Chapter 3

Government Support for Energy Investments

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Government Support for Energy Investments

Main Points

3.1 We undertook this study to give Parliament comprehensive information on the support provided by government for energy investments and to determine whether this support favours the non-renewable energy sector. We were particularly interested in support through the tax system because it is less transparent than direct support. We also wanted to explore reasons why energy from renewable sources, other than large-scale hydro-electric projects, makes up a small portion of Canada's energy mix. We sought to determine whether tax incentives are a major contributor to this situation.

3.2 Overall, we found that with a few exceptions, federal government support today for energy investments, including support through the tax system, does not particularly favour the non-renewable sector over the renewable sector. We also found that in the past, governments have intervened in energy markets for various reasons through direct spending, regulations and tax incentives. Most of the federal spending and tax incentives have been for non-renewable resources, the predominant source of energy in Canada.

3.3 All forms of energy are competing for investment dollars against many other investment opportunities. Investments with higher rates of return, established markets and good track records are the ones that attract investors. Most investors we surveyed find that many renewable energy investments do not currently have these features. As well, the payback period is often too long for investments in renewable energy and energy efficiency to make them the preferred choice.

3.4 The federal government stated in its 1996 Renewable Energy Strategy that it wants to increase investments in renewable energy. It has also said for many years that it wants Canadians to use energy more efficiently. Given the barriers we have identified, the federal government may wish to consider developing new strategies and approaches to accomplish its stated objectives for investments in renewable energy and energy efficiency.

Background and other observations

3.5 In December 1997, Canada and 160 other nations negotiated the Kyoto Protocol, an agreement on climate change to reduce emissions of six important greenhouse gases, including carbon dioxide. (The main source of human-induced greenhouse gas emissions in Canada is the production and consumption of fossil fuels, such as oil, natural gas and coal.) For its part, Canada committed to reducing its emissions to six percent below 1990 levels by 2008–2012. But Canada's emissions were already 13 percent above 1990 levels by 1997 and are expected to keep growing. Unless Canada takes new measures, Natural Resources Canada estimates that Canada will actually have to reduce emissions by at least 26 percent from their forecast levels to meet the Kyoto target.

3.6 For the purpose of this study, "non-renewable sources of energy" included oil, natural gas and coal (which are fossil fuels) and nuclear power. "Renewable sources of energy" included water (large-scale and small-scale hydro-electric projects), wind, the sun, the photovoltaic cell (energy produced by exposing to light two dissimilar materials), biomass (plant materials and animal waste), ethanol, geothermal power (heat energy produced in the earth), and waves or tides.

3.7 Governments have used the tax system to encourage exploration for and development of various sources of energy. Most of the federal tax provisions that exist today accelerate the write-off of an expense for tax

purposes. This means that the taxpayer reduces current taxes but pays higher taxes later. Accelerated write-offs are a benefit mainly because of the “time value” of money. Investors who can reduce current taxes are able to achieve a higher rate of return on their investment and have more cash for other investments.

3.8 An adequate rate of return on investment was the factor most frequently mentioned by our survey respondents in assessing the potential of an investment project. As the International Energy Agency pointed out, many renewable energy projects do not yet provide an adequate rate of return to make them a desirable investment. Three reasons for this are markets are difficult to enter, renewable energy products generally cost more than non-renewable ones, and payback periods are often longer.

Introduction

3.9 In December 1997, Canada and 160 other nations negotiated the Kyoto Protocol, an agreement on climate change to reduce emissions of six important greenhouse gases, including carbon dioxide. (The main source of human-induced greenhouse gas emissions in Canada is the production and consumption of fossil fuels, such as oil, natural gas and coal.) For its part, Canada committed to reducing its emissions to six percent below 1990 levels by 2008–2012. But Canada's emissions were already 13 percent above 1990 levels by 1997 and are expected to keep growing. Unless Canada takes new measures, Natural Resources Canada (NRCan) estimates that Canada will actually have to reduce emissions by at least 26 percent from their forecast levels to meet the Kyoto target.

3.10 The ministers of energy and the environment in the federal, provincial and territorial governments approved a process in April 1998 to develop a national implementation strategy to address climate change. Sixteen "issue tables" or working groups, involving about 450 people with many perspectives on climate change, were created to examine the impacts, costs and benefits of implementing the Kyoto Protocol. Each issue table is expected to develop a set of options for consideration by the ministers over a series of meetings in 2000–2001.

3.11 Two important ways to address climate change are using energy more efficiently and establishing a more sustainable mix of energy sources, which means a greater reliance on renewable sources. Using energy more efficiently is widely recognized as an effective way to reduce greenhouse gas emissions, particularly carbon dioxide. Renewable energy sources, such as water, biomass (plant materials and animal waste), wind and the sun, can provide Canada with a secure supply of energy over the long term in an environmentally friendly way.

3.12 For the purpose of this study, "non-renewable sources of energy" included oil, natural gas and coal (which are fossil fuels) and nuclear power. "Renewable sources of energy" included water (large-scale and small-scale hydro-electric projects), wind, the sun, the photovoltaic cell (energy produced by exposing to light two dissimilar materials), biomass, ethanol, geothermal power (heat energy produced in the earth), and waves or tides. "Other sources of energy" included methanol/methane and the hydrogen fuel cell. These sources can be renewable or non-renewable.

Overview of the energy sector

The economic development of modern societies depends on energy.

3.13 The economic development of modern societies depends on energy. Exhibit 3.1 shows the many sources of energy and their uses. According to NRCan, the Canadian consumption of energy in 1997 was 39 percent in the industrial sector, 27 percent in the transportation sector, 18 percent in the residential sector, 13 percent in the commercial sector, and 3 percent in the agricultural sector. In Canada, the consumption of energy varies by region because of population patterns, the climate and the mix of industrial activities.

3.14 In 1997, 24 percent of Canada's energy needs were met by electricity. To determine its environmental effects, it is important to understand how electricity is produced. Over half of Canada's electricity is generated from hydro-electric projects, mostly large-scale ones that can have negative impacts on the environment when flooding is required to create large reservoirs. The rest of the country's electricity is produced mostly by nuclear power reactors and the burning of fossil fuels. Some forms of renewable energy, such as wind, solar energy and biomass, also produce electricity, but the total amounts are small.

3.15 NRCan has projected Canada's growing energy requirement to 2020. As Exhibit 3.2 shows, non-renewable sources will be used to meet most of this requirement. However, extracting, producing and burning fossil fuels creates greenhouse gases, which have implications for climate change. Either domestic or foreign sources of energy can satisfy Canadian requirements. As long as Canadians and Canadian industry need more energy and are willing to pay for it, suppliers will provide it.

3.16 Domestic requirements for energy combined with export opportunities drive Canadian energy production. For some energy products such as electricity, there is a fairly close link between Canadian requirements and Canadian production. For others such as oil and gas, the link is not as close.

3.17 Non-renewable sources of energy tend to be traded on international markets, which set their prices. Changes in Canadian production will not necessarily affect the amount Canadians consume or the price they pay. However, international changes in the price or supply of these energy sources could well affect Canadian consumers. Canada has large reserves of oil, natural gas and coal and using them to meet Canadian energy requirements, thus, has some economic advantages.

3.18 Canada has a large and vibrant oil and gas industry. Net spending of the upstream sector of the industry (exploration and production) was about $28.4 billion in 1998. That year, companies produced over 2 million barrels of crude oil a day and about 16 billion cubic feet of natural gas a day and exported about half of this production. The upstream oil and gas sector employs over 70,000 people. From 1991 to 1997, the oil and gas industry recorded operating profit margins of 9.1 percent on average, compared with 6.6 percent for all industries. It recorded a return on capital of 5.5 percent on average, compared with 5.8 percent for all industries.

3.19 Renewable sources of energy tend to be produced, priced and consumed in a more local or regional market. These sources are competitive in their markets if they are available and if their cost is comparable with other energy options.

3.20 Both renewable and non-renewable sources of energy need capital to grow. However, they do not necessarily compete with each other for investment dollars. Rather, investors look

Exhibit 3.1

Energy Sources and Uses

	Non-renewable					Renewable								Other[3]	
Use \ Source	Oil	Natural gas	Coal	Nuclear power	Propane	Water (hydro-electric)	Wind	Sun	Photovoltaic cell	Biomass	Ethanol	Geothermal power	Waves and tides	Methanol/Methane	Hydrogen fuel cell
Transportation[1]	✓	✓			✓					✓	✓			✓	✓
Residential[2]	✓	✓			✓			✓		✓		✓			
Commercial[2]	✓	✓			✓			✓				✓			
Industrial[2]	✓	✓	✓					✓		✓					
Agriculture[2]	✓	✓			✓		✓	✓							
Electricity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓

Source: Office of the Auditor General of Canada and the Commissioner of the Environment and Sustainable Development

[1]Excludes the use of electricity.
[2]Excludes the use of electricity and transportation.
[3]Other sources of energy can be renewable or non-renewable.

for investments that meet their specific objectives, including a desired rate of return.

Energy policy, a shared responsibility

3.21 Jurisdiction over energy policy is shared between the federal and provincial governments. The provinces own energy resources and develop energy and taxation policies and regulations on the management of these resources. The federal government mainly deals with interprovincial and international movement of energy and energy-using equipment as well as projects that extend beyond a province's borders. It also regulates the nuclear industry in Canada. In addition, the federal government has broad taxation and spending powers. Both levels of government have responsibilities for protecting the environment.

3.22 Federal energy policy has evolved over the last three decades. During the mid-1970s and early 1980s, the government wanted to ensure that Canadians had a secure supply of energy at an affordable price. As world oil prices fell and supplies increased in the late 1980s and early 1990s, the focus shifted to developing Canadian energy resources and improving regional economies. Today's stated energy policy is market-based and increasingly shaped by Canada's domestic and international commitments, such as the North American Free Trade Agreement and the Kyoto Protocol. The planned national implementation strategy for dealing with climate change may have a significant effect on future energy policy.

