

# Regional Details: Saskatchewan

Oil and gas production in Saskatchewan has increased significantly in recent years, and revenues associated with oil and gas production represent a growing share of total provincial revenues. As this revenue source becomes more significant, it is important to consider the long-term stability of both the economic and environmental situations in Saskatchewan. In this appendix, we describe the methods the Government of Saskatchewan uses to capture revenues from oil and gas production in the province. We also present quantitative estimates of revenues, costs and the value of oil and gas resources over the study period, and discuss the environmental impacts associated with oil and gas production in the province. We begin with background information on oil and gas production in Saskatchewan.

## Background

In this section, we identify the government authorities that play a role in regulating, managing and/or facilitating oil and gas production in Saskatchewan. For each authority, we provide a brief description of its relevant responsibilities. We also present background information on the oil and gas sector, with figures for oil and gas production, employment in the oil and gas sector and gross domestic product associated with oil and gas production in Saskatchewan.

### *Responsible Authorities*

One key department, the Department of Industry and Resources, has authority over oil and gas developments in Saskatchewan. This department has several divisions focused on different aspects of the regulation, management and promotion of oil and gas production in the province.

1. The **Department of Industry and Resources** co-ordinates, develops, promotes and implements policies and programs with the goal of strengthening and diversifying the Saskatchewan economy.
2. The **Industry Development Division** of the **Department of Industry and Resources** assists and attracts new, existing and expanding businesses, co-operatives and entrepreneurs to create and/or expand business activity in the province, and facilitates the development and capacity enhancement of community economic development organizations.
3. The **Strategic Sector Development Branch** of the **Industry Development Division** facilitates the growth and development of the province's oil and gas sector, among other sectors.
4. The **Geology and Petroleum Lands Branch** of the **Department of Industry and Resources** administers oil and gas dispositions.

### *Oil and Gas Production in Saskatchewan*

Saskatchewan is Canada's second-largest producer of oil, currently accounting for almost 18 percent of the country's total production. The provincial Crown owns 25.3 million hectares of oil and natural gas rights in the surveyed area of the province. This represents about 78 percent of total provincial rights, of which about 6.6 million hectares (or 20 percent of the total provincial petroleum and natural gas rights) are currently leased to oil and gas companies.<sup>1</sup> Oil production in Saskatchewan has almost doubled in the last 10 years.<sup>2</sup> More recently, the focus of new

<sup>1</sup> See [www.ir.gov.sk.ca/Default.aspx?DN=3659,3384,2936,Documents](http://www.ir.gov.sk.ca/Default.aspx?DN=3659,3384,2936,Documents).

<sup>2</sup> Canadian Association of Petroleum Producers Web site. See [www.capp.ca](http://www.capp.ca).

development in Saskatchewan has shifted from oil to natural gas. As Table 1 demonstrates, between 1995 and 2002 oil production declined by 11 percent, while over the same time period natural gas production increased by 31 percent.

**Table 1 Oil and gas production, Saskatchewan, 1995 to 2002 (million BOE)**

<b>PRODUCTION</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Oil	47	41	39	39	41	42	42	42
Gas	119	133	148	147	139	154	158	155
<b>Total</b>	<b>166</b>	<b>173</b>	<b>187</b>	<b>187</b>	<b>180</b>	<b>196</b>	<b>200</b>	<b>197</b>

*Source: Canadian Association of Petroleum Producers*

### ***Oil and Gas Employment in Saskatchewan***

Table 2 presents direct employment figures for oil and gas production in Saskatchewan. The table shows total employment figures for the province, as well as the share of total employment attributable to the oil and gas sector. The figures indicate that increases in employment associated with oil and gas production have outpaced increases in total employment in the province. Indeed, between 1995 and 2002, while total employment in Saskatchewan increased by 5 percent, employment directly associated with oil and gas production increased by 20 percent.

**Table 2 Employment associated with oil and gas production and total employment, Saskatchewan, 1995 to 2002**

<b>EMPLOY'T</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Oil and Gas	1,912	2,000	2,164	2,279	1,919	1,968	2,781	2,289
Total	459,000	458,000	470,000	476,000	480,000	485,000	472,000	482,000
% of Total	0.4%	0.4%	0.5%	0.5%	0.4%	0.4%	0.6%	0.5%

*Source: 1997 to 2002 oil and gas employment figures from Statistics Canada, CANSIM Table 383-0009*

### ***Oil and Gas Gross Domestic Product in Saskatchewan***

Table 3 presents gross domestic product (GDP) associated with oil and gas production, total provincial GDP, and oil and gas GDP as a percentage of GDP generated by all industries. The figures in the table demonstrate that the growth of all industries combined has outpaced the growth of the oil and gas sector quite significantly. Between 1995 and 2002, GDP associated with oil and gas production declined by 11 percent. Over the same period, "all industries" GDP increased by 13 percent. Oil and gas GDP as a percentage of "all industries" GDP declined by 22 percent between 1995 and 2002. These figures indicate that oil and gas production constitutes a declining portion of the total economy in Saskatchewan.

