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Environmental protection expenditures in the business sector

2000

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Symbols

The following standard symbols are used in Statistics Canada publications:

- **.** not available for any reference period
- **..** not available for a specific reference period
- **...** not applicable
- **p** preliminary
- **r** revised
- **x** suppressed to meet the confidentiality requirements of the *Statistics Act*
- **E** use with caution
- **F** too unreliable to be published

Preface

This publication presents estimates from the Survey of Environmental Protection Expenditures, 2000. The survey covers capital and operating expenditures made in 2000 by businesses in order to anticipate or to respond to environmental regulations, environmental conventions or voluntary agreements.

Environmental regulations, current and anticipated, play a major role in the evolution of industry spending on environmental protection. For the past decade, governments in Canada have imposed various environmental regulations regarding the prevention or reduction of air emissions, effluents, solid waste, as well as the protection of wildlife and habitat. However, industry spending on environmental protection may also be affected by environmental conventions and voluntary agreements between governments and industry representatives. These are increasingly important and include specific actions on pollution prevention or abatement.

The Survey of Environmental Protection Expenditures (SEPE) tries to fill gaps in the data regarding the cost to industry of environmental protection and the demand for associated environmental products and services. In addition to covering business expenditures on environmental protection, the SEPE, since 1997, has been broadened to cover the adoption of environmental management practices, pollution prevention practices and environmental technologies. Beginning reference year 1998, the Survey of Environmental Protection Expenditures has been changed from an annual to a biennial survey, partly in an effort to reduce respondent burden.

Acknowledgements

The cooperation of survey respondents was critical to the successful completion of this publication and is gratefully acknowledged.

This report was prepared by the Environment Accounts and Statistics Division under the direction of Claude Simard, Director, Rob Smith, Assistant Director and Bruce Mitchell, Chief, Environmental Protection Accounts and Surveys. Data collection for this survey was conducted by the Operations and Integration Division (Mel Jones, Director) and the Environment Accounts and Statistics Division.

Jeffrey Fritzsche, Senior Analyst, Environment Protection Accounts and Surveys, managed the survey. Peter van Wesenbeeck was responsible for the compilation of the report.

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1 Highlights and Introduction

1.1 Highlights

- Total environmental protection expenditures reached $5.4 billion in 2000, the first increase since 1996.[1]
- Business capital expenditures on environmental protection increased 26% in 2000 to $2.2 billion, mostly as a result of major increases in spending on pollution prevention and pollution abatement and control in the Oil and Gas Extraction and Transportation Equipment industries.
- Environmental capital expenditures represented 3% of total capital expenditures in the primary and manufacturing industries.
- Operating expenses related to protecting the environment increased from $3.0 billion to $3.3 billion, up 9% from 1998[2]. Almost half (48%) of operating expenditures were directed at pollution abatement and control (end-of-pipe) processes, while pollution prevention processes accounted for almost 14%.[3]
- The year 2000 represented the first time since the survey was started that the Pulp, Paper and Paperboard Mills Industry did not have the highest total environmental protection expenditures. The biggest spender in 2000 was the Oil and Gas Extraction Industry (almost $790 million).
- Unlike most other industries, the Oil and Gas Extraction Industry directed the majority of its environmental expenditures at capital projects (59% or $465.1 million). Most of these capital costs were for pollution prevention ($114.8 million) and pollution abatement and control projects ($244.8 million). The bulk of operating expenses ($117.4 million) in this industry were related to reclamation and decommissioning projects.
- The Transportation Equipment Industry experienced a large increase in capital expenditures on environmental protection, climbing from $48.7 million in 1998 to $203.1 million in 2000. The change was due almost entirely to major investments in pollution prevention processes (from $30.4 million in 1998 to $187.9 million in 2000).
- Expenditures on pollution abatement and control (PAC) continued to be focused on treating emissions to air in 2000. Of the $881.4 million total PAC expenditures made by industry, almost 64% ($560.4 million) was directed towards controlling substances released to air - double the amount directed at controlling substances released to surface water.
- Pollution prevention capital expenditures also tended to be directed towards processes aimed at preventing the release of substances to air. About 50% of the total capital expenditures ($944 million) was directed at preventing the release of air pollutants.
- Approximately nine out of ten establishments reported employing at least one form of pollution prevention. Businesses were most likely to report using good operating practices or pollution prevention training (79%) and prevention of leaks and spills (73%) as methods by which they reduced the release of pollutants to the environment.
- Two-thirds of establishments indicated they used at least one type of energy conservation method in 2000. The use of energy conservation methods varied greatly by industry - almost nine out of ten establishments in the Pulp, Paper and Paperboard Mills Industry reported using at least one type of energy conservation method compared to less than four out of ten establishments in the Logging Industry.
- All of the reporting establishments in the Natural Gas Distribution and Pipeline Transportation industries responded that they used at least one type of environmental management practice in 2000. In contrast, across all industries, half of all responding establishments reported using at least one environmental management practice.
- Three-quarters of businesses in the Oil and Gas Extraction Industry reported cost savings as a result of implementing pollution prevention or environmental management practices in 2000. Overall, 38% of reporting establishments indicated cost savings after adopting such practices.

