

# Regional Details: British Columbia

In this appendix, we describe the methods the Government of British Columbia uses to capture economic rent. We present quantitative estimates of revenues, cost of production and value of resources over the study period, and discuss the environmental impacts associated with oil and gas production in the province. We begin by providing background information on oil and gas production in British Columbia.

## Background

In this section, we identify the government authorities that play a role in regulating, managing and/or facilitating oil and gas production in British Columbia. 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 British Columbia.

### *Responsible Authorities*

Several government authorities in British Columbia are involved in oil and gas production in the province. Those most relevant to oil and gas developments include the following:

1. The **Ministry of Energy and Mines (MEM), Petroleum Lands Branch** is responsible for issuing and administering provincially owned petroleum and natural gas rights, as well as collecting revenues associated with the issuance of those rights. In addition, the MEM is responsible for setting policy with respect to oil and gas royalties and determining prices to be used in gas royalty calculations.
2. The **Ministry of Provincial Revenue** is responsible for administering sections of the *Petroleum and Natural Gas Act* that relate to the collection of royalties and freehold production taxes.
3. The **Oil and Gas Commission** regulates oil and gas activities and pipelines in British Columbia, reviews applications related to oil and gas activities and pipelines, encourages the participation of First Nations and Aboriginal peoples, participates in planning processes, and undertakes education and communication programs related to oil and gas developments.

### *Oil and Gas Production in British Columbia*

British Columbia is the second-largest producer of natural gas in Canada, after Alberta. The province currently accounts for 16 percent of Canada's gas production.<sup>1</sup> In the face of an oil and gas exploration and development boom, the British Columbia government has proposed to double oil and gas production in the province and has implemented a number of recent policy initiatives to facilitate that expansion. These initiatives are described in detail later in this appendix.

Table 1 shows B.C. oil and gas production from 1995 to 2002, inclusive. As the figures indicate, production of both oil and gas in the province has increased significantly over the time period. Total production increased by 49 percent between 1995 and 2002. In concert with this rise in production, the province has realized an increase in

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<sup>1</sup> Canadian Association of Petroleum Producers Web site ([www.capp.ca](http://www.capp.ca)).

- the number of oil and gas wells drilled, from 438 in 1995 to 645 in 2002;
- the number of leases awarded, from 7,809 in 1995 to 9,726 in 2002; and,
- the number of drilling licences in the province, from 1,067 in 1995 to 2,039 in 2002.<sup>2</sup>

While the table below shows figures up to 2002 only, it is anticipated that the increase in oil and gas production and associated activities will continue and even increase in 2003. The Petroleum Services Association of Canada forecasts record increases in drilling in British Columbia for 2003, with a predicted 46 percent increase over 2002 drilling activity.<sup>3</sup>

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

PRODUCTION	1995	1996	1997	1998	1999	2000	2001	2002
Oil	121	122	131	134	137	140	161	177
Gas	19	21	23	27	21	32	32	32
<b>Total</b>	<b>140</b>	<b>143</b>	<b>155</b>	<b>161</b>	<b>158</b>	<b>172</b>	<b>194</b>	<b>209</b>

Source: Canadian Association of Petroleum Producers

The potential for oil and gas production in British Columbia is significant. According to the provincial government, experts estimate that there may be as much as 115 trillion cubic feet of natural gas (220 trillion barrels of oil equivalent, or BOE) and 18 billion barrels of oil yet to be discovered in British Columbia. The potential for developing offshore oil and gas resources is also significant. Total resources in west coast basins could amount to as much as 9.8 billion barrels of oil and 43.4 trillion cubic feet of gas.<sup>4</sup>

#### ***Oil and Gas Employment in British Columbia***

Table 2 presents direct employment figures for oil and gas production in British Columbia. The table shows total employment figures for the province, as well as the share of total employment attributable to oil and gas production.