**Table 3 GDP associated with oil and gas production and provincial GDP, Saskatchewan, 1995 to 2002 (million 2000\$)**

<b>GDP</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Oil and Gas <sup>3</sup>	2,190	2,209	2,429	2,858	2,264	1,973	2,068	1,942
All Industries	28,847	31,017	30,849	30,845	31,514	33,704	32,575	32,634
% of Total	7.6%	7.1%	7.9%	9.3%	7.2%	5.9%	6.3%	6.0%

Source: Oil and gas figures from Statistics Canada, CANSIM Table 379-0025

## Oil and Gas Revenue Generation

The provincial Crown owns approximately 78 percent of all petroleum and natural gas rights in Saskatchewan. Freehold lands comprise 18.5 percent, Indian reserves hold 2 percent, and the remaining 1.5 percent is held under federal jurisdiction.

Dispositions of Crown petroleum and natural gas rights can be purchased at Crown land sales, which are held six times each year. Once rights to produce oil and gas in Saskatchewan have been granted, the government collects royalties on the oil and gas production that takes place. Royalties in Saskatchewan vary with price, age and productivity. Oil and gas producers in Saskatchewan are also liable for provincial and federal income taxes. Table 4 lists the taxes and royalties the Saskatchewan government uses to obtain revenues from oil and gas production in the province.

**Table 4 Key means of revenue generation, Saskatchewan**

<b>COMPONENT</b>	<b>KEY ATTRIBUTES</b>
Natural Gas Royalty	Natural gas in Saskatchewan is considered either non-associated or associated. Within each of these categories, for the purposes of royalty calculations, gas is classified as fourth-tier, third-tier, new or old. Royalty rates in Saskatchewan are price-sensitive. Below a threshold price, <sup>4</sup> a base royalty rate applies. Above that threshold, royalty rates increase with prices.
Associated Natural Gas Royalty Regime	A royalty is payable on associated natural gas produced from an oil well that exceeds approximately 65,000,000 m <sup>3</sup> /month. The royalty rates are based on the fourth-tier natural gas royalty structures.
Crude Oil Royalty	Crude oil in Saskatchewan is considered either heavy oil, southwest-designated oil, or non-heavy oil. Within each of these categories, oil is classified as fourth-tier, third-tier, old or new. Royalty rates are lowest for fourth-tier oil.
Helium and Associated Gases Royalty	This royalty is determined by applying a Crown royalty rate to helium and associated gases produced from each well.
Corporate Income Tax	The current income tax rate is 17% of taxable income earned in Saskatchewan.
Royalty/Tax Program for High Water-Cut Oil Wells	High water-cut oil resulting from qualifying investments made to rejuvenate oil wells and/or associated facilities receive "third-tier oil" Crown royalty rates with a Saskatchewan Resource Credit of 2.5%.

<sup>3</sup> Includes coal manufacturing.

<sup>4</sup> Established by the Minister of Industry and Resources monthly.

**Table 4 Continued**

<b>COMPONENT</b>	<b>KEY ATTRIBUTES</b>
Royalty/Tax Regime for Incremental Oil Produced from New or Expanded Waterflood Projects	Incremental waterflood oil produced from an approved waterflood project qualifies for "fourth-tier oil" Crown royalty rates. Incremental waterflood oil does not qualify for a royalty incentive volume.
Federal Income Tax	The net federal corporate income tax rate for oil and gas companies is 28%, against which the government allows a number of deductions.

Oil and gas producers in Saskatchewan can take advantage of a number of deductions and credit programs that encourage and facilitate oil and gas production in the province, including the Saskatchewan Resource Credit. A number of changes to the royalty regime governing oil and gas production in Saskatchewan were announced in 2002. These changes include new lower royalty structures and a new system of volume incentives. In addition, a new royalty regime for gas produced from new oil wells was introduced, and incentives were introduced for horizontal and deep wells.<sup>5</sup> Provincial oil and gas producers are also eligible for federal credit and incentive programs. These and other key programs are described in Table 5.