1. Beginning in 1998, the Survey of Environmental Protection Expenditures (SEPE) is conducted every 2 years. Therefore, the SEPE was not conducted in reference year 1999. Please see Text Box 1.3.1 for a definition of 'environmental protection expenditures'.
2. Includes the 'other manufacturing' industry category. See Table 2.1.1 and Table A.5. Please see Text Box 2.1.1 for a description of the 'other manufacturing' industries category.
3. Does not include the 'other manufacturing' industry category.

1.2 Survey objectives

The Survey of Environmental Protection Expenditures (SEPE) is conducted to measure the costs incurred by Canadian industry to comply with present or anticipated environmental regulations, conventions or voluntary agreements. The SEPE also collects information on environmental management practices and environmental technologies used by industry for the purpose of preventing, abating or controlling pollution.

The survey was conducted on an annual basis from 1994 to 1998. The 2000 survey represents the first iteration of a new biennial cycle.

1.3 Definitions

The business sector is involved in a variety of activities aimed directly or indirectly at protecting the environment from the effects of its production. These activities have often been brought about by environmental regulations and, more recently, by voluntary agreements and actions. One method of assessing the effectiveness of these activities is to measure expenditures made on environmental protection (Text Box 1.3.1).

Text Box 1.3.1
Environmental protection expenditures

Environmental protection expenditures are defined as all capital (investment) and operating (current) expenditures[1] incurred by businesses in order to comply with or to anticipate Canadian and international environmental regulations, conventions[2] or voluntary agreements.

The challenge in measuring expenditures made on environmental initiatives (e.g., projects to reduce energy consumption or waste generation) is to isolate them from expenditures made in order to reduce production costs. For this reason, the 1997 survey expanded the criterion of environmental protection to include any expenditure that ensures or anticipates compliance to environmental regulation or official voluntary agreement.[3] Environmental protection expenditures are classified as follows:

Environmental monitoring: expenditures for purchase of equipment, supplies, labour and services required to monitor pollutant emissions that would affect air, water or soil quality;

Environmental assessments and audits: expenditures made to review current operations' compliance with regulations and to evaluate the environmental impact of proposed projects;

Site reclamation and decommissioning: expenditures for clean-up of environmental damage and for closing a site;

Wildlife and habitat protection: expenditures made to protect wildlife and habitat from the effects of economic activity and to restore stocks that have been adversely affected by such activity;

Pollution abatement and control (end-of-pipe processes): expenditures related to funding of separately identifiable processes whose sole purpose is to abate or control undesirable substances emitted during normal production activities, without any incidence on the production process itself; expenditures on waste and sewage management and treatment;

Pollution prevention:[4] expenditures made to develop a new or significantly modified production process (integrated processes) in order to prevent or reduce pollutants and waste before they are generated; expenditures on leak and spill prevention; expenditures on energy and water conservation; expenditures on on-site recirculation, recovery, reuse and recycling of materials and substances;

Environmental fees, fines and licences: permits, fees, levies, fines, penalties or damage awards paid to government agencies or to individuals, or any other charges paid to regulating bodies, and;

Other environmental protection: expenditures for administration of environmental projects, for training, and for other initiatives not elsewhere specified

Expenditures on environmental research and development are excluded, in principle, from the data on business expenditures. These data are collected through the Research and Development in Canadian Industry Survey[5].