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

EMPLOY'T	1995 <sup>5</sup>	1996	1997	1998	1999	2000	2001	2002
Oil and Gas	2,514	2,563	2,777	2,053	2,077	2,597	2,194	2,525
Total	1,792,000	1,821,000	1,869,000	1,870,000	1,906,000	1,949,000	1,942,000	1,973,000
% of Total	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

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

<sup>2</sup> "Opening Up Oil and Gas Opportunities in BC: Statistics and Resource Potential 1992 to 2002, 2003" from Financial and Economic Review, July 2003. See [www.em.gov.bc.ca/subwebs/oilandgas/stat/stat.htm](http://www.em.gov.bc.ca/subwebs/oilandgas/stat/stat.htm).

<sup>3</sup> Whitely, Don. "Drillers Headed to Record Year in Canada: 46% Increase Expected in BC. *Petroleum News*, Vol. 8, No. 32, 2003.

<sup>4</sup> Gillett, Sandy. *Oil and Gas Legacy Funding in Norway, Alaska, Alberta and BC*. Vancouver, British Columbia. 2002.

<sup>5</sup> Employment figures for the oil and gas sector for 1996 and 1997 were not available in the same format as the figures for 1997 to 2002 due to a change in industry classifications between 1996 and 1997 from the Standard Industry Classification System to the North American Industry Classification System. Thus, figures for employment in the oil and gas production sector for 1995 and 1996 are estimated by correlating employment with production for 1997 and extrapolating to 1995 and 1996 based on this correlation.

The figures indicate that while total employment in the province has increased (by 10 percent between 1995 and 2002), employment directly associated with oil and gas production has remained relatively steady. As a result, the portion of total employment attributable to oil and gas has declined (by 9 percent between 1995 and 2002). The trend in oil and gas employment is particularly noteworthy in light of the trend in production. Recall Table 1, which showed an increase in oil and gas production in British Columbia of 49 percent between 1995 and 2002. During the same time period, employment in this sector increased by only 0.4 percent.

### ***Oil and Gas Gross Domestic Product in British Columbia***

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 oil and gas sector's rate of growth outpaced the growth of all industries combined. While the GDP associated with oil and gas production increased by 55 percent between 1995 and 2002, "all industries" GDP increased by 18 percent over the same time period. Oil and gas GDP as a percentage of "all industries" GDP also increased between 1995 and 2002.

**Table 3 GDP associated with oil and gas production and provincial GDP, British Columbia, 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>6</sup>	1,054	1,230	1,264	1,361	1,325	1,445	1,597	1,634
All Industries	110,695	113,164	118,032	117,711	123,096	131,086	129,757	130,148
% of Total	1.0%	1.1%	1.1%	1.2%	1.1%	1.1%	1.2%	1.3%

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

## **Oil and Gas Revenue Generation**

With the exception of a small amount of freehold production,<sup>7</sup> the provincial government owns all rights to petroleum and natural gas currently produced in British Columbia. Private oil and gas companies extract, process and market natural gas and oil, while the Crown reserves a portion of this production in the form of royalties. The royalty regime in British Columbia is sensitive to the age and productivity level of the well, in addition to commodity prices.

The rights to develop the province's oil and gas resources are granted to the highest bidder. Through the bidding process, oil and gas producers in British Columbia become liable for disposition bonuses. Oil and gas producers must also pay provincial and federal income taxes and federal capital taxes. The provincial capital tax rate in British Columbia was reduced to zero percent in August 2002.

Table 4 lists some key means the government uses to obtain revenues from oil and gas production on publicly owned lands in British Columbia.

<sup>6</sup> The GDP figures shown here include a degree of coal manufacturing in the province.

<sup>7</sup> In British Columbia, "freehold" petroleum and natural gas rights stem from the fact that the Crown does not own the petroleum and natural gas rights under certain lands. Because of this, the Crown cannot include "freehold" areas in the legal description of rights being offered for disposition.