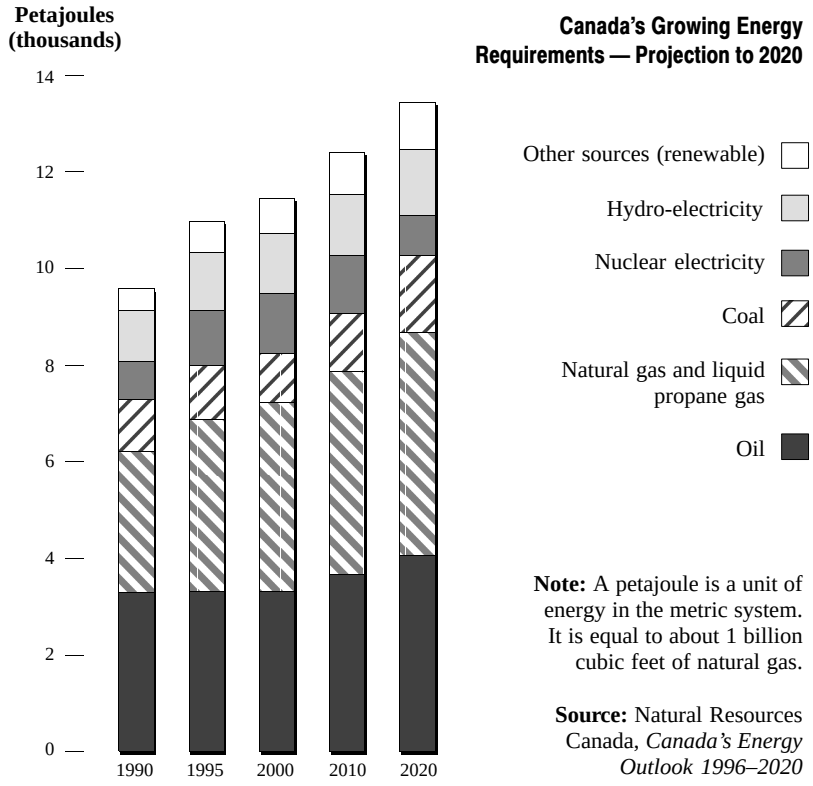
3.23 In October 1996, NRCan released its *Renewable Energy Strategy: Creating a New Momentum.* Its objective is to bring Canadian renewable energy technologies into commercial use more quickly by enhancing investment conditions and promoting technology and market development initiatives. In April 1998, NRCan established the Office of Energy Efficiency with the mandate to renew, strengthen and expand Canada's commitment to energy efficiency.

Focus of the study

3.24 Governments have supported the exploration for and development of energy from non-renewable and renewable sources and encouraged energy efficiency over the years for various reasons. These include securing the supply of energy, especially during oil crises, developing regional economies and addressing environmental concerns. Some believe that the non-renewable sector has enjoyed and continues to enjoy more support than the renewable sector. Many have said that there are hidden subsidies in the tax system for investments in the non-renewable energy sector. Furthermore, some have argued that the renewable energy sector in Canada is not expanding as quickly as it should, largely because of government action, or inaction.

Exhibit 3.2

Canada's Growing Energy Requirements — Projection to 2020



Note: A petajoule is a unit of energy in the metric system. It is equal to about 1 billion cubic feet of natural gas.

Source: Natural Resources Canada, *Canada's Energy Outlook 1996–2020*

3.25 We undertook this study to give Parliament comprehensive information on the support provided by the federal government for energy investments and to determine whether this support favours the non-renewable energy sector. We were particularly interested in support through the tax system because it is less transparent than direct support. While our focus was on energy investments, we reviewed other significant federal government interventions in the energy sector. We also wanted to explore reasons why energy from renewable sources, other than large-scale hydro-electric projects, makes up a small portion of Canada's energy mix. We sought to determine whether tax incentives are a major contributor to this situation.

3.26 For more information on this study, see **About the Study** at the end of the chapter.

Observations

Government Spending and Regulation

Federal and provincial governments have intervened in energy markets almost since their beginning.

3.27 Federal and provincial governments have intervened in energy markets almost since their beginning. Government policies have controlled or influenced particular activities through direct spending, regulation and tax incentives to provide Canadians with a secure supply of energy, to develop regional economies and to address environmental concerns. Appendix A presents highlights of federal government spending and regulation related to energy investments. In the past, much of this was focussed on non-renewable resources, the predominant source of energy in Canada. Sometimes the spending and regulation benefited mainly the producers of non-renewable resources; at other times consumers were the main beneficiaries.

Federal spending

3.28 We analyzed federal spending on energy reported in the Public Accounts of Canada and departmental reports on plans and priorities (formerly a portion of Part III of the Main Estimates) from 1970–71 to 1998–99. Exhibits 3.3 and 3.4 break down the spending over this period by energy source. We included payments to third parties and government programs that relate to investments in energy. We excluded general operating expenses of departments and regulatory expenses of agencies concerned with energy matters. We also excluded federal spending on energy to power, heat and cool facilities or run vehicles and other equipment.

3.29 For non-renewable resources, other than nuclear power, the federal government's greatest spending occurred between 1974 and 1986 during the days of oil import compensation payments (OICPs) and the National Energy Program (NEP).

3.30 The government introduced OICPs in 1974 so that consumers in Quebec and Atlantic Canada, who were then completely dependent on imported oil, would be protected against increases in world oil prices. The payments had totalled about $13.6 billion by the time they ended in 1985. A tax on crude oil exports helped to finance the payments.

3.31 The NEP was introduced in 1980 and, among other things, retained the government's objective of a single "made-in-Canada" oil price set below world levels. The NEP imposed a refinery levy, the petroleum compensation charge, to help achieve this objective. By the end of the regime following the signing of the Western Accord in 1985, the petroleum compensation charge had raised about $11.3 billion from refiners, of which $11.1 billion was paid out to the first users (usually other refiners) of high-cost petroleum. Under the NEP, the government encouraged exploration and sought to increase Canadian ownership in

the oil and gas industry by paying some $7.7 billion in cash grants under the Petroleum Incentives Program.

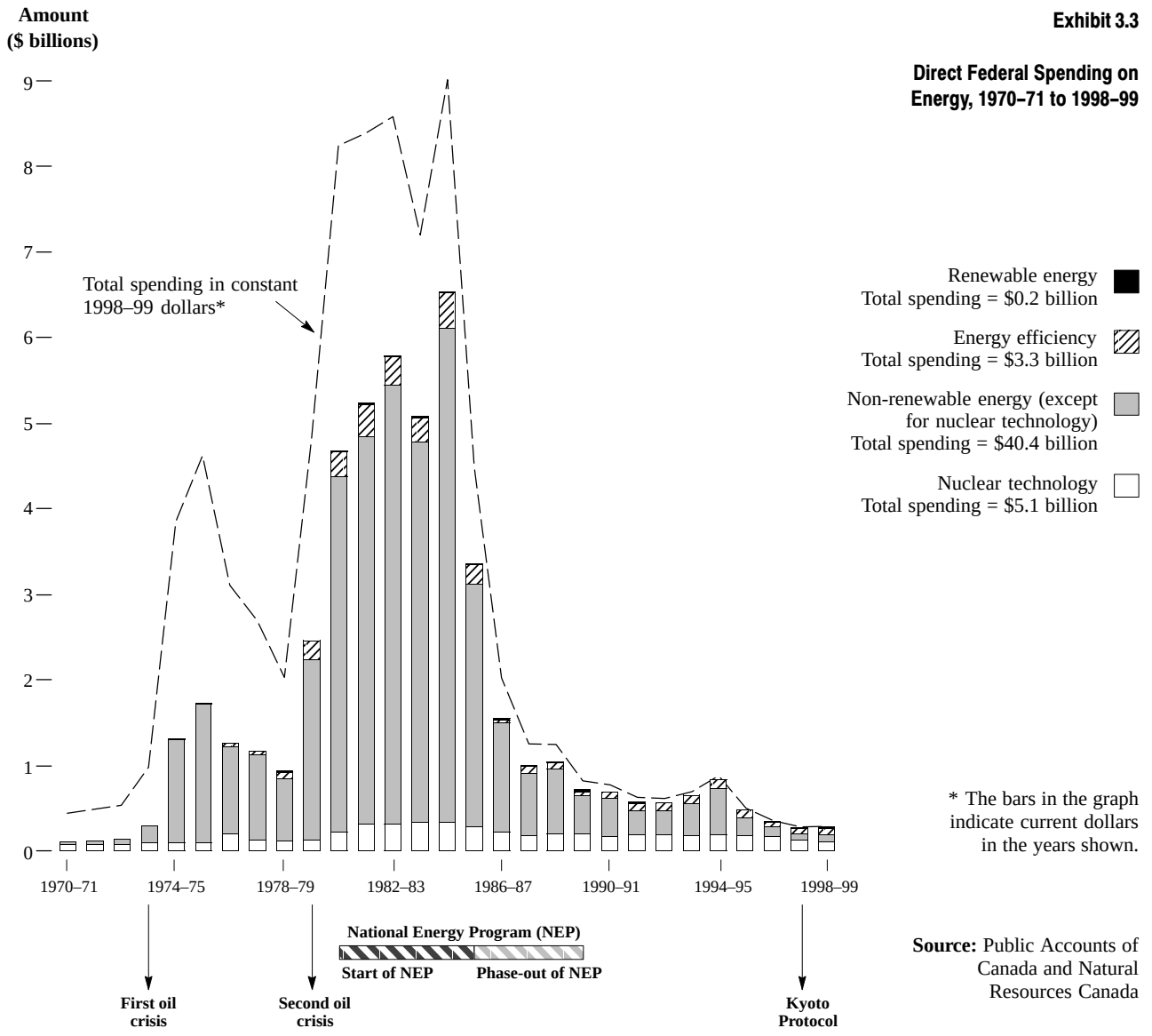
3.32 In the late 1980s and early 1990s, the federal government supported energy megaprojects, such as the Hibernia Development Project and heavy oil upgraders. Since 1995, federal government spending on non-renewable energy resources has been reduced significantly.

3.33 The development of nuclear technology in Canada began in the 1940s. In 1944, the federal government started constructing a research facility at Chalk River, Ontario. Since 1946, the federal government has spent about $6 billion on nuclear technology, mostly through Atomic Energy of Canada Limited. As Exhibits 3.3 and 3.4 show, annual spending has declined in recent years.

3.34 The federal government has supported the development and use of

Exhibit 3.3

Direct Federal Spending on Energy, 1970–71 to 1998–99



* The bars in the graph indicate current dollars in the years shown.

Source: Public Accounts of Canada and Natural Resources Canada

renewable energy technologies for over 20 years, mainly through research and development programs and tax incentives. At first, this was because it wanted to be certain that Canada had a secure supply of energy. Now it is more concerned about the environmental impacts of using non-renewable resources to produce energy. The federal government is spending around $12 million annually to support renewable energy technologies.