**Table 5 Key deductions and credits related to oil and gas, Saskatchewan**

<b>COMPONENT</b>	<b>KEY ATTRIBUTES</b>
Saskatchewan Resource Credit	A credit against royalty and freehold production tax rates, which can reduce royalty rates to 0%.
Royalty Tax Regime Applicable to Enhanced Oil Recovery Projects	A calculation that determines royalty and tax rates on a profitability basis, both before and after payout of the project.
Royalty/Tax Incentive Volumes for Vertical Oil Wells <sup>6</sup>	An incentive volume for qualifying vertical oil wells.
Royalty/Tax Incentive Volume for Horizontal Oil Wells	An incentive volume for qualifying horizontal oil wells.
Exploratory Gas Wells	An incentive volume for wells that qualify as exploratory gas wells.
Low Productivity Wells Royalty Rate	A fiscal regime that does not subject wells producing at rates less than about 23 m <sup>3</sup> /month to a royalty.
Low Productivity Wells Freehold Tax Rate	A low productivity tax reduction that can be applied against freehold taxes.
Oil Well Reactivation Program	A program targeting oil production from reactivated oil wells, which are subject to a maximum royalty rate of 5% less the Saskatchewan Resource Credit.
Federal Capital Cost Allowance	A deduction against income for depreciating property; Class 41 covers oil and gas equipment and allows a 25% writedown on equipment on a declining balance basis.

<sup>5</sup> Government of Saskatchewan. *Economic News: Royalty and Tax Changes to Stimulate Oil and Gas*, 2002. See [www.wideopenfuture.ca/news-2002-10-07.html](http://www.wideopenfuture.ca/news-2002-10-07.html).

<sup>6</sup> Non-deep vertical development oil wells and development gas wells are not eligible for any incentive volume.

**Table 5 Continued**

<b>COMPONENT</b>	<b>KEY ATTRIBUTES</b>
Federal Resource Allowance	A notional allowance in lieu of deduction of provincial royalties and freehold mineral taxes; over the study period, the deduction was equal to 25% of taxable net resource profits.
Federal Exploration and Development Expenses	Exploratory and development expenses are grouped into one of three pools: Canadian Exploration Expenses (CEE), Canadian Development Expenses (CDE), and Canadian Oil and Gas Property Expenses (COGPE). The CEE balance of exploration expenditures is fully deductible against income, with any unclaimed portion carried forward indefinitely. Up to 30% of the CDE balance and up to 100% of the COGPE balance can be applied against income.
Federal Earned Depletion	An additional deduction from taxable income of certain exploration and development expenditures and other resource investments. The deductions for earned depletion are generally limited to 25% of the taxpayer's annual resource profits. <sup>7</sup>

## Quantitative Results of Revenue Generation

Table 6 demonstrates the trend in revenues obtained from oil and gas producers in Saskatchewan. The major sources of revenue are royalties, especially oil royalties and income taxes. Total revenues increased by 56 percent between 1995 and 2002.

**Table 6 Revenue from oil and gas production, Saskatchewan, 1995 to 2002 (million 2000\$)**

<b>REVENUE SOURCE<sup>8</sup></b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Oil Royalty	577	479	731	510	313	640	775	524
Natural Gas Royalty	67	44	56	46	68	92	232	122
Income Taxes <sup>9</sup>	101	233	103	95	100	247	307	520
<b>TOTAL</b>	<b>745</b>	<b>757</b>	<b>890</b>	<b>651</b>	<b>480</b>	<b>979</b>	<b>1,314</b>	<b>1,166</b>

Table 7 compares trends in revenue with production to determine if the Government of Saskatchewan is capturing more or less revenue today than in 1995. The figures in the table show that both revenue and production increased between 1995 and 2002. Revenue increased by 56 percent and production increased by 19 percent. Over the same period, revenue per unit of production increased by 32 percent, from \$4.5/BOE to \$5.9/BOE.

<sup>7</sup> While Earned Depletion has been phased out, federal government expenditures related to it continued until 2001.

<sup>8</sup> A number of the items presented in Table 6-4 are combined for the purposes of this table.

<sup>9</sup> Includes federal and provincial income taxes.