**Table 4 Key means of revenue generation, British Columbia**

COMPONENT	KEY ATTRIBUTES
Natural Gas Royalty	British Columbia's natural gas royalty is age- and price-sensitive. As long as the price of natural gas remains above a threshold, <sup>8</sup> rates increase with price. Gas is categorized as either conservation <sup>9</sup> or non-conservation. <sup>10</sup> Within non-conservation gas, gas is classified as old, new or third-tier, with royalties lowest for third-tier gas. Royalty rates for conservation gas are lower than those for non-conservation gas.
Oil Royalty	The royalty regime for oil is age- and production-sensitive. Oil is classified as old, new or third-tier, with royalties lowest for third-tier oil, <sup>11</sup> reflecting relatively higher costs for exploration and extraction.
Drilling Licence	Drilling licences grant the exclusive right to drill oil and gas wells in a defined area.
Disposition Bonus	For each parcel of petroleum and natural gas rights granted through the Crown sale process, companies submit bids that include an amount to cover the fees and rental, plus a disposition bonus. Bids are selected based on the highest acceptable disposition bonus for each parcel.
Permits	Permits obligate companies to conduct oil and gas exploration.
Leases	Leases allow production, in addition to providing exclusive drilling rights.
Corporate Income Tax	Between 1993 and 2001, the general corporate income tax rate in British Columbia was 16.5%. The current general rate is 13.5%.
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.

A number of deductions and credits are available in British Columbia to encourage oil and gas production, including the gas cost allowance, the producer cost of service allowance and reduced royalties for deep and marginal wells. There are credits for coalbed methane, a royalty reduction for summer drilling programs and support for road infrastructure. Provincial oil and gas producers are also eligible for federal credit and incentive programs. The key deduction and credit programs related to oil and gas production in British Columbia are briefly described in Table 5.

<sup>8</sup> Called the “select price” and defined by the Minister of Energy monthly.

<sup>9</sup> Gas that is produced in association with oil and is conserved and marketed, rather than flared.

<sup>10</sup> Gas that is not conserved. This describes the vast majority of natural gas production in British Columbia.

<sup>11</sup> Oil produced from a pool discovered after June 1, 1998.

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

<b>COMPONENT</b>	<b>KEY ATTRIBUTES</b>
Gas Cost Allowance (GCA)	A deduction from natural gas royalties and taxes for the cost of processing and transporting the Crown's share of gas.
Producer Cost of Service Allowance (PCOS)	A deduction from royalties for the cost of moving the royalty or tax share of gas from the wellhead to the processing plant.
Coal Bed Methane Royalty Credit	A \$50,000 royalty credit for coalbed methane wells drilled up to 2008 (extended from 2004).
Summer Oil and Natural Gas Drilling Royalty Program	A credit on a portion of drilling costs incurred for wells with spud dates between March and December for 2004 and 2005.
Deep Royalty Program	A deduction for wells with a depth of at least 1,500 metres and a spud date after June 30, 2003 and before July 1, 2008.
Marginal Royalty Program	A deduction from royalties when well production is between 180 and 880 million cubic feet per day.
Road Infrastructure Program	Royalty credits of up to \$30 million annually for road infrastructure related to exploration and development.
Discovery Oil Royalty Holiday	A royalty exemption for oil from a new pool discovery well for the first 36 months or 11,450 m <sup>3</sup> , whichever comes first.
Deep Discovery Royalty Program	The lesser of either a three-year royalty holiday or 283 million cubic metres of royalty-free gas for deep discovery wells.
Deep Re-entry Royalty Program	A deduction for wells with re-entry dates after November 30, 2003 and before July 1, 2008.
Skills Development Funding	A \$500,000 per year investment in skills development with matching funding by industry.
Federal Capital Cost Allowance	A deduction against income for depreciating property; Class 41 covers oil and gas equipment and allows a 25% writedown of equipment on a declining balance basis.
Federal Resource Allowance	A notional allowance in lieu of deduction of provincial royalties and freehold mineral taxes; over the study period, the deduction was 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>12</sup>

<sup>12</sup> While Earned Depletion has been phased out, federal government expenditures related to it continued until 2001.