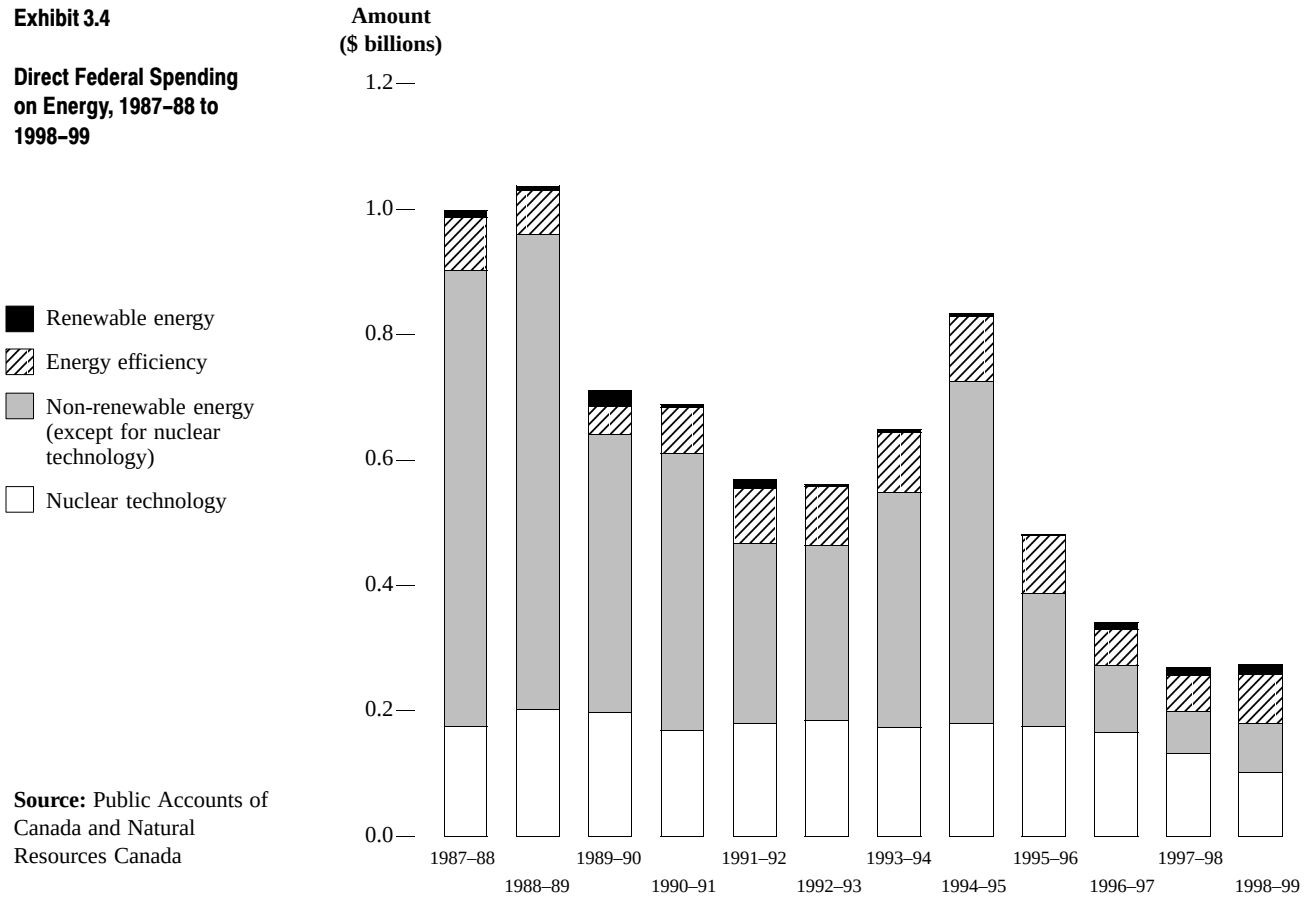
3.35 The federal government has also promoted energy conservation and energy efficiency for many years. In the late 1970s, spending on energy efficiency programs grew significantly (see Exhibit 3.3). Grant programs, such as the Canadian Home Insulation Program, were used to convince energy users to become more energy-efficient. By the mid-1980s, spending on energy efficiency dropped substantially. In the early 1990s, the federal government re-emphasized energy efficiency and energy from alternative sources and began to regulate the energy efficiency of products that use energy. In recent years, it has spent about $64 million annually on energy efficiency activities.

Other federal support

3.36 The federal government has also supported the energy sector by investing in companies, granting loans, remitting certain taxes and export charges, and assuming certain potential losses (contingent liabilities). Since 1970, the federal government has written off $2.8 billion of its investments and loans for energy projects in the non-renewable sector; this is in addition to the amounts shown in Exhibits 3.3 and 3.4. Between 1975–76 and 1981–82, it remitted almost

Exhibit 3.4

Direct Federal Spending on Energy, 1987–88 to 1998–99



Source: Public Accounts of Canada and Natural Resources Canada

$2.4 billion of export and other charges on certain types of oil or oil products that companies exported "when an equal volume was returned to Canada."

3.37 The federal government's reported contingent liabilities related to energy had reached about $950 million on 31 March 1999. These liabilities concern the Hibernia Development Project, the NewGrade heavy oil upgrader, and installations governed by the *Nuclear Liability Act*. They do not include the cost of cleaning up high-level radioactive waste on federal property. Nor do they include the cost of cleaning up low-level radioactive waste, mainly in the Port Hope area of Ontario, and decommissioning sites of uranium tailings. (We estimated these costs to be $850 million in our May 1995 Report, Chapter 3, Federal Radioactive Waste Management.)

The Tax System and Energy Investments

Federal government revenue from energy

3.38 The federal government collects taxes from the production and consumption of energy (see Exhibits 3.5 and 3.6). The largest source of revenue is the excise tax that consumers pay on fuels to run their vehicles and equipment, which raised some $50 billion between 1970 and 1999. The federal government also collects goods and services tax (GST) on a number of energy products and services, but it is difficult to determine the exact amounts.

3.39 From 1973–74 to the late 1980s, the federal government collected about $7.8 billion in oil export taxes, $10.1 billion from the petroleum and gas revenue tax, and, as noted in paragraph 3.31, about $11.3 billion from the petroleum compensation charge. These levies were phased out after the Western Accord was signed in 1985 (see Appendix A).

3.40 The federal government also collects income taxes from producers of energy, except for provincially owned oil and gas companies and utilities. Exhibit 3.6 shows that between 1990 and 1997, the oil and gas and electricity industries paid over $12 billion in federal corporate income taxes.

Current tax incentives for energy investments

3.41 Governments have used the tax system to encourage exploration for and development of various sources of energy. Appendix B highlights some of the ways this support has been provided in the past. Appendix C describes the current income and excise tax provisions that relate specifically to energy investments. These provisions are complex and, when they are used, so is the way they interact with each other, with all the other provisions in the *Income Tax Act* and with provincial tax and royalty regimes.

Governments have used the tax system to encourage exploration for and development of various sources of energy.

3.42 Most of the current federal tax provisions accelerate the write-off of an expense for tax purposes. This means that the taxpayer reduces current taxes but pays higher taxes later (see Exhibit 3.7). Accelerated write-offs are a benefit mainly because of the "time value" of money. Investors who can reduce current taxes are able to achieve a higher rate of return on their investment and have more cash for other investments.

3.43 The incentive for companies is to keep spending and take advantage of the accelerated write-offs to reduce current taxes and put off the day when they have to pay increased taxes. This reaction is what the government had in mind when it designed these tax incentives to encourage investments in non-renewable and renewable resources.

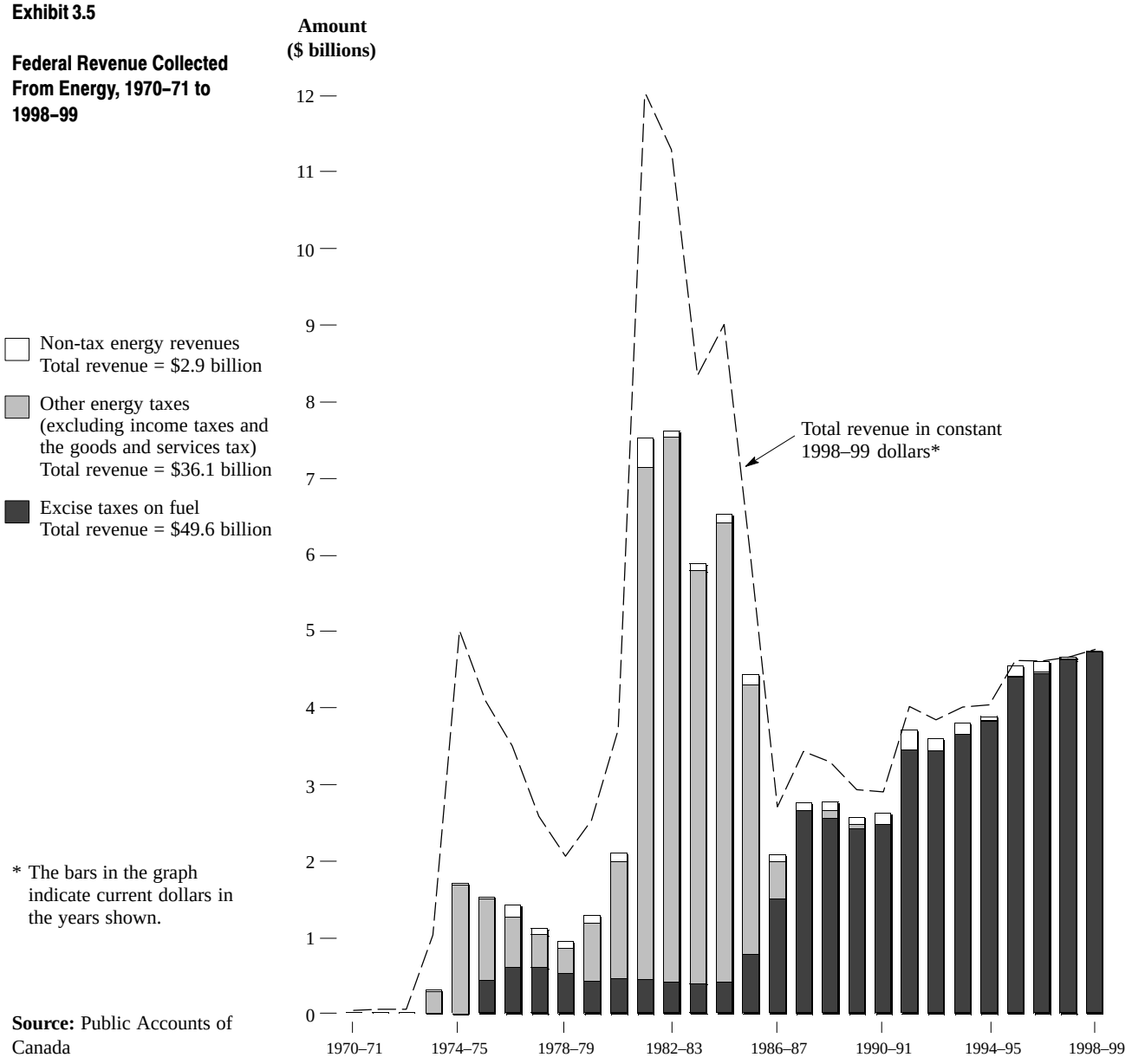
3.44 Accelerated write-offs work best for companies that are making profits and are in a position to pay taxes. For companies that are not, the accelerated write-offs can be carried forward and

deducted for tax purposes when the companies become profitable.

3.45 Flow-through shares allow companies to raise funds to carry out certain activities by flowing (or passing) some of their accelerated write-offs to shareholders. A company can issue flow-through shares for Canadian exploration expenses, Canadian development expenses and Canadian renewable and conservation expenses (see Appendix C for definitions). Investors receive equity in the company and can deduct the accelerated write-offs in calculating their taxes. The company cannot deduct the expenses that it has flowed to investors, and it may eventually pay higher taxes. In general, small companies that do not have taxable income are the ones that issue flow-through shares.

Exhibit 3.5

Federal Revenue Collected From Energy, 1970–71 to 1998–99



* The bars in the graph indicate current dollars in the years shown.