**Table 7 Revenue generation and production, Saskatchewan, 1995 to 2002**

<b>SUMMARY</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Revenue (million 2000\$)	745	757	890	651	480	979	1,314	1,166
Production (million BOE)	166	173	187	187	180	196	200	197
<b>Revenue/Production (2000\$/BOE)</b>	<b>4.5</b>	<b>4.4</b>	<b>4.7</b>	<b>3.5</b>	<b>2.7</b>	<b>5.0</b>	<b>6.6</b>	<b>5.9</b>

## Economic Rent in Saskatchewan

Table 8 presents data for the value of oil and gas resources and the cost of oil and gas production annually for the province of Saskatchewan. Figures are shown as 2000\$/BOE, like the revenue figures in the previous section. The value of oil and gas resources in Saskatchewan increased by 27 percent between 1995 and 2002. At the same time, the cost of production increased by 68 percent. Economic rent was available for capture by the Saskatchewan government in every year over the study period. The rate of rent capture ranged from a low of 23% in 2000 to a high of 100% in 1997 and 1998.

**Table 8 Resource value, production costs and economic rent (2000\$/BOE), Saskatchewan, 1995 to 2002**

	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Resource Value	17.7	21.5	19.1	13.5	21.5	31.7	25.1	22.5
Production Cost	8.7	12.9	14.6	11.6	16.8	10.3	12.0	14.6
Economic Rent	9.0	8.6	4.5	1.8	4.6	21.5	13.1	7.9
<b>Rent Capture</b>	<b>50%</b>	<b>51%</b>	<b>100%</b>	<b>100%</b>	<b>58%</b>	<b>23%</b>	<b>50%</b>	<b>75%</b>

Source: Value figures from the Canadian Association of Petroleum Producers Statistical Handbook, Cost figures derived as per the methodology section of the report.

## Trends in Associated Environmental Impacts

As the figures above demonstrate, in recent years Saskatchewan has experienced an increase in oil and gas production. Between 1995 and 2002, oil and gas production combined expanded by a total of 19 percent. Over the same time period, the amount of revenue captured by the province increased by 56 percent, and revenue per unit of production increased by 31 percent. This growth has been accompanied by environmental impacts in many forms, including disturbance of wildlife habitat due to well drilling and pipeline construction, and acidifying emissions and greenhouse gas emissions.

### **Land Disturbance**

Table 9 shows the increase in the number of wells drilled each year from 1995 to 2002; in 1995 a total of 2,092 oil and gas wells were drilled, compared to 3,401 wells in 2002. Adding these annual figures to the total number of wells in existence in the province prior to 1995 provides an estimate of the total number of wells in the province. Prior to 1995, there were an estimated 50,557 oil and gas wells in Saskatchewan.<sup>10</sup> This means that with the 2,092 wells drilled in Saskatchewan in 1995, there were a total of 52,649 wells or wellpads in the province at the end of that year. Assuming one hectare of disturbance for each wellpad, 52,649 hectares of land is

<sup>10</sup> Saskatchewan Department of Industry and Resources. *Mineral Statistics Handbook*, 2001.

disturbed in Saskatchewan by oil and gas wellpads. Between 1995 and 2002, the footprint associated with wellpads in the province increased from 52,649 to 74,105 hectares. That 41 percent increase in the amount of land disturbed by oil and gas wellpads in the province occurred in just seven years.

**Table 9 Number of wells drilled in Saskatchewan, 1995 to 2002**

<b>WELLS DRILLED</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Oil	1,550	2,039	3,059	908	1,298	2,330	1,954	1,489
Gas	210	307	248	567	990	1,160	1,372	1,713
Abandoned and Suspended	332	518	525	202	185	210	183	199
<b>Total Annual Growth</b>	<b>2,092</b>	<b>2,864</b>	<b>3,832</b>	<b>1,677</b>	<b>2,473</b>	<b>3,700</b>	<b>3,509</b>	<b>3,401</b>
<b>CUMULATIVE FOOTPRINT (hectares)</b>	<b>52,649</b>	<b>55,513</b>	<b>59,345</b>	<b>61,022</b>	<b>63,495</b>	<b>67,195</b>	<b>70,704</b>	<b>74,105</b>

Source: Saskatchewan Industry and Resources, Mineral Statistics Yearbook

The trend in the table above is expected to continue. Saskatchewan anticipated record drilling activity in 2003, with a total of 3,900 wells drilled,<sup>11</sup> compared to 3,401 wells drilled in 2002. Table 10 shows the total length of all pipelines built in Saskatchewan each year from 1995 to 2002. Prior to 1995, there were 17,837 kilometres of pipelines in the province. Adding this figure to the 1995 figure reveals the total kilometres of oil and gas pipelines in Saskatchewan at the end of 1995: 18,133 kilometres. The cumulative figures in Table 10 demonstrate the expansion of oil and gas pipelines in the province between 1995 and 2002, from a total of 18,133 kilometres in 1995 to a total of 21,125 kilometres in 2002. That is a 17 percent increase in the total kilometres of pipelines in the province over seven years.