## Quantitative Results of Revenue Generation

Table 6 demonstrates the trend in revenue obtained from oil and gas producers in British Columbia after all tax credits and incentive programs.<sup>13</sup> The sources of revenues are grouped by major category, with the main sources of revenue being disposition bonuses and oil and gas royalties. The quantity of revenue from all sources increased between 1995 and 2002, with the largest increase occurring for royalties. Total royalties from oil and gas in British Columbia increased by 466 percent between 1995 and 2002.

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

REVENUE SOURCE <sup>14</sup>	1995	1996	1997	1998	1999	2000	2001	2002
Disposition Bonuses	137	133	224	99	179	248	432	277
Natural Gas Royalty <sup>15</sup>	98	137	180	185	299	877	1,112	756
Oil Royalty	53	76	82	65	77	136	109	103
Income Taxes <sup>16</sup>	82	187	83	81	87	216	301	560
<b>TOTAL</b>	<b>371</b>	<b>532</b>	<b>569</b>	<b>430</b>	<b>643</b>	<b>1,478</b>	<b>1,954</b>	<b>1,695</b>

Source: "Opening Up Oil and Gas Opportunities in BC: Statistics and Resource Potential 1992 to 2002, 2003" from Financial and Economic Review, July 2003

To get a sense of whether the Government of British Columbia is capturing more or less revenue today than in 1995, it is necessary to take the figures for total revenue obtained and investigate them per unit of oil and gas produced. Table 7 shows revenue generation, total production (including both oil and gas in millions of barrels of oil equivalent) and revenue generation per unit of production for the province. The table demonstrates the increase in revenue per unit production as a result of the significant increase in revenues obtained in the province over the study period.

**Table 7 Revenue generation and production, British Columbia, 1995 to 2002**

SUMMARY	1995	1996	1997	1998	1999	2000	2001	2002
Revenue (million 2000\$)	371	532	569	430	643	1,478	1,954	1,695
Production (million BOE)	140	143	155	161	158	172	194	209
<b>Revenue/Production (2000\$/BOE)</b>	<b>2.6</b>	<b>3.7</b>	<b>3.7</b>	<b>2.7</b>	<b>4.1</b>	<b>8.6</b>	<b>10.1</b>	<b>8.1</b>

<sup>13</sup> Recall that this is not a complete list of all revenue sources from oil and gas, but just those that form a significant portion of economic rent capture. Other revenue sources (such as some fees) are covered in operating costs.

<sup>14</sup> A number of the items listed in Table 4 are grouped together in this table.

<sup>15</sup> Includes gas products.

<sup>16</sup> Includes federal and provincial income taxes.

## Economic Rent in British Columbia

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 British Columbia. Like the revenue figures in the previous section, these figures are shown as 2000\$/BOE. The value of oil and gas resources in British Columbia increased by 117 percent between 1995 and 2002. At the same time, the cost of production increased by 84 percent. Note that in years where the cost of resource production exceeded the value of the resource, no economic rent was available for capture by government.