Source: Public Accounts of Canada

Royalties and the resource allowance

3.46 When companies calculate their federal income taxes, they cannot deduct royalties paid to provincial governments for oil, natural gas and minerals. (Normal income tax rules allow a deduction for most amounts that are paid to earn income.) The federal government imposed this restriction in 1974 in part to disentangle provincial royalty regimes from federal income taxes. To compensate for the restriction and to offer more incentives for exploration and development, the government introduced the resource allowance in 1976. In calculating income taxes, companies can deduct a resource allowance that is 25 percent of resource profits from mining and from producing oil and gas. In general terms, resource profits are defined as resource revenue minus associated overhead, operating costs and capital cost allowances (write-offs of capital assets, such as equipment and buildings).

3.47 In recent years, the benefits that the oil and gas industry received as a whole from the resource allowance deduction have roughly offset the increased tax cost arising from the non-deductibility of provincial royalty payments (see Exhibit 3.8). For the mining sector (including coal and uranium mines), the resource allowance generally exceeds royalties. However, the relationship between royalties and the resource allowance differs from one corporation to another. For example, a company with low resource profits would receive a small resource allowance that might not offset the non-deductibility of Crown royalties. But the rules give companies some discretion in calculating the resource allowance, and accelerated write-offs can reduce it significantly.

3.48 We encourage the Department of Finance to monitor the resource allowance and ensure that it is an appropriate compensation for the non-deductibility of provincial royalty payments.

Estimating resource-related tax expenditures

3.49 Tax expenditures are usually thought of as tax measures, such as exemptions, deductions or tax credits, that the government uses to achieve specific economic and social policy objectives.

Current tax incentives for the energy sector are mainly accelerated write-offs that are designed to encourage investment.

Exhibit 3.6

Federal Corporate Income Taxes Paid by Oil and Gas and Electricity Industries

	1990	1991	1992	1993	1994	1995	1996	1997
	($ millions)							
Oil and gas (upstream)	763.2	523.9	639.2	773.2	874.6	1,072.9	1,246.5	1,221.5
Oil and gas (downstream)	388.8	466.1	234.8	437.8	414.4	507.1	556.5	750.5
Total oil and gas	1,152.0	990.0	874.0	1,211.0	1,289.0	1,580.0	1,803.0	1,972.0
Electricity	142.0	143.0	187.0	210.0	231.0	218.0	214.0	257.0
Total income taxes paid by oil and gas and electricity industries	1,294.0	1,133.0	1,061.0	1,421.0	1,520.0	1,798.0	2,017.0	2,229.0
Total federal income taxes paid by all industries	10,724.0	10,550.0	10,546.0	11,318.0	13,488.0	16,198.0	18,512.0	19,767.0

Source: Statistics Canada

Exhibit 3.7

The Effects of Accelerated Write-Offs

Facts:

1. In year 1, a company spends $100,000 exploring for natural gas.
2. The company writes off this amount in its books over the production life of the discovered well.
3. The company earns profits of $200,000 each year before the write-off and before taxes.
4. The tax rate is 30 percent.

	Year 1	Year 2	Year 3	Year 4	Year 5
	($ thousands)				
Income recorded in the books:					
Profits earned	200	200	200	200	200
Write-off of exploration expenses	17	17	17	13	9
Income before taxes	183	183	183	187	191
Taxes at 30% (rounded)	**55**	**55**	**55**	**56**	**57**
Income calculated for taxes:					
Profits earned	200	200	200	200	200
Write-off of exploration expenses	100	0	0	0	0
Income before taxes	100	200	200	200	200
Taxes at 30%	**30**	**60**	**60**	**60**	**60**
Reduction in taxes due to accelerated write-off	**25**				
Increase in taxes due to accelerated write-off		**(5)**	**(5)**	**(4)**	**(3)**

If the accounting rules and the tax rules were the same, the company would pay $55,000 of taxes in year 1. However, the accelerated write-off allows the company to deduct the full $100,000 of exploration expenses in year 1 and reduce its taxes for that year by $25,000.

In year 2 the company would pay taxes of $55,000 if the accounting rules and the tax rules were the same. However, because of the accelerated write-off in year 1, the company has no deductions left and the company must pay $60,000 in taxes in year 2, an increase of $5,000.

This trend continues for all future years until the exploration expenses are completely written off in the books.

They are often an alternative to direct spending. For example, incentives for research and development can be provided through government grants or through tax credits.

3.50 Current tax incentives for the energy sector are mainly accelerated write-offs that are designed to encourage investment. In these cases, a reasonable proxy for the tax expenditure would be the tax on the difference between the amount written off in the companies' books and the amount written off for taxes. When the tax write-off is greater than the book write-off there is a reduction in taxes and a positive tax expenditure (see Exhibit 3.7). When the tax write-off is less than the book write-off there is an increase in taxes and a negative tax expenditure.

3.51 Estimating total tax expenditures for accelerated write-offs is not an easy task. The provisions are complex, and gathering the appropriate data is difficult. Many of the deductions are discretionary, meaning that the taxpayer can determine how much of the eligible amount is actually claimed in a given year. Furthermore, because accelerated write-offs can result in positive or negative tax expenditures, an annual estimate may not provide an accurate picture of the real cost resulting from the write-offs.

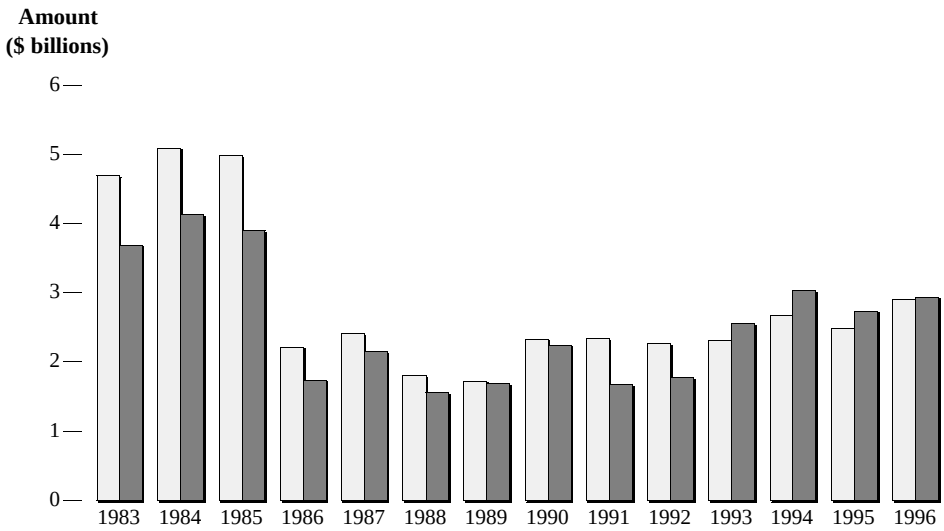
3.52 The Department of Finance has tried to deal with these issues in its annual tax expenditure account by calculating the net present value of the tax benefit that an investor would realize from accelerated write-offs for a hypothetical investment of $100,000. According to the 1999 account, if $100,000 is spent on exploration for non-renewable resources, the net present value of the tax benefit from the accelerated write-off of the expense is $4,800. But this approach does not provide information on total tax expenditures.

3.53 Furthermore, no one is now collecting the data needed to estimate total tax expenditures related to accelerated write-offs. To get a sense of the size of the difference between the write-offs for book purposes and for tax purposes, we used rough data from Statistics Canada on the oil and gas

No one is now collecting the data needed to estimate total tax expenditures related to accelerated write-offs.

Exhibit 3.8

Relationship Between Resource Allowance and Crown Royalties for Upstream Activities in the Oil and Gas Industry, 1983–1996



Note: This table does not include the results of the Gulf Canada case (see the Auditor General's 1993 Report, Chapter 3, Other Audit Observations).

Source: Natural Resources Canada and Department of Finance

industry. As Exhibit 3.9 shows, the tax write-off for physical assets is less than the book write-off, but for exploration and development expenses, the tax write-off is greater than the book write-off. However, it is not possible to estimate a tax expenditure using these data, mainly because the estimates must be calculated for each company to take account of its unique tax situation.

3.54 We encourage the Department of Finance to explore other ways to estimate the total cost of these tax incentives, to determine whether the incentives are meeting their objectives cost-effectively and to determine whether they are still needed.

Is the Current Tax Treatment Similar for Investments in Renewable and Non-Renewable Energy?

3.55 To answer this question asked by many interested stakeholders, NRCan and the Department of Finance published a study in 1996, *The Level Playing Field: The Tax Treatment of Competing Energy Investments*. The main objective of the study was to measure the degree to which the tax system does (or does not) provide comparable levels of support to investments in non-renewable and renewable energy and in energy efficiency.

3.56 The study concluded that while the playing field is not level, there are few variations in the tax treatment of energy projects, except for ethanol and certain energy efficiency projects. The level of tax support for investments in the supply of non-renewable and renewable energy varied between 5 percent and 20 percent of capital costs.

3.57 We reviewed the study and its underlying methodology to determine the accuracy of the findings. The study analyzed a number of projects and showed how much each project is taxed under the current system when compared with a neutral tax system (one that does not have any incentives). Then it determined which projects pay more taxes and which ones pay less.

3.58 We sought to check the results of the *Level Playing Field* study by using a different methodology, called marginal effective tax rates (METRs). This

Exhibit 3.9

Differences Between Amounts Written Off for Tax Purposes and Book Purposes in the Oil and Gas Industry

	1991	1992	1993	1994	1995	1996	1997
	($ millions)						
Physical assets							
Amounts written off for tax purposes	3,076	3,629	4,721	4,692	4,732	5,618	5,152
Amounts written off for book purposes	5,115	5,099	5,435	6,018	6,330	6,272	6,382
Difference	(2,039)	(1,470)	(714)	(1,326)	(1,598)	(654)	(1,230)
Exploration and development							
Amounts written off for tax purposes	2,829	3,242	3,209	4,756	4,342	5,676	5,418
Amounts written off for book purposes	1,811	1,799	2,268	3,154	2,336	3,021	3,159
Difference	1,018	1,443	941	1,602	2,006	2,655	2,259

Source: Statistics Canada

methodology looks at how the tax system treats marginal investments, that is investments that just meet the investor's acceptable rate of return. Once METRs are calculated for various investments, it is easy to see which ones the tax system does or does not favour.

3.59 We were unable to reach a firm conclusion using the METR methodology because some of the data that we needed to apply the methodology were not available. However, to the extent that we were able to complete the analysis, our results supported the conclusions of the *Level Playing Field* study.

3.60 We reviewed other evidence to determine whether the tax system favours non-renewable energy sources over renewable ones. We also examined the tax provisions for energy investments, including their evolution over time, and consulted people who invest in energy.

3.61 The Minister of Finance's Technical Committee on Business Taxation reported in 1997 on the METRs paid by companies in various industries. The Committee found that the average METR for all industries was 19 percent. Unfortunately, the Committee did not provide METRs for renewable energy.

3.62 For the upstream activities (exploration and development) of the oil and gas industry, the Committee calculated two METRs, depending on how royalties were treated. For purposes of comparing various energy investments, we believe that treating royalties paid to provincial governments as a tax is the preferred treatment. The METR for the upstream activities of the oil and gas industry was 18.2 percent, which was close to the average METR for all industries.

3.63 The downstream activities (refining and marketing) of the oil and gas industry are included in the manufacturing and retail trade industries. The METR was 16.5 percent for the manufacturing industry and 23.2 percent for retail trade. These METRs are reasonably similar to the average METR for all industries.

