real Estate	41,865	18,967	1,676	7,324	69,832	12,964	82,796
Business Services	8,052	4,427	303	1,425	14,207	3,427	17,634
Educational Services	613	160	11	74	858	153	1,011
Health Care	4,246	1,812	130	651	6,838	1,214	8,052
Food and Accommodation	6,754	1,676	160	1,228	9,817	2,689	12,506
Other Services	23,862	12,501	1,432	5,435	43,230	10,364	53,594
Total	633,903	101,517	8,402	45,325	789,147	95,784	884,930

Other mining, crude oil & oil sands, natural gas and coal mining sectors include corresponding incidental services.

As can be seen from the table, the oil sands activities would add approximately \$789 billion to Canadian GDP. The total GDP impact in Alberta, \$634 billion, is more than 3 times as high as the province's 2004 GDP, which equalled \$187 Billion.⁵ Similarly, the GDP impacts in Ontario (\$102 billion), Quebec (\$8 billion) and the Rest of Canada (\$45 billion), represent 20 percent, 3.1 percent and 14 percent of their corresponding GDP levels in 2004, respectively.⁶ A significant portion of the total impacts on GDP, 11 percent, would occur in other countries.

Notably, the manufacturing industry outside of Canada would see larger economic impacts than the manufacturing industry in Alberta.

⁵ The purpose of this comparison, which is made between a stock number (the impact during the 2000-2020 period) and a flow number (GDP of year 2004), is just to indicate the magnitude of the impact.

⁶ According to Statistics Canada, the 2004 GDP for Canada, Alberta, Ontario and Quebec are \$1.29 trillion, \$187 billion, \$518 billion and \$ 267 billion, respectively.

Impacts on Employment and Labour Income

Oil sands activities would generate employment in Canada equal to 5.4 million person years (see Table ES.2), leading to a corresponding increase in labour income of \$259 billion.

Within Canada, Alberta will see the highest increase in employment as well as labour income. Approximately 68 percent of the total jobs created within Canada (3.6 million person years) would be created in Alberta. The Wood Buffalo-Cold Lake region would experience employment increases of 778 thousand person years which is 21 percent of the total jobs that would be created in Alberta. About one million person years would be created in Ontario, 125 thousand person years in Quebec and 612 thousand person years in other parts of Canada. Employment would also be created outside Canada (1,130 thousands person years), generating income of approximately \$39 billion, higher than in any province in Canada except Alberta.

Table ES.2
Cumulative Impacts on Employment by Sector and Jurisdiction for the years
2000-2020

(Thousand person years)

Sector	Alberta	Ontario	Quebec	Rest of Canada	Canadian Total	Outside Canada	Grand Total
Agriculture	98	12	3	40	153	91	244
Forestry	10	1	1	12	25	10	35
Other Mining	6	6	0	1	13	4	16
Crude Oil & Oil Sands	1,043	88	0	19	1,150	21	1,172
Natural Gas	26	1	0	5	32	17	49
Coal Mining	2	0	0	0	3	1	4
Manufacturing	276	137	33	98	545	295	839
Construction	28	14	1	6	49	8	57
Transport & Communication	113	50	9	34	206	49	255
Electricity Utility	33	10	1	4	48	8	56
Gas Utility	107	2	0	1	110	2	112
Wholesale Trade	75	31	5	26	137	35	172
Retail Trade	439	127	13	82	661	104	765
Finance, Insurance & Real Estate	174	84	9	34	301	54	355
Business Services	234	141	12	65	453	100	553
Educational Services	243	72	7	37	359	61	420
Health Care	286	94	11	47	438	82	520
Food and Accommodation	244	60	7	49	360	97	457
Other Services	212	109	13	50	384	92	476
Total	3,649	1,039	125	612	5,425	1,130	6,556

Other mining, crude oil & oil sands, natural gas and coal mining sectors include corresponding incidental services.

While the crude oil & oil sands sector would see the largest job creation, jobs created in other sectors, such as manufacturing and retail, are also substantial. In fact, of the total jobs created, 82 percent will be in sectors other than oil. In other words, the number of jobs created in other sectors is more than four times higher than that created in the crude oil & oil sands sector.