1. *Capital expenditures* refer to all costs in 2000 (reporting year) for machinery and equipment and their installation and repair, as well as for the construction of non-residential facilities (by contractors or own employees). *Operating expenditures* refer to all cash expenses, rather than accruals, incurred during the 2000 reporting year for maintenance and repair (of existing environmental equipment), labour, fuel and electricity, materials and supplies, and purchased services.
2. Environmental conventions include any formal multiparty commitment to meet specific targets relating to habitat protection and waste and pollution abatement, such as the Canada–U.S. Air Quality Agreement, and the Responsible Care Program adopted by the Canadian Chemical Producers' Association.
3. Any voluntary agreement implemented by an establishment or the participation in any voluntary environmental program such as ARET (Accelerated Reduction/Elimination of Toxics).
4. Please note that previous *Environmental Protection Expenditures in the Business Sector* reports refer to pollution prevention as 'PAC integrated processes'. Integrated processes are a subset of pollution prevention.
5. Statistics Canada, 2000, *Research and Development in Canadian Industry Survey,* Catalogue no. 88-001-XIB, Ottawa.

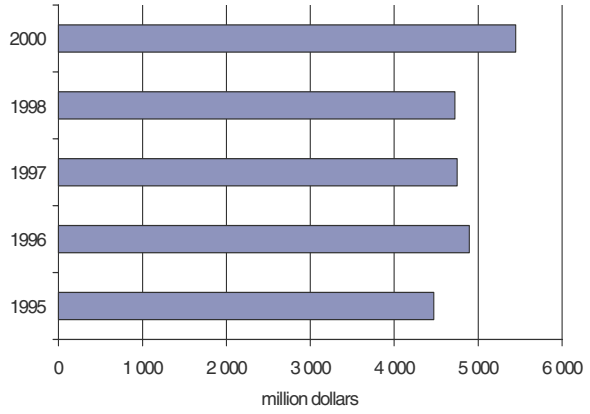
2 Survey Results

2.1 Total environmental protection expenditures

Canadian businesses spent just over $5.4 billion on environmental protection in 2000. This represented an increase of over $700 million from 1998 expenditures (Figure 2.1.1 and Table 2.1.1). Both operating and capital expenditures played a part in the increase, rising by almost 10% and 26% respectively. This is unlike previous survey years, where total operating expenditures remained stable at about $3.0 billion, while capital expenditures experienced modest decreases (Figure 2.1.2).[1]

Expenditures on pollution prevention and pollution abatement and control (PPAC)[2] totalled $4.3 billion in 2000 (Tables A.1 and A.5). Much of the increase in expenditures compared with 1998 was attributable to a large increase in capital spending (up from $1.5 billion in 1998 to $2.0 billion in 2000) (Table A.1). Operating expenditures also increased, up $164.5 million from 1998.

Figure 2.1.1
Total environmental protection expenditures by businesses, 1995-2000



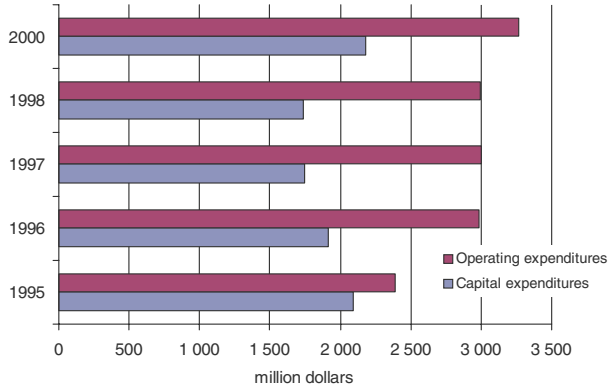
Note:
Includes primary and manufacturing industries. For a complete description of the coverage of the SEPE, please refer to Chapter 3 – **Concepts, Methodology and Data Quality**.
Source:
Statistics Canada, Environment Accounts and Statistics Division

1. The Survey of Environmental Protection Expenditures was conducted on an annual basis between 1994 and 1997. However, as of reference year 1998 this survey is conducted every two years.
2. Expenditures on pollution prevention and pollution abatement and control (PPAC) include expenditures on pollution abatement and control (end-of-pipe) processes, pollution prevention (integrated) processes and environmental monitoring.