3.64 The Committee also calculated METRs for mining, including coal. When royalties paid to provincial governments are treated as a tax, the METR was 17.7 percent, which was close to the average METR for all industries.

3.65 It is important to note, however, that the approach used in the *Level Playing Field* study and the methodology for calculating METRs are theoretical. They assume that the tax provisions will be used in a particular manner. The way the provisions are actually applied determines the taxes that companies pay on specific energy investments. For example, most taxpayers can deduct interest on money borrowed for investments when calculating their taxes. Interest is a key component of many energy investments. If companies have the time and the resources to engage in complex tax-planning mechanisms that involve the deduction of interest, they can legally reduce the taxes they pay on particular energy investments.

3.66 We found that tax incentives for investing in non-renewable energy were more generous in the past than they are today. For example, the depletion allowances that allowed companies to deduct more than their actual expenses in the 1960s and 1970s are no longer available (see Appendix B). Changes were also made in the 1990s to tighten the income tax rules for calculating the resource allowance.

3.67 We also found that several amendments have been made in recent years that are intended to give similar tax treatment to all forms of energy investment. Investors told us that in most cases, the federal income tax treatment for renewable energy and non-renewable energy is similar but they desire further changes to ensure that all of the available provisions can be used.

For current investments, the federal income tax treatment given to renewable and non-renewable energy investments is reasonably similar.

Many renewable energy projects do not yet provide an adequate rate of return to make them a desirable investment for several reasons.

3.68 At the same time, there are three important exceptions to this similar tax treatment. First, the tax system does not give any preferential treatment to certain investments that improve energy efficiency. For example, installing energy-efficient windows in a building is treated the same way for taxes as installing regular windows. Any encouragement to install energy-efficient windows has to come from other sources, such as reducing heating and cooling costs over time. Investors who want to have their investment repaid in a short period of time would likely choose regular windows if they were cheaper.

3.69 Second, investments in oil sands, like all mining investments including coal, receive a significant tax concession (see Appendix C). The rules allow companies to write off all capital costs for a project before they pay any federal income taxes on the profits earned from the project. These provisions recognize the risks involved in oil sands investments and the potential economic benefits, but they make the investments more attractive than they otherwise would be. The Department of Finance estimates that the benefit of this tax concession is between $5 million and $40 million for every $1 billion invested. As well, Alberta charges lower royalty rates during the early years of an oil sands project than it does for conventional oil and gas.

3.70 Third, alternative fuels, such as ethanol produced from renewable sources, propane, compressed natural gas and methanol, are exempted from the federal excise tax. For blended fuels, the tax exemption applies only to the proportion of the exempt fuel in the product.

3.71 Based on our review of the evidence, for current investments, the federal income tax treatment given to renewable and non-renewable energy investments is reasonably similar except for certain investments in energy efficiency, oil sands, coal mines and alternative fuels. Nevertheless, the interaction between the federal and provincial tax systems and the applicable provincial royalty regimes could result in dissimilarities in the overall treatment of energy investments.

Investing in Renewable Energy and Energy Efficiency

3.72 Renewable energy appears to be having difficulty getting established, despite its environmental benefits. The exception is large-scale hydro-electric projects, which are generally financed by provincial utilities and operate in a highly regulated market. We sought to determine some of the reasons for this difficulty, given that the current tax system does not significantly discriminate against renewable energy investments. We conducted a survey of a broad cross-section of individuals and small, medium-sized and large companies that invest in energy. We also reviewed some of the literature on energy investments.

3.73 In 1997, the International Energy Agency published *Key Issues in Developing Renewables*. It noted that most forms of renewable energy still had a long way to go before they could compete with fossil-fuel technologies, especially for generating electrical power. The Agency added that financiers and manufacturers were reluctant to invest the capital needed to reduce costs when consumer demand for renewable energy was low and uncertain. But demand stayed low because potential cost reductions cannot always be realized at low levels of production.

3.74 The Agency cited three major barriers that had to be overcome to increase the use of renewable energy in the market:

- **Technical barriers.** Many renewable energy technologies were still at an early stage of development. The Agency stated that renewable energy needed to build a substantial track record in order to

convince consumers of its cost effectiveness and reliability.

- **Economic barriers.** Renewable energy generally could not compete with conventional fuels strictly on cost, except in niche markets. This was partly because the prices of energy products did not include the full costs of external factors such as environmental impacts.

- **Institutional barriers.** Key market players — policy makers, financial institutions, suppliers of utility equipment and consumers — were not aware of how far renewable energy technologies had developed.

3.75 We found similar issues. An adequate rate of return on investment was the factor most frequently mentioned by our survey respondents in assessing the potential of an investment project. As the Agency pointed out, many renewable energy projects do not yet provide an adequate rate of return to make them a desirable investment, for several reasons:

- markets are difficult to enter;

- renewable energy products generally cost more than non-renewable ones; and

- payback periods are often longer.

3.76 Provincial utility companies control the production of most electricity in Canada. They have little incentive to purchase or produce more costly "green power" (electricity generated with minimal environmental impact from renewable sources other than large-scale hydro-electric projects) when they can produce power more cheaply from existing sources. This means that independent "green power" producers have difficulty selling their product to the utility companies.

3.77 Furthermore, because the provinces have had highly regulated electricity markets, these independent producers generally have restricted access to the electrical grid, which also limits their ability to market their products. Some provinces are moving to deregulate their electricity markets and make them more open to competition.

3.78 The costs of many forms of "green power" have declined significantly in the last decade. However, they are still generally higher than the costs of generating power from existing and more traditional sources such as large-scale hydro-electric projects and fossil-fuel plants, except in niche markets. More research and development is likely to reduce the costs even further. Gaining access to larger markets would also help bring down costs as each unit is usually cheaper when goods are produced in larger quantities.

3.79 Proponents of renewable energy argue that the cost and ultimate market price of individual energy products do not include the environmental effects of producing and using them. So far, there is no general agreement on the value to be attached to these effects, known as externalities, particularly when broad geographic areas are involved. Therefore, a strategic role exists for governments to help markets take into account all of the benefits and effects of producing and consuming energy. If it were possible to include the value of the externalities in the price of individual energy products, the cost of fuels that create more environmental damage would be higher.

The cost and ultimate market price of individual energy products do not include the environmental effects of producing and using them.

3.80 Investors told us that they generally look for the shortest possible time for their investment to be repaid (the payback period), given the risks of the investment and potential returns. The payback periods for renewable energy and energy efficiency investments are often too long to consider them desirable; thus, financing is hard to find. In the past, governments have in some cases provided a combination of direct support, regulations and tax incentives to help overcome such barriers.

3.81 Investors confirmed that the tax system can play a role in influencing their

investment decisions. Tax incentives can sometimes improve the rate of return or reduce the payback period on an investment to make it more appealing. Tax incentives like accelerated write-offs are useful when a company has sufficient profits to claim the write-offs immediately. In other situations, tax incentives like refundable tax credits and flow-through shares are more valuable.

Conclusion

3.82 With the exception of large-scale hydro-electric projects, energy from renewable sources currently makes up a small portion of Canada's energy mix. Producers of renewable energy report that they face several barriers to financing and marketing their products. Some stakeholders have suggested that hidden tax subsidies for investments in energy from non-renewable sources are one important reason why this is happening.

The federal government may wish to consider developing new strategies and approaches to accomplish its stated objectives for investments in renewable energy and energy efficiency.

3.83 We found that governments have intervened in energy markets in the past through direct spending, regulations and tax incentives. Sometimes this was to encourage investments in certain forms of energy and at other times it was to achieve specific policy objectives. Most of the federal spending and tax incentives have been for non-renewable resources, the predominant source of energy in Canada.

3.84 Overall, we found that with a few exceptions, federal government support today for energy investments, including support through the tax system, does not particularly favour the non-renewable sector over the renewable sector. The exceptions are investments in oil sands and coal mines, which receive a significant tax concession; nuclear technology investments, which receive substantial direct support; investments in alternative fuels, which receive more favourable excise tax treatment; and provincially owned energy companies, which pay no federal income tax. We also found that the income tax system does not give any preferential treatment to certain energy efficiency investments.

3.85 All forms of energy are competing for investment dollars against many other investment opportunities, such as high technology. Investments with higher rates of return, established markets and good track records are the ones that attract investors. Non-renewable energy investments often have these features. However, most investors we surveyed find that many renewable energy investments do not currently have these features. They also revealed that the payback period is often too long for investments in renewable energy and energy efficiency to make them the preferred choice.

3.86 Two important ways to address climate change are using energy more efficiently and establishing a more sustainable mix of energy sources, which means a greater reliance on renewable sources. The federal government stated in its 1996 Renewable Energy Strategy that it wants to increase investments in renewable energy. It has also said for many years that it wants Canadians to use energy more efficiently, and the Office of Energy Efficiency is currently promoting this goal.

3.87 Given the barriers we have identified, the federal government may wish to consider developing new strategies and approaches to accomplish its stated objectives for investments in renewable energy and energy efficiency. It will also need to work in close co-operation with other levels of government because in Canada jurisdiction over energy policy is shared.

Natural Resources Canada's comments: *The chapter's historical record of federal energy expenditures and revenues offers the public considerable insight into how federal fiscal policies may have influenced the evolution and growth of the Canadian energy sector over the eventful period covered in the analysis.*

As the report acknowledges, jurisdiction over energy policy is shared between the federal and provincial governments. Both levels of government have a responsibility to foster an attractive investment climate. One important objective of current policy is to use energy more efficiently and to increase market acceptance of renewable energy. Natural Resources Canada is committed to reducing greenhouse gas emissions resulting from energy production and consumption and is working closely with the provinces and stakeholders to address the issue of climate change.

Department of Finance's comments: *In reference to paragraph 3.48, the Department acknowledges the importance of monitoring the resource allowance to ensure that it is an appropriate compensation for the non-deductibility of provincial royalty payments. An extensive review of the resource allowance was undertaken in 1995–96 and, as a result of this review, a number of changes were proposed in the March 6, 1996 budget. The Department continues to monitor the effectiveness of the resource allowance and other resource tax provisions.*

In reference to paragraph 3.54, the Department is continuing to improve its estimates of tax expenditures related to accelerated write-offs for both renewable and non-renewable projects including oil sands investments.

About the Study

Objectives

The objectives of our study were to give Parliament comprehensive information on the support provided by the federal government for energy investments and to determine whether this support favours the non-renewable energy sector. We were particularly interested in support through the tax system because it is less transparent than direct support. While our focus was on energy investments, we reviewed other significant federal government interventions in the energy sector. We also wanted to explore reasons why energy from renewable sources, other than large-scale hydro-electric projects, makes up a small portion of Canada's energy mix. We sought to determine whether tax incentives are a major contributor to this situation.

Scope and Approach

We focussed mainly on Natural Resources Canada (NRCan), the Department of Finance and the Canada Customs and Revenue Agency (the successor to Revenue Canada). We also obtained information about other federal organizations that dealt with or had an impact on energy matters, such as Atomic Energy of Canada Limited, the Atomic Energy Control Board, the Cape Breton Development Corporation and the National Energy Board.