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

	1995	1996	1997	1998	1999	2000	2001	2002
Resource Value	9.2	10.4	11.6	10.7	14.3	30.0	29.1	19.9
Production Cost	8.3	11.6	16.1	13.4	10.6	11.9	20.4	15.3
Economic Rent	0.8	0.0	0.0	0.0	3.7	18.1	8.7	4.6
<b>Rent Capture</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>47%</b>	<b>100%</b>	<b>100%</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, British Columbia has realized record increases in oil and gas production in recent years. Between 1995 and 2002, oil and gas production increased by a total of 49 percent. Over the same time period, the amount of revenue obtained by the province increased by a significant 357 percent, and revenue per unit of production increased by 207 percent. This rate of increase is unprecedented in both British Columbia and Canada. This growth, however, has been accompanied by significant costs in terms of environmental impacts, including increased land disturbance and increases in acidifying 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 438 oil and gas wells were drilled, compared to 645 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 number of wells in the province. Prior to 1995, there were an estimated 8,464 oil and gas wells in the province.<sup>17</sup> That means that with the 438 wells drilled in British Columbia in 1995, there were 8,902 wells or wellpads in the province at the end of that year. Assuming that each wellpad disturbs one hectare of land, 8,902 wellpads converts into a historical footprint of 8,902 hectares. Between 1995 and 2002, the footprint associated with wellpads in the province increased from 8,902 to 13,508 hectares, which is a 52 percent expansion of the total area of land disturbed.

<sup>17</sup> B.C. Oil and Gas Commission. *2002–2003 Annual Report*.

**Table 9 Number of wells drilled in British Columbia, 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	65	71	109	93	38	58	75	40
Gas	234	221	213	380	405	494	594	427
Abandoned	104	118	83	113	121	137	95	68
Cased/Service <sup>18</sup>	35	51	178	66	56	81	111	110
<b>Total Annual Growth</b>	<b>438</b>	<b>461</b>	<b>583</b>	<b>652</b>	<b>620</b>	<b>770</b>	<b>875</b>	<b>645</b>
<b>CUMULATIVE FOOTPRINT (hectares)</b>	<b>8,902</b>	<b>9,363</b>	<b>9,946</b>	<b>10,598</b>	<b>11,218</b>	<b>11,988</b>	<b>12,863</b>	<b>13,508</b>

Source: "Opening Up Oil and Gas Opportunities in BC: Statistics and Resource Potential 1992 to 2002, 2003" from Financial and Economic Review, July 2003

As Table 10 demonstrates, the total length of pipelines built in British Columbia varies from year to year, with annual additions ranging from 809 kilometres constructed in 1995 to 1,953 kilometres in 1998. Prior to 1995, there were a total of 2,905 kilometres of pipelines in the province. Adding this figure to the 1995 figure reveals the total kilometres of oil and gas pipelines in British Columbia at the end of 1995: 3,714 kilometres. The cumulative figures in Table 10 clearly demonstrate the significant expansion of oil and gas pipelines in the province between 1995 and 2002, from a total of 3,714 kilometres in 1995 to a total of 13,792 kilometres in 2002. That is a 271 percent increase in the total kilometres of pipelines in the province in just seven years.

Table 10 also estimates the size of the footprint associated with oil and gas pipelines in British Columbia from 1995 to 2002. The footprint estimate is based on the average right of way for pipelines in British Columbia (15 metres), and is converted to hectares. The footprint associated with pipelines in the province has increased significantly, from 5,571 hectares in 1995 to 20,688 hectares in 2002.

**Table 10 Length of pipelines completed in British Columbia, 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	678	708	1,130	1,131	1,380	1,674	1,454	1,163
National Energy Board	131	246	23	822	10	50	45	242
<b>Total</b>	<b>809</b>	<b>954</b>	<b>1,153</b>	<b>1,953</b>	<b>1,390</b>	<b>1,724</b>	<b>1,499</b>	<b>1,405</b>
Cumulative	3,714	4,668	5,821	7,774	9,164	10,888	12,387	13,792
<b>CUMULATIVE FOOTPRINT (hectares)</b>	<b>5,571</b>	<b>7,002</b>	<b>8,731</b>	<b>11,661</b>	<b>13,746</b>	<b>16,332</b>	<b>18,580</b>	<b>20,688</b>

Source: B.C. Oil and Gas Commission, National Energy Board, personal communication

<sup>18</sup> When a steel pipe is placed in well to prevent the sides of the well from caving in, to prevent fluids from moving from one formation to another and to aid in well control.