Business capital expenditures on environmental protection[3]

Business capital expenditures on environmental protection totalled $2.2 billion in 2000 (Tables 2.1.1, 2.1.2 and A.1)[4], representing an increase of $400 million, or 25.6%, from 1998 (Figure 2.1.2). Most of the increase was the result of higher expenditures on pollution prevention and pollution abatement and control projects (PPAC). PPAC capital investments continued to represent the majority of capital spending on environmental protection. In fact, of the $2.2 billion spent on capital projects, almost $2.0 billion (91%) went towards PPAC (Table A.1). Other areas of spending, (environmental monitoring, environmental assessments and audits, etc.), accounted for the remaining 9% of environmental expenditures.

Figure 2.1.2
Business operating and capital environmental protection expenditures, 1995-2000



Note:
Includes primary and manufacturing industries. For a complete description of the coverage of the SEPE, please refer to Chapter 3 – **Concepts, Methodology and Data Quality**.
Source:
Statistics Canada, Environment Accounts and Statistics Division

In some industries, increased capital spending on environmental protection initiatives mirrored increases in total capital spending. For instance, the Oil and Gas Extraction Industry spent $465.1 million on capital projects to protect the environment in 2000, a $278.6 million increase over 1998. While the industry had higher environmental capital expenditures in 2000 compared to 1998, it also had higher overall capital spending ($17.1 billion in 1998 to $21.8 billion in 2000).[5] However, the share of capital spending on environmental protection projects was higher in 2000 (2.1%) than in 1998 (1.1%). Across all manufacturing and primary industries, total

3. For a description of capital expenditures, please see Text Box 1.3.1, page 2.
4. Includes the 'other manufacturing' industry category. Please see Text Box 2.1.1 for a description of the 'other manufacturing' industry category.
5. Investment and Capital Stock Division, Statistics Canada. Capital expenditure data taken from CANSIM II, Table 029-0009, 'Capital and repair expenditures, industry sectors 31-33, manufacturing, annual'.

Table 2.1.1
Distribution of expenditures on environmental protection by industry and province and territory, 2000

Industry	Capital expenditures		Operating expenditures		**Total expenditures**
	million dollars	percent of total	million dollars	percent of total	**million dollars**
Logging	4.8	2.9	161.4	97.1	**166.2**
Oil and Gas Extraction	465.1	58.9	324.7	41.1	**789.8**
Mining	142.6	34.8	267.6	65.2	**410.3**
Electric Power Generation, Transmission and Distribution	182.4	41.6	255.8	58.4	**438.3**
Natural Gas Distribution	2.8	31.5	6.1	68.5	**8.9**
Food	86.3	38.0	140.7	62.0	**227.1**
Beverage and Tobacco Products	4.4	16.0	23.4	84.0	**27.8**
Wood Products	123.3	46.2	143.7	53.8	**267.0**
Pulp, Paper and Paperboard Mills	234.8	35.6	425.4	64.4	**660.3**
Petroleum and Coal Products	214.6	50.2	212.9	49.8	**427.5**
Chemicals	147.6	38.9	232.0	61.1	**379.6**
Non-Metallic Mineral Products	106.3	70.9	43.6	29.1	**150.0**
Primary Metals	105.3	17.7	490.6	82.3	**596.0**
Fabricated Metal Products	14.9	17.6	69.6	82.4	**84.5**
Transportation Equipment	203.1	54.4	170.2	45.6	**373.3**
Pipeline Transportation	33.9	35.8	61.0	64.2	**94.9**
Other manufacturing	105.4	30.4	241.7	69.6	**347.1**
Total	**2 177.9**	**40.0**	**3 270.6**	**60.0**	**5 448.4**
Province/Territory	Capital expenditures		Operating expenditures		**Total expenditures**
	million dollars	percent of total	million dollars	percent of total	**million dollars**
Newfoundland and Labrador	33.1	42.8	44.3	57.2	**77.4**
Prince Edward Island	0.7	19.2	3.1	80.8	**3.8**
Nova Scotia	28.9	35.1	53.3	64.9	**82.2**
New Brunswick	205.6	65.9	106.6	34.1	**312.2**
Quebec	394.8	35.7	711.2	64.3	**1 105.9**
Ontario	587.9	34.0	1 141.0	66.0	**1 728.9**
Manitoba	78.0	48.3	83.3	51.7	**161.3**
Saskatchewan	97.6	45.7	115.7	54.3	**213.3**
Alberta	572.6	50.4	562.9	49.6	**1 135.6**
British Columbia	160.8	27.6	421.1	72.4	**581.9**
Yukon Territory, Northwest Territories and Nunavut	18.0	39.1	28.0	60.9	**46.0**
Canada	**2 177.9**	**40.0**	**3 270.6**	**60.0**	**5 448.4**