We reviewed direct federal spending and regulatory regimes as well as federal revenues collected from the energy sector between 1970–71 and 1998–99 to provide historical information and analyze trends. Due to some data limitations, we looked at corporate income tax revenue only for the calendar years 1990 to 1997.

We analyzed the financial information contained in the Public Accounts of Canada and departmental reports on plans and priorities (formerly a portion of Part III of the Main Estimates) and obtained more information from NRCan, the Department of Finance and Statistics Canada. We included payments to third parties and government programs that relate to investments in energy. We excluded general operating expenses of departments and regulatory expenses of agencies concerned with energy matters. We also excluded federal spending on energy to power, heat and cool facilities or run vehicles and other equipment. For regulatory matters, we reviewed documentation on historical developments and information from federal organizations.

We examined past and current means by which the federal government has used the tax system to encourage exploration for and development of various sources of energy. We reviewed and analyzed how the system treats marginal investments, that is investments that just meet the investor's acceptable rate of return.

We conducted a telephone survey of 45 investors to explore reasons why energy from renewable sources, other than large-scale hydro-electric projects, makes up a small portion of Canada's energy mix and to determine whether tax incentives are a major contributor to this situation. These investors, comprising a broad cross-section of individuals and small, medium-sized and large companies, explained the factors they consider in making their decisions on energy investments.

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Appendix A

Highlights of Federal Government Spending and Regulation Related to Energy Investments

Oil

1. During the 1950s and 1960s, oil was plentiful and controlled by a handful of large multinational companies. It was relatively cheap and prices remained stable on international markets. The supply of oil from western Canada developed quickly but vast distances separated it from consumers in the east and a pipeline was considered the only practical solution to reach them. However, importing oil by tanker to eastern Canada was much cheaper than transporting it by pipeline from the west.

2. In 1959, the National Energy Board (NEB) was created to monitor and report on all federal matters of energy as well as regulate pipelines, energy imports and exports and utility rates and tariffs.

3. The National Oil Policy, introduced in 1961, established a protected market for Canadian crude oil producers at prices that were linked to international prices. Consumers west of the Ottawa Valley bought domestically produced oil; those east of it bought imported oil.

4. The days of the National Oil Policy ended in September 1973 when the federal government announced the extension of the interprovincial oil pipeline to Montreal (completed in 1976), froze prices of domestic crude and certain oil products, and sought to control export prices. The federal government announced this change in policy so that supply problems in the United States would not automatically raise prices for Canadian consumers.

5. Later that year, the first price shock of the Organization of the Petroleum Exporting Countries (OPEC) overtook this new policy. After the price shock, the federal government formally broke the link between domestic prices and international prices. The objective of "made-in-Canada" prices for crude oil was to protect Canadians across the country from the whims of the world oil market and to provide producers with enough incentives to develop new energy resources.

6. In 1974, Canada inaugurated its first system for pricing oil, with three objectives:

   - to regulate prices of domestic crude oil through federal-provincial agreements;
   - to subsidize imported oil so that consumers in eastern Canada would enjoy lower prices;
   - to control prices and quantities of crude oil and products in the export market.

   Synthetic crude oil (upgraded petroleum from oil sands) was exempted from this policy and sold at the world price. The federal government levied a tax on all oil refined in Canada to pay for the difference between the prices of synthetic and conventional crude oil.

7. Oil import compensation payments were introduced in January 1974 so that consumers in Quebec and Atlantic Canada, who were then completely dependent on imported oil, would also be protected against increases in world oil prices. The payments had totalled about $13.6 billion by the time they ended in 1985. The federal government also controlled the export prices of crude oil through the oil export tax set by the National Energy Board. The oil was sold at the world price but producers received the domestic price; the difference was the oil export tax. The tax helped to finance the oil import compensation payments and raised some $7.8 billion by 1985.

8. In October 1980, the federal government introduced the National Energy Program (NEP), which included several new energy taxes and a broad range of policy initiatives. The NEP retained the objective of a single "made-in-Canada" oil price set below world levels, except for the production of synthetic oil. It also imposed a refinery levy, the petroleum compensation charge, to help achieve this objective. By the end of the regime following the signing of the Western Accord in 1985, the petroleum compensation charge raised about $11.3 billion from refiners, of which $11.1 billion was paid out to the first users (usually other refiners) of high-cost petroleum.

9. The NEP also made changes to the incentive system for exploration. The incentives had been provided mainly through the tax system (see Appendix B). Under the NEP, the government encouraged exploration and sought to increase Canadian ownership in the oil and gas industry by paying some $7.7 billion in cash grants under the Petroleum Incentives Program (PIP). The NEP also introduced the petroleum and gas revenue tax (PGRT), which raised about $10.1 billion.

10. The NEP was phased out following the 1985 Western Accord, which deregulated domestic oil prices. The accord abolished import subsidies, the export tax on crude and oil products, and the petroleum compensation charge. It also phased out PIP grants and the PGRT. In addition, controls were lifted on oil exports.

11. The late 1980s and early 1990s saw the creation and development of several energy megaprojects, including the Hibernia Development Project, the Bi-Provincial Upgrader near Lloydminster and the NewGrade Upgrader in Regina. We examined these megaprojects and presented our findings in the Auditor General's 1992 Report, Chapter 14, Department of Energy, Mines and Resources – Energy Megaprojects.

12. Today, Canada continues to have a deregulated market that uses the world oil price. In addition, the North American Free Trade Agreement includes certain provisions to encourage trade in energy and basic petrochemical goods. Companies are actively exploiting oil deposits off the east coast and oil sands in central and northern Alberta, where they have announced several new projects amounting to almost $20 billion.

Natural gas

13. Natural gas usually travels by pipeline from the field to the final user. This situation has led to a regulated downstream market, although some deregulation is now taking place. It also means that Canadians have easy access only to North American supplies rather than those from all over the world, as is the case with crude oil.

14. At the start of the 1950s, domestic markets for natural gas were limited and most producers concentrated on finding and developing new reserves of crude oil that were easier to market. In 1953, the government declared that an all-Canadian pipeline route was needed to get natural gas from western producers to eastern consumers. A few years later, it approved the TransCanada PipeLines Limited (TCPL) project. However, since natural gas was scarce in eastern Canada and manufactured gas was expensive, a market had to be developed. The federal government permitted imports of gas from the United States to eastern Canada starting in 1956. These gradually ended once the TCPL pipeline reached the southern Ontario market in 1958.

15. Another challenge faced the gas industry. Potential buyers of the product, provincially regulated utilities, had no strong connections to either the producers or the pipeline. For the pipeline to be profitable, TCPL required long-term contracts with gas utilities and producers. Its financial problems and the measures the federal government took to assist the company eventually led to the "great pipeline debate" of 1956–57.

16. In the 1960s, Canadian consumption of natural gas grew quickly, as did exports to the United States. In 1971, the NEB declared that Canada did not have enough gas to meet its future domestic needs; the NEB rejected all applications for additional exports. At the same time, governments began to take a more active interest in natural

gas prices, believing them to be too low in relation to competing fuels. World oil prices rapidly increased following the first OPEC price shock in the fall of 1973. The federal government soon replaced pricing guidelines with regulation, particularly for export prices. Domestically, it had jurisdiction over natural gas prices in interprovincial trade, but the producing provinces were raising prices of gas sold beyond their borders. In its budget of June 1975, the federal government announced its agreement with Alberta to set the price of natural gas delivered to Toronto.

17. In 1979, the second OPEC price shock foreshadowed rising costs for imported oil. In the next years, as the surplus of domestic natural gas grew, the National Energy Program (NEP) encouraged Canadian consumers to use gas rather than oil by establishing a single wholesale price for all gas consumed in eastern Canada. It also applied a tax on domestic natural gas and gas liquids. In May 1981, wholesale prices of natural gas and oil were subjected to another federal levy, the Canadian ownership special charge, which was introduced to finance some of the NEP projects that promoted Canadian public ownership of energy investments in Canada.

18. Domestic and export sales of natural gas dropped during the 1981–82 recession. Meanwhile, higher prices to producers stimulated drilling activity. The combination of these two factors resulted in a growing surplus of natural gas. Governments responded to the situation by relaxing controls over prices and exports. When the Western Accord was signed in 1985, the federal government and the governments of the gas-producing provinces committed themselves to establishing a more flexible system of pricing natural gas in the domestic market. By November 1986, governments had stopped regulating field prices of natural gas and let buyers and sellers negotiate them. Gas prices to final users remained provincially regulated for the most part.

19. Today, the NEB continues to regulate interprovincial and international pipelines and export sales but with increasing flexibility, particularly since the signing of the North American Free Trade Agreement.

Coal

20. Canada’s coal reserves are distributed widely across the country. There are two main uses for coal. Thermal coal (or steam coal) is used mainly to generate electricity. Metallurgical coal (or coking coal) is used for the production of coke, which is a reducing agent and heat source in steelmaking. In 1998, companies exported about half of Canada’s coal production, with metallurgical coal forming over 80 percent of these exports.

21. Coal has been and remains an important part of Canada’s energy sector. In the early decades of the 1900s, coal was the main source of primary energy in Canada. By the middle of the century, it began to yield to its successors — oil and natural gas. A gradual upturn in coal use occurred in the 1970s, when oil price shocks improved coal’s competitive position for producing electricity. In 1998, 19 percent of Canada’s electricity was generated using coal.

22. Burning coal produces more carbon dioxide per unit of energy generated than other fossil fuels, such as oil and natural gas. Natural Resources Canada’s Energy Technology Centre, part of the Canadian Centre for Mineral and Energy Technology (CANMET), works with private and other public sector partners to help the coal industry develop cleaner, more energy-efficient combustion processes.

23. The Cape Breton Development Corporation (DEVCO), a federal Crown corporation, is among the producers of coal. Since the inception of DEVCO in 1967, the federal government has provided funding of about $1.6 billion to DEVCO’s coal division. In early 1999, it announced that DEVCO would be privatized by the end of 2000.

Nuclear technology

24. The development of nuclear technology in Canada began in the 1940s. In 1944, the federal government started constructing a research facility at Chalk River, Ontario. It also took control of Canada's only uranium mining company at the time and ran it as a Crown corporation, Eldorado Mining and Refining Limited (later Eldorado Nuclear Limited and now Canada Eldor Inc.).

25. In 1946, the Atomic Energy Control Board (AECB) was established under the *Atomic Energy Control Act* to control and supervise the development, application and use of nuclear (atomic) energy. The Act also authorized the AECB to regulate the Canadian nuclear industry. When the Act was passed, the AECB took over the administration, but not the operation, of research at the Chalk River facility. The National Research Council operated the facility under an arrangement with the AECB until 1952 when Atomic Energy of Canada Limited (AECL), a Crown corporation, took it over. The research facility remained under the administrative control of the AECB until 1954 following amendments to the Act.

26. Since 1946, the federal government has spent about $6 billion on nuclear technology, mostly through AECL. Exhibit 3.3 of the chapter shows the trend in this spending since 1970–71.