Table 10 also estimates the size of the footprint associated with oil and gas pipelines in Saskatchewan from 1995 to 2002. The footprint estimate is based on the average right of way for pipelines in British Columbia (15 metres). The footprint associated with pipelines in Saskatchewan has increased from 27,199 hectares in 1995 to 31,687 hectares in 2002.

**Table 10 Length of pipelines completed in Saskatchewan, 1995 to 2002, kilometres**

<b>PIPELINES</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Provincial	296	410	395	92	153	133	267	232
National Energy Board	-	89	231	795	1	-	194	-
<b>Total</b>	<b>296</b>	<b>499</b>	<b>626</b>	<b>887</b>	<b>154</b>	<b>133</b>	<b>461</b>	<b>232</b>
Cumulative	18,133	18,632	19,258	20,145	20,299	20,432	20,893	21,125
<b>CUMULATIVE FOOTPRINT (hectares)</b>	<b>27,199</b>	<b>27,948</b>	<b>28,887</b>	<b>30,217</b>	<b>30,448</b>	<b>30,648</b>	<b>31,339</b>	<b>31,687</b>

Source: Alberta Energy Utilities Board Statistical Series 57, National Energy Board, personal communication

<sup>11</sup> Whiteley, Don. "Drillers Headed to Record Year in Canada; 46% Increase Expected in BC." *Petroleum News*, Vol. 8, No. 32, 2003.

### Acidifying Emissions

In addition to land disturbances, oil and gas production in Saskatchewan results in the release of acidifying emissions of nitrogen oxides (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>). Between 1995 and 2002, emissions of nitrogen oxides and sulphur dioxide increased by 8 percent and 37 percent, respectively.

**Table 11 Emissions of NO<sub>x</sub> and SO<sub>2</sub> from the upstream oil and gas sector, Saskatchewan, 1995 to 2002, tonnes**

EMISSION	1995	1996	1997	1998	1999	2000	2001	2002
Nitrogen Oxides	13,423	12,494	13,353	13,314	13,584	14,467	14,731	14,536
Sulphur Dioxide	5,281	7,202	7,932	8,962	7,177	7,214	7,346	7,249

Source: 1995 to 2000 data from Clearstone Engineering, *Emissions Inventories for GHG and CAC, Volume 1 and 2*, produced for Canadian Association of Petroleum Producers, 2004

### Greenhouse Gas Emissions

In addition to acidifying emissions, oil and gas production results in emissions of greenhouse gases. Table 12 estimates the greenhouse gases (in carbon dioxide equivalents) associated with upstream oil and gas emissions in Saskatchewan between 1995 and 2002. Greenhouse gas emissions associated with oil and gas production in Saskatchewan increased by 58 percent between 1995 and 2002.