Impacts on Government Revenue

The total revenues accruing to various governments in Canada are estimated to be \$123 billion (see Table ES.3). The sources of this \$123 billion in revenues that would be generated in Canada due to oil sands activity are: personal income tax 25 percent (\$31 billion), royalty 22 percent (\$27 billion), corporate income tax 20 percent (\$25 billion), property tax 18 percent (\$23 billion) and indirect tax (GST, PST) 15 percent (\$19 billion).

Table ES.3
Cumulative Impacts on Government Revenues by type of Revenue and Jurisdiction
for the years 2000-2020
(Million 2004 dollars)

Source of Revenue	Federal Government	Alberta Provincial Government	Other Provincial Governments	Municipal Governments	Total Canada	Outside Canada	Grand Total
Royalties	0	26,762	0	0	26,762	0	26,762
Indirect Tax	14,089	0	4,652	0	18,742	3257	21,998
Corporate Income Tax	16,280	5,989	2,248	0	24,517	3680	28,197
Personal Income Tax	20,721	6,521	3,344	0	30,586	4312	34,898
Property Tax	0	4,522	1,268	16,893	22,684	2269	24,953
Total	51,091	43,795	11,512	16,893	123,291	13,518	136,809

Of the total revenue collected in Canada (\$123 billion), the federal government would receive 41 percent (\$51 billion), the Alberta provincial government 36 percent (\$44 billion), the other provincial and territorial governments 9 percent (\$12 billion), and municipalities 14 percent (\$17 billion). An interesting result of this study is that the federal government would realize more tax revenue (\$51 billion) than the Alberta provincial government (\$44 billion) from Alberta's oil sands industry.

E.5 Sensitivity Analysis

The results presented in the preceding section correspond to CERI's forecast of development and production levels under a central scenario. This scenario assumes a US\$32 per barrel of SCO price along with an "Expected" production and investment profile that systematically adjusts the completion dates and production levels of projects depending on assumed resource constraints and their present level of completion. Projects further from completion are adjusted more than those close to completion. It is of interest to consider how results might vary if all currently announced projects actually came to fruition as currently announced, a situation referred to as the "Potential" case. The effect of higher oil prices and more intensive upgrading within Alberta are also worth considering. The sensitivity analysis considers all these issues.

Table ES.4 presents the impacts on GDP under various sensitivity scenarios. The corresponding impact from the central scenario is also presented to allow for comparisons.

**Table ES.4
Results of Sensitivity Analysis – GDP Impacts**

Sensitivity Case	SCO Prices (2004 US\$)	Cumulative GDP Impacts for Years 2000-2020 (Billion 2004 dollars)	Change in Cumulative GDP Impact from the Central Scenario
Expected production & investment projection			
Central Scenario	US\$32	\$885	-
S1	US\$25	\$734	-17%
S2	US\$40	\$1,037	17%
Potential production & investment projection			
S3	US\$32	\$1,163	31%
S4	US\$25	\$958	8%
S5	US\$40	\$1,369	55%
Expected Projection with Higher Proportion of Bitumen Converted to SCO			
S6	US\$32	\$1,091	23%

The expected cases, being somewhat constrained, lead to lower impacts on GDP, varying from 734 billion dollars to just over 1,037 billion dollars, depending on the assumed prices of oil. The potential cases, assuming production as announced, lead to somewhat higher impacts, over 1.3 trillion dollars in the \$40 price case.

A comparison of our results with those found in the 1995 National Taskforce on Oil Sands Strategies study demonstrates that the magnitude of the economic impact of oil sands activities estimated currently is higher than that estimated ten years back, largely because oil prices and consequent activity are much higher now. However, there is not much difference in the jurisdictional distribution of economic impacts estimated now versus then as the last study found Alberta realized 83 percent of the total impacts in Canada, compared to 80 percent in this study. This suggests the distribution of oil related activity in the provinces has remained relatively unchanged over the past decade.