27. A large portion of this amount paid for research and development, including the design and development of the CANDU (Canadian deuterium uranium) nuclear power reactor and its predecessors, as well as the storage of radioactive waste. Some of the federal money financed research in other nuclear applications not related to energy, such as radioisotopes in medicine.

Renewable energy

28. Renewable resources have historically provided us with energy. We have used wood for heating and cooking; water and wind have helped to produce mechanical power. The federal government has supported the development and use of renewable energy technologies for over 20 years. At first, it wanted to be certain that Canada had a secure supply of energy. Now it is more concerned about the environmental impacts of using non-renewable resources to produce energy, and it has taken several steps in recent years to encourage investments in renewable energy.

29. Beginning in 1998, the federal government provided $20 million annually for three years to promote investments in renewable energy and energy efficiency. This provision included an allocation of $12 million over the three years for the Renewable Energy Deployment Initiative to stimulate demand for renewable energy systems that heat and cool space and water in the private sector and in federal facilities. Also starting in 1998, the government provided $50 million a year over three years for climate change initiatives to build momentum toward concrete action and results for investments in renewable energy and energy efficiency. The February 2000 Budget announced that this support will be extended for another three years at $70 million each year.

30. Natural Resources Canada (NRCan) has also supported the development and use of renewable energy technologies in several ways:

    - The Energy Diversification Research Laboratory at CANMET develops and promotes the use of innovative technologies in renewable energy and energy efficiency.
    - The CANMET Energy Technology Centre works with private and other public sector partners to develop and use clean, energy-efficient technologies for buildings, industry, transportation and power production. It includes a program for renewable energy technologies that began after the 1973 oil crisis. The program supports the Canadian industry's efforts to develop and use renewable energy technologies that are cost-effective and environmentally responsible, namely small-scale hydro-electric projects, active solar energy, wind energy and bioenergy (energy produced from plant materials and animal waste).

- NRCan administers the interdepartmental Program of Energy Research and Development (PERD), which promotes research and development of renewable energy and energy efficiency.

Energy efficiency

31. The federal government, particularly NRCan, has promoted energy conservation and energy efficiency for many years. The rationale, focus and approach of these efforts have varied.

32. In the mid- to late 1970s, in response to the oil crises of 1973 and 1979, the federal government focussed its efforts on energy conservation. It promoted changes to behaviour and lifestyle to reduce the consumption of energy. For example, people were encouraged to turn down their thermostats and to turn off unnecessary lighting.

33. In the late 1970s and early 1980s, federal government spending on energy efficiency programs grew significantly, as shown in Exhibit 3.3 of the chapter. It used grant programs, such as the Canadian Home Insulation Program (CHIP), to convince energy users to become more energy-efficient.

34. By the mid-1980s, with energy prices declining and energy supplies increasing, the federal government redirected its focus to promoting energy efficiency through research and development, market-based research, demonstration projects and activities to provide information.

35. By the late 1980s, there was a growing concern worldwide about the burning of fossil fuels, the associated greenhouse gas emissions and their impact on global climate change. Because of this and other environmental concerns, the federal government began in the early 1990s to re-emphasize improving energy efficiency. It has promoted a wiser use of energy without sacrificing its benefits or requiring major changes in lifestyle. For example, people are encouraged to buy more energy-efficient furnaces and to buy light bulbs that produce about the same light with less energy. We examined NRCan's energy efficiency initiatives and presented our findings in the Auditor General's April 1997 Report, Chapter 10, Natural Resources Canada – Energy Efficiency.

36. The *Energy Efficiency Act* came into effect on 1 January 1993. The Act enables NRCan to make and enforce regulations on the energy efficiency of products that use energy and to promote energy efficiency and energy from alternative sources. NRCan now regulates minimum levels of energy performance for more than 20 products that use energy. These products, such as stoves and refrigerators, account for 65 percent of overall use of energy in homes.

37. One of the federal government's objectives in promoting improvements in energy efficiency was to help stabilize greenhouse gas emissions at 1990 levels by the year 2000, commonly referred to as Canada's stabilization goal. Promoting greater energy efficiency in all sectors of the economy was a key element of Canada's 1995 National Action Program on Climate Change. Under the Program, federal, provincial and territorial ministers of energy and the environment agreed to work together to achieve Canada's stabilization goal. We examined results of this effort and presented our findings in our May 1998 Report, Chapter 3, Responding to Climate Change – Time to Rethink Canada's Implementation Strategy.

38. In April 1998, NRCan established the Office of Energy Efficiency (OEE). The OEE originated out of Canada's commitment to reduce emissions of certain greenhouse gases to six percent below 1990 levels by 2008–2012. Canada made this commitment when it agreed to the Kyoto Protocol in December 1997.

Appendix B

Highlights of Government Support for Energy Investments Through the Tax System

1. During the 1950s and 1960s, the oil and gas industry enjoyed stable, favourable treatment by the federal tax system. Capital expenses were classified either as intangible, such as the costs of geological work and drilling for exploration and development, or as tangible, such as the purchase of equipment and buildings. For tax purposes, companies could write off intangible expenses in the year they were incurred. They could write off tangible expenses over several years using the capital cost allowance rules in the *Income Tax Act*. They could also fully deduct the royalties paid to the provinces for the use of energy resources in calculating their federal income taxes.

2. One of the most important provisions affecting the industry was percentage depletion. For the operator of an oil and gas well, percentage depletion was equal to 33 1/3 percent of the oil and gas production profits from the well; for other companies that had an interest in the well, it was 25 percent. This tax deduction, designed to encourage exploration, was in addition to the actual expenses that companies incurred and could be claimed even if they had not spent any money on exploration and development. In effect, the deduction meant that companies paid taxes at a reduced rate.

3. In 1974, the federal government made several changes to the tax system:

   - It divided exploration and development expenses into two groups. Exploration expenses (money spent looking for new resources) could still be written off for tax purposes in the year they were incurred. Development expenses (money spent bringing known resources into production) were added to a pool and the maximum amount companies could write off each year was 30 percent of the balance in the pool.
   - Companies could no longer deduct provincial royalty payments when calculating federal corporate income taxes. Instead, the government imposed a lower tax rate, which was replaced in 1976 with a deductible resource allowance (explained in Appendix C).
   - The concept of earned depletion replaced percentage depletion. Depletion was no longer an automatic deduction; companies had to spend money on exploration and development to “earn” a deduction.

4. In 1977, the federal government introduced “superdepletion”, a larger deduction that would apply for three years. In addition to the regular deduction for earned depletion, companies would “earn” an additional depletion allowance of 66 2/3 percent for exploration expenses above $5 million per well. This allowance applied only to very expensive wells, such as those drilled in the Beaufort Sea. The combination of depletion and superdepletion resulted in a 200 percent write-off for tax purposes for eligible expenses above $5 million per well. For example, if a company spent $6 million to drill one well, it could deduct about $8.7 million when calculating its federal income taxes (that is, the $6 million actually spent, $2 million in earned depletion and about $0.7 million in superdepletion).

5. The National Energy Program in 1980 brought other changes to the tax regime for energy:

   - It imposed the petroleum and gas revenue tax (PGRT) to fund the new Petroleum Incentives Program (PIP) and to stop the erosion of the federal tax base resulting from the generous incentives for exploration.
   - A system of cash payments under the new PIP replaced earned depletion as an incentive to explore for oil and gas, particularly by Canadians. These grants varied between exploration and development and among regions, and were higher for firms with higher degrees of Canadian ownership. However, earned depletion was retained for the costs of enhanced oil recovery equipment and oil sands equipment.

The federal government phased out PIP grants and the PGRT after the Western Accord was signed in 1985. In 1987, tax reform lowered most corporate income tax rates but changed a number of deductions and allowances to broaden the income base on which taxes were calculated.

6. Less dramatic changes followed in the early 1990s and more attention was paid to renewable energy and energy efficiency. In 1992, the government eliminated the excise tax on ethanol and methanol in blended fuels, mainly gasoline. In 1994, it reduced the accelerated write-offs for tax purposes for renewable energy equipment that produces electricity and heat but expanded the range of energy equipment eligible for the revised write-offs.

7. In 1996, the federal government made some major changes for non-renewable energy investments:

   - It clarified and tightened the income tax rules for calculating the resource allowance and changed the rules for flow-through shares to restrict them to more risky expenses.
   - The rules for joint exploration corporations, which had been in place since 1962, were terminated. The rules were designed to help companies pool their resources to explore for and develop oil and gas and minerals, but the government determined that they were being used mainly to reduce taxes on the sale of resource properties.
   - The rules for accelerated write-offs for new mines and major mine expansions, including oil sands, were expanded to allow more costs to qualify for the accelerated write-offs.
   - Tangible capital expenses for oil sands *in situ* projects (those that use drilling techniques) could be written off in the same way as expenses for oil sands projects that employ surface mining techniques. Before 1996, these expenses were written off using the tax rules for oil and gas. As a result of the change, they could be written off using the more generous tax rules for mining.

8. Also in 1996, the government made changes to encourage investments in renewable energy. It removed some restrictions from the specified energy property rules in order to allow more companies to claim the accelerated write-offs for investments in renewable energy that produces electricity or heat. It introduced the concept of Canadian renewable and conservation expenses, which let companies immediately write off expenses incurred to develop renewable energy projects. Finally, it allowed companies to pass these expenses to shareholders who bought flow-through shares.

9. In 1999, the government announced that it would begin phasing in an extension of the seven percent tax credit for manufacturing and processing to companies that produce, for sale, electrical energy or steam used in generating electricity. This extension will be available to companies that use renewable and non-renewable energy sources. The February 2000 Budget announced that this extension would include all steam produced for sale.

Appendix C

Current Income and Excise Tax Provisions for Energy Investments

Provisions for capital expenses

1. Companies and individuals pay federal income tax on their business income; provincially owned oil and gas companies and utilities do not. The *Income Tax Act* contains general provisions that apply to all sectors of the economy and special provisions that apply only to specific sectors. Table 1 below summarizes those provisions that concern the energy sector only. The provisions for renewable and non-renewable resources are complex, and when they are used, so is the way they interact with each other, with all the other provisions in the Act and with provincial tax and royalty regimes.

Intangible capital expenses **Table 1**

Intangible capital expenses are incurred to explore for and develop non-renewable resources and to develop renewable resources, for example, expenses to bring a discovered oil well to production or to look for a suitable windy site for future wind turbines.

The oil and gas industry uses two methods to write off intangible capital expenses for book purposes:

- Under the "successful efforts" method, successful exploration and development investments (those that lead to the finding of reserves that produce oil or natural gas) are capitalized and written off over the production life of the found reserves. Unsuccessful exploration and development investments (dry holes) are written off in the year the money is spent.
- Under the "full cost" method, all exploration and development investments, whether successful or not, are capitalized and written off over the production life of the found reserves.

The renewable resource sector normally capitalizes intangible capital expenses for book purposes and writes them off over the production life of the new resource.

For tax purposes, these expenses are put in different pools depending on their nature and are written off according to the rules for each pool. The pools are described below.

Canadian exploration expense (CEE) includes qualifying expenses to determine the existence, location, extent or quality of a non-renewable resource. CEE can be fully written off as soon as the money is spent (with some limitations) or carried forward to future years. It can also be passed to shareholders who have bought flow-through shares. When this happens, the shareholders claim the CEE rather than the company.