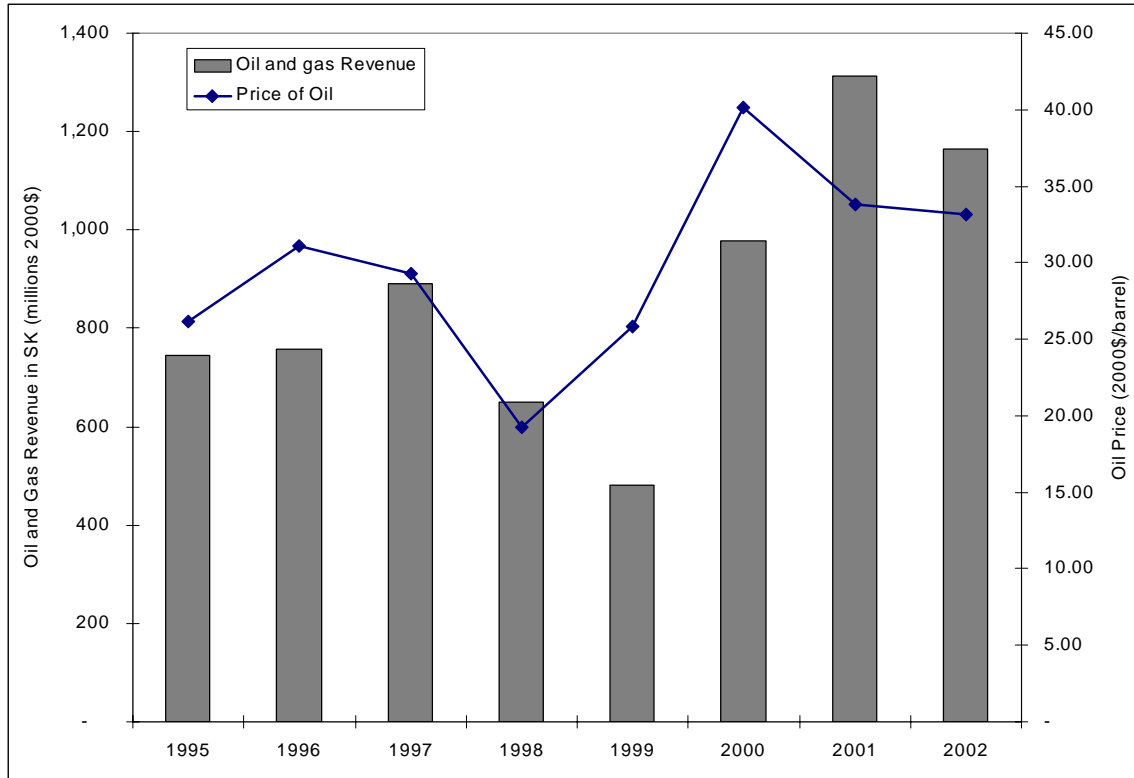
**Table 12 Upstream greenhouse gas emissions, Saskatchewan, 1995 to 2002, kilotonnes**

EMISSION	1995	1996	1997	1998	1999	2000	2001	2002
CO <sub>2</sub> E	9,857	10,648	12,746	12,759	12,859	15,161	15,777	15,568

Source: 1995 to 2000 data from Clearstone Engineering, *Emissions Inventories for GHG and CAC, Volume 1 and 2*, produced for Canadian Association of Petroleum Producers, 2004

## Summary

As was the case in both British Columbia and Alberta, the increase in revenue per unit of oil and gas production in Saskatchewan between 1995 and 2002 is largely the result of increased commodity prices. Between 1995 and 2002, the price of natural gas increased by 160 percent and the price of oil increased by 44 percent (see Figure 1). Because the increase in the price of oil over the study period was not as significant as the increase in the price of natural gas, and because the focus in Saskatchewan is on oil rather than natural gas, the increase in the amount of revenue generated in Saskatchewan was not as extreme as in British Columbia and Alberta (regions that focus more on natural gas developments). Specifically, revenue per unit of production in British Columbia increased by 207 percent between 1995 and 2002, while it increased by 117 percent in Alberta and by just 31 percent in Saskatchewan in the same period.



**Figure 1 Trends in oil and gas revenues in Saskatchewan and the price of oil (2000\$), 1995 to 2002**

In every year over the study period, economic rent was available for capture by the Saskatchewan Government. In 1997 and 1998, the government managed to capture the maximum amount of rent available (100%). In other years, the government left economic rent in the hands of industry as excess profits.

As petroleum production in Saskatchewan has increased, so, too, have the associated environmental impacts. Between 1995 and 2002, Saskatchewan saw an increase in the amount of land disturbed by wellpads (41 percent) and by pipelines (17 percent). Other environmental effects include an increase in NO<sub>x</sub> emissions of 8 percent, an increase of SO<sub>2</sub> emissions of 37 percent, and an increase in greenhouse gas emissions from oil and gas production of 58 percent.

Finally, it is worth noting that in October 2002, the premier of Saskatchewan announced a number of major changes to the Crown royalty and freehold production tax structures, as well as the Corporation Capital Tax Surcharge rate that applies to production from new oil and gas exploration and development activity in the province. Specifically, the following initiatives were introduced:

1. A new, lower "fourth-tier" production and price-sensitive Crown royalty structure for oil and gas production on or after October 1, 2002;
2. A reduction in the Corporation Capital Tax Surcharge rate from 3.6 percent to 2.0 percent for oil and gas production;
3. A system of volume-related incentives and maximum royalty rates that apply to initial production from oil and gas wells with a finished drilling date on or after October 1, 2002; and,

4. Application of the "fourth-tier" royalty regime to re-entry and short section horizontal oil wells with a finished drilling date on or after October 1, 2002.

It remains to be seen whether the above initiatives will lead to a higher or lower rate of rent capture in the province of Saskatchewan.