### **Acidifying Emissions**

In addition to land disturbances, oil and gas production in British Columbia results in the release of acidifying emissions of nitrogen oxides (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>). As Table 11 demonstrates, the expansion of oil and gas production in British Columbia has increased NO<sub>x</sub> and SO<sub>2</sub> emissions from oil and gas production. Oil and gas production in British Columbia resulted in 25,806 tonnes of NO<sub>x</sub> emissions in 1995 and 45,903 tonnes of NO<sub>x</sub> emissions in 2002, an increase of 78 percent. Similarly, oil and gas production in British Columbia resulted in 31,523 tonnes of SO<sub>2</sub> emissions in 1995 and 37,972 tonnes of SO<sub>2</sub> emissions in 2002, an increase of 20 percent.

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

<b>EMISSION</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>
Nitrogen Oxides	25,806	27,443	29,225	34,896	36,584	37,860	42,582	45,903
Sulphur Dioxide	31,523	33,880	54,210	46,143	32,733	31,318	35,224	37,972

*Source: 1995 to 2000 figures 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 gas emissions (in CO<sub>2</sub>E, or carbon dioxide equivalents) associated with the upstream oil and gas sector in British Columbia between 1995 and 2002. Greenhouse gas emissions increased between 1995 and 2002 by 47 percent.

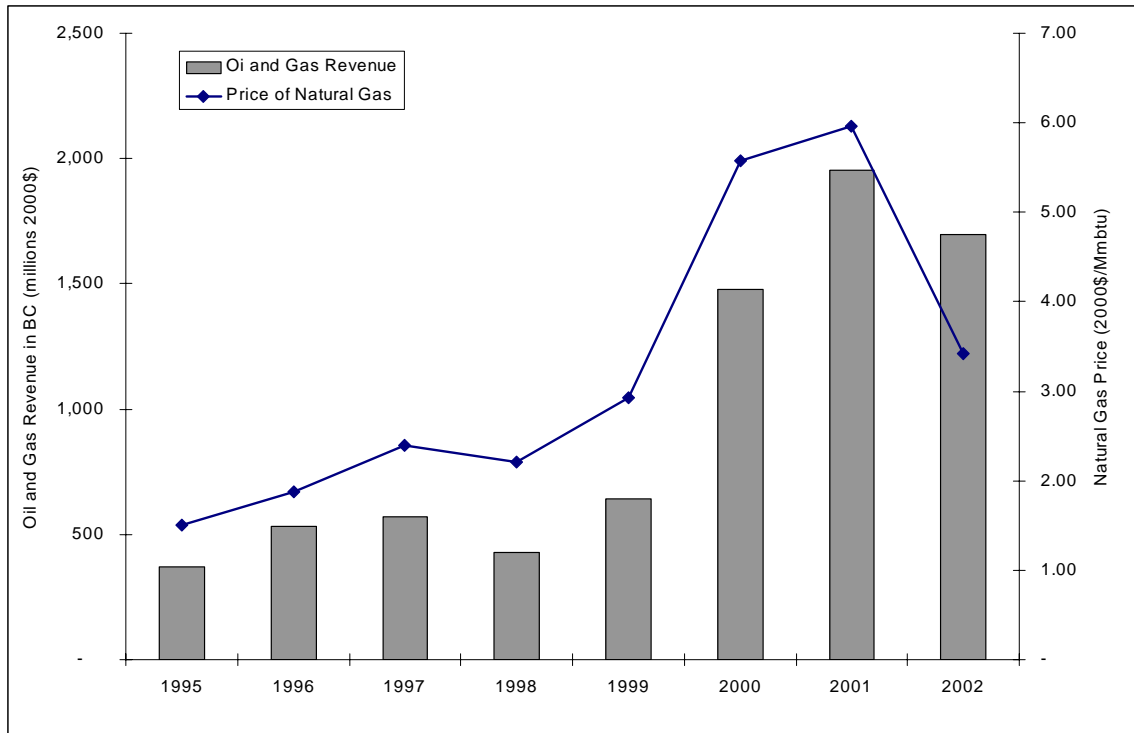
**Table 12 Upstream greenhouse gas emissions, British Columbia, 1995 to 2002, kilotonnes**