Canadian development expense (CDE) includes qualifying drilling expenses to bring known reserves into production. CDE can be written off at a maximum rate of 30 percent of the balance in the pool each year. The balance left in the pool is carried forward to future years. CDE can be flowed through to shareholders. Under certain conditions small companies can reclassify the first $1 million of CDE as CEE to get a faster write-off.

Canadian oil and gas property expense (COGPE) refers to lease and bonus payments to resource owners, typically provinces, for the rights to explore, develop and take the resource. COGPE can be written off at a maximum rate of 10 percent of the balance in the pool each year. The balance left in the pool is carried forward to future years.

Mining provisions for intangible expenditures are similar to those listed above but there are differences that are particularly relevant to oil sands mining and coal. Property expenses are treated as CDE and can be written off at a maximum rate of 30 percent of the balance in the pool each year (compare with COGPE). Pre-production development expenses for new mines are treated as CEE and can be fully written off as soon as the money is spent or carried forward to future years (compare with CDE).

Canadian renewable and conservation expense (CRCE) includes qualifying expenses to develop a renewable energy project for which it is expected that at least 50 percent of the capital cost of the equipment to be used is eligible for class 43.1 treatment (see below). CRCE can be fully written off as soon as the money is spent or carried forward to future years. CRCE can be flowed through to shareholders.

Tangible capital expenses **Table 1 (continued)**

Tangible capital expenses are the costs of physical assets, such as buildings and equipment.

Tangible capital expenses are generally written off (depreciated) on a company's books over the useful life of the assets. For tax purposes, they are grouped into capital cost allowance (CCA) classes, each with an annual write-off rate that is often different than the book depreciation rate. There are many CCA classes defined in the *Income Tax Act*, of which the following five classes are the most relevant to energy investments.

Class 1 includes pipelines, other than oil and gas pipelines with a useful life of 15 years or less, buildings and structures, including their energy-using components, dams, and electrical generating equipment. The CCA rate is four percent (the February 2000 Budget proposes an increase to eight percent for qualifying energy equipment) on a declining balance basis. (This means that the costs are pooled: four percent of the balance in the pool is written off as an expense for the year and deducted from the pool, and the remaining balance in the pool is carried forward to the next year.)

Class 8 includes oil and gas pipelines with a useful life of 15 years or less and electrical generating equipment that has a maximum load of 15 kilowatts. The CCA rate is 20 percent on a declining balance basis.

Class 41 includes all resource extraction assets acquired after 1987. It also includes electrical generating equipment for mines, equipment used in resource exploration and heavy crude oil processing, natural gas processing plants and drilling vessels for oil and gas. The CCA rate is 25 percent on a declining balance basis. There is also a special CCA rate of 100 percent for new mine and mine expansion assets, as defined in the Act, but it is limited to the amount of income earned from the mine. In these cases, no corporate income tax is paid on the income from the mine until all capital expenses are written off.

Class 43 includes energy conservation equipment and heat recovery equipment used in manufacturing and processing plants, equipment used in refineries, natural gas straddle plants, and facilities to produce alternative transportation fuels, such as ethanol. The CCA rate is 30 percent on a declining balance basis.

Class 43.1 covers energy conservation equipment, or investments in renewable energy that produce electricity and heat (with some restrictions). It includes mainly co-generation and specified waste-fuelled electrical generation systems, active solar and passive solar systems, small-scale hydro-electric installations, heat recovery systems, wind energy conversion systems, photovoltaic electrical generation systems, geothermal electrical generation systems, specified waste-fuelled heat production equipment, and electrical generating equipment using solution gas. The CCA rate is 30 percent on a declining balance basis.

Provincial royalties and the federal resource allowance

2. The provinces own much of Canada's non-renewable energy resources. They charge royalties for taking these resources. They also charge mineral taxes on freehold mineral rights. Table 2 summarizes some of the royalty regimes that exist today.

Highlights of provincial royalty regimes **Table 2**

Alberta. The royalty rate on conventional oil and gas production varies with the vintage (the date the oil or gas was discovered), the productivity of the well and the price. There are minimum and maximum royalties. For example, the minimum royalty for natural gas from a normal to high-producing well is 15 percent of the volume produced; the maximum royalty is 35 percent for old gas and 30 percent for new gas. Alberta also provides a refundable royalty tax credit equal to between 25 percent and 75 percent of the first $2 million in Crown royalties paid. As well, Alberta offers reduced royalties or short-term royalty holidays to encourage certain activities, such as drilling gas wells deeper than 2,500 metres.

In the past, Alberta negotiated royalty agreements for oil sands projects with each developer. Its current royalty regime charges a minimum royalty of one percent of project gross revenue. After payout, the royalty is the greater of the minimum royalty or 25 percent of project net revenue. Payout occurs at the point in time when cumulative revenues from the project equal cumulative operating and capital costs plus a return to the developer. There are transitional agreements for developers moving from negotiated agreements to the current royalty regime.

British Columbia. The royalty rate on conventional oil production varies with the vintage and productivity of the well. Rates are lower for new oil. The royalty rate for natural gas varies with the price and the type of gas but not the vintage or productivity of the well. A 36-month royalty holiday is given to oil produced from a new pool discovery well completed after 30 June 1974.

Table 2 (continued)

Newfoundland. Newfoundland has separate royalty regimes for onshore and offshore resources. There is currently no onshore production of oil and gas. For the offshore, the royalty rate varies with the amount of oil produced and the level of profit earned. For example, before payout the royalty rate ranges from one percent to 7.5 percent of gross revenue.

The Hibernia Development Project has a separate royalty regime. It includes a fixed royalty of $0.01 per barrel and a variable royalty. Before payout the variable royalty rate gradually increases from one percent to five percent of gross revenue over six years. After payout the variable royalty is the greater of five percent of gross revenue or 30 percent of net revenue (as defined in the agreement). If the project is very profitable, a supplementary royalty also applies.

The Terra Nova Development Project also has a separate royalty regime. It includes a fixed royalty of $0.01 per barrel and a variable royalty. Before payout the variable royalty gradually increases from one percent to 10 percent of gross revenue. After payout the variable royalty is similar to Hibernia's.

Nova Scotia. On 4 August 1998, Nova Scotia announced a new royalty regime for future offshore projects. The royalty varies with project revenues and project profits starting at two percent of gross revenue. A minimum of five percent of gross revenue is always payable after payout. There is no royalty holiday.

The Sable Island project will pay a reduced royalty of one percent of gross revenue for the first three years. After that, the royalty rate increases to two percent of gross revenue. Depending on the profitability of the project, it continues to rise to a maximum of 35 percent of net revenue.

Saskatchewan. The royalty rates on conventional oil and gas production vary with the vintage and productivity of the well, and the price. The rates start at zero for low-producing wells and increase progressively for higher-producing wells. For example, a new vertically drilled heavy oil development well producing 100 cubic metres of oil per month will pay a minimum royalty rate of 7.5 percent if the price is $100 per thousand cubic metres or less and a maximum royalty rate of 22.5 percent. Saskatchewan also provides royalty incentives to encourage new projects.

3. In 1997, the Minister of Finance's Technical Committee on Business Taxation reported that the overall effective royalty rate was between 16 percent and 17 percent of gross revenues for conventional oil and gas; this rate takes into account royalty incentives. As Table 2 shows, the royalty regime for oil sands and offshore projects is initially more generous than that for conventional oil and gas; royalties are around one percent of revenues until cumulative operating and capital project costs and a return on investment are covered.

4. When companies calculate their federal income taxes, they cannot deduct royalties paid to provincial governments for oil, natural gas and minerals. (Normal income tax rules allow a deduction for most amounts that are paid to earn income.) To compensate for this restriction, companies can deduct a resource allowance that is 25 percent of resource profits from mining and producing oil and gas. In general terms, resource profits are defined as resource revenue minus associated overhead, operating costs and capital cost allowances.

Investment tax credits

5. There are two general investment tax credits in the federal tax system that are of particular importance to the energy sector. The Atlantic Investment Tax Credit aims to develop the economy of the Atlantic provinces by granting a 10 percent tax credit on investments in manufacturing and energy production. Offshore oil and gas companies currently receive a large share of the total amount claimed for this credit.

6. The other tax credit is designed to support investments by Canadian industry in scientific research and experimental development. Companies can reduce the taxes they have to pay by claiming a credit equal to 20 percent of the cost of eligible research and development. Smaller Canadian-controlled companies can claim 35 percent, and a portion of this amount is refundable if the claimant does not have any taxes to pay. Many companies in the renewable and non-renewable resource sectors carry out extensive research and development and can use this investment tax credit.

Oil sands, a special case

7. Central and northern Alberta have large deposits of tar-like bitumen, which can be converted into petroleum products. However, the substance is too thick to be extracted by conventional oil production methods. Deposits that are located near the surface can be recovered by surface or open-pit mining techniques. Bitumen deposits buried too deep for mining to be economical are extracted using *in situ* (drilling) methods more similar to those used for conventional oil and gas.

8. The mining provisions of the *Income Tax Act* are used for oil sands mines, rather than the oil and gas provisions. The mining provisions are similar to those for oil and gas but allow more generous write-offs for property and pre-production development expenses.

9. There are also special provisions for assets used to extract the bitumen. When a company acquires these assets for a new mine or a major expansion of an existing mine, including oil sands mines, it can write them off immediately, as long as the write-off does not exceed the income from the mine. In other words, the company only pays federal income tax on the income from the mine once it has written off all the eligible capital costs. This write-off is a significant tax concession. In the case of a major mine expansion, the income from the mine includes the whole mine, not just the expansion. As a result, the costs of expanding an existing mine will likely be written off more quickly than the costs of opening a new one. After 6 March 1996, oil sands projects that use *in situ* extraction methods can apply the mining provisions to all qualifying tangible capital expenses on the basis that the product is similar, regardless of the extraction method.

10. Oil sands projects are also subject to the resource allowance system described earlier, with one major exception. The Syncrude project received a remission order in 1976 that has allowed the participants to deduct provincial royalties as well as the resource allowance for two of its leases. The order is in effect until the production of 2.1 billion barrels of synthetic crude or 31 December 2003, whichever comes first. According to the Public Accounts of Canada, the government had remitted at least $153 million in taxes under the order by 31 March 1999.

11. The tax system has recognized the risks and huge costs of oil sands projects, particularly in earlier years when the technology was evolving and the operating costs were greater than the selling price of the product. As noted in Table 2, the Province of Alberta charges lower royalty rates during the early years of an oil sands project than it does for conventional oil and gas.

Excise taxes

12. Consumers pay several taxes on fuels to run their vehicles and equipment: federal and provincial excise taxes, the federal goods and services tax and, in some instances, provincial sales taxes. Consumers who purchase more fuel-efficient vehicles benefit from an effective reduction in the total excise taxes that they would have paid. Alternative fuels, such as ethanol produced from renewable sources, propane, compressed natural gas and methanol, are exempted from the federal excise tax. For blended fuels, the tax exemption applies only to the proportion of the exempt fuel in the product.