<b>EMISSION</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>
Total CO <sub>2</sub> E	5,905	6,313	6,518	7,041	7,093	7,183	8,079	8,709

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

## **Summary**

British Columbia has realized a significant increase in the amount of revenue generated from oil and gas developments in the province of late. This increase is largely the result of increased commodity prices. As Table 5 described, the royalty regime for natural gas (as well as oil) is sensitive to fluctuations in the price of fuel. Thus, when the price of natural gas increases, so, too, does the revenue the government can capture. Between 1995 and 2002, the price of oil increased by 44 percent and the price of natural gas increased by 160 percent. The greatest increases were observed between 1999 and 2000, when the international price of natural gas increased by 94 percent and the price of oil increased by 58 percent. This increase coincided with a significant increase (111 percent) in the amount of revenue per unit of production in British Columbia, as Figure 1 shows. In British Columbia we have also seen a relatively low value of resource combined with fairly high production costs resulting in a low value of economic rent and a high portion of rent capture by the government over the study period.



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

It is also worth highlighting the apparent disconnect between oil and gas production and employment in British Columbia between 1995 and 2002. While oil and gas production in the province increased by 49 percent between 1995 and 2002, direct employment in the sector increased by only 0.4 percent. This is especially interesting given recent statements by the provincial government that new oil and gas production will lead to increased employment in the province. The provincial government, in its recent energy policy, *Energy for Our Future: A Plan for BC*,<sup>19</sup> describes its intention to build the B.C. economy and create jobs in the province through energy developments. Investments in energy efficiency improvements and renewable energy have been shown to result in more employment than investments in conventional energy. A survey by the Pembina Institute in this area found that, on average, energy efficiency investments (e.g., building retrofits) create more than 35 person years of employment per million dollars invested.<sup>20</sup> That is about four times as many jobs as average levels for equivalent investments in energy supply: three times as many as alternative energy supply (e.g., solar and biomass) and five times as many as conventional energy supply (e.g., oil and gas). If the B.C. government wants to provide new employment opportunities to the citizens of the province, focusing on renewables and energy efficiency investments is more appropriate than expanding oil and gas developments.

Finally, it is important to note that while revenue generation and oil and gas production have increased in the province, so, too, have associated environmental impacts. Between 1995 and 2002:

<sup>19</sup> B.C. Ministry of Energy and Mines. *Energy for Our Future: A Plan for BC*, 2002.

<sup>20</sup> Campbell, Barbara, Larry Dufay and Rob Macintosh. *Comparative Analysis of Employment from Air Emission Reduction Methods*. Environment Canada, 1997.

- the total number of wells drilled in the province increased by 47percent;
- the footprint from pipelines increased by 271 percent;
- emissions of nitrogen oxides increased by 78 percent;
- emissions of sulphur dioxide increased by 20 percent; and,
- greenhouse gas emissions increased by 47 percent.

According to the B.C. government, "Unclear environmental standards and inefficient regulatory processes have hindered environmentally responsible energy development in the province up to now."<sup>21</sup> Without government intervention, these trends will continue. This is especially worrisome in the face of several recent government initiatives designed to increase and accelerate oil and gas developments in the province. The B.C. government wants to double oil and gas production by 2010 and has implemented a number of policies<sup>22</sup> to help achieve this goal, without adequate safeguards for environmental protection.

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<sup>21</sup> B.C. Ministry of Energy and Mines. *Energy for Our Future: A Plan for BC*, 2002.

<sup>22</sup> These initiatives are described in Table 5, and include a royalty credit for coalbed methane production, a summer drilling royalty credit, deep and marginal well royalty reductions, and a road infrastructure tax credit.