Note:
Figures may not add up to totals due to rounding.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

environmental capital expenditures represented 3.1% of all capital expenditures, a 0.5% increase over 1998.[1]

Industries that reported higher capital investments in 1998 compared to 2000 also typically showed an increase in operating expenses over the same period. This trend was noted in the Pipeline Transportation, Primary Metals, and Pulp, Paper and Paperboard Mills industries (Table 2.1.2). Establishments who invested heavily in 1998 were spending more on the operation and maintenance of their equipment and technology in 2000.

1. Investment and Capital Stock Division, Statistics Canada. Capital expenditure data taken from CANSIM II, Table 029-0009, 'Capital and repair expenditures, industry sectors 31-33, manufacturing, annual' and Survey of Environmental Protection Expenditures, 2000. Comparisons must be made with caution as the SEPE only surveys establishments with 50 or more employees.

Text Box 2.1.1
Other manufacturing industry category

The 'other manufacturing' industry category was created for the SEPE to capture environmental expenditures in manufacturing industries that were not already included in the sample. It comprises establishments with 50 or more employees from all other manufacturing industries (4-digit NAICS level) that do not typically have large environmental expenditures. That is, establishments in industries that, on average, have environmental expenditures of less than $1 000 per employee. Some of the industries included in this category are: Clothing Knitting Mills; Converted Paper Products; Plastic Products; Rubber Products; Communications Equipment Manufacturing; etc.

Table 2.1.2
Expenditures on environmental protection by industry and type of activity, 1998 and 2000

Industry	Environmental monitoring		Environmental assessments and audits		Reclamation and decommissioning		Wildlife and habitat protection		Pollution abatement and control processes (end-of-pipe)[1]		Pollution prevention processes		Fees, fines and licences		Other		**Total**	
	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	**1998**	**2000**
	million dollars																	
Operating Expenditures																		
Logging	3.0	3.8	5.0	9.4	19.1	29.6	70.4	106.4	5.4	3.8	4.4	3.8	1.4	1.2	7.8	3.4	**116.5**	**161.4**
Oil and Gas Extraction	16.0	19.7	8.6	15.0	110.2	117.4	1.3	3.0	55.0	81.2	26.4	35.7	9.2	12.9	31.7	39.7	**258.4**	**324.7**
Mining	20.6	25.5	4.8	14.4	55.8	53.2	2.3	4.1	104.9	99.9	38.7	44.1	4.6	8.7	17.2	17.7	**248.8**	**267.6**
Electric Power Generation, Transmission and Distribution	6.6	9.1	34.2	16.4	5.7	23.0	12.0	6.8	x	106.3	5.3	28.9	32.7	10.5	x	54.9	**295.6**	**255.8**
Natural Gas Distribution[2]	0.3	0.2	1.6	0.3	0.6	0.5	0.1	..	2.4	1.7	0.7	0.4	0.1	0.1	3.2	3.0	**8.9**	**6.1**
Food	11.0	15.5	2.6	3.6	0.2	7.6	3.7	0.5	78.4	84.8	14.2	11.1	9.6	13.4	4.0	4.2	**123.7**	**140.7**
Beverage and Tobacco Products[2]	0.8	1.1	0.5	1.1	0.9	0.0	..	..	13.3	14.0	1.6	1.1	2.3	4.7	1.8	1.3	**21.2**	**23.4**
Wood Products	8.5	8.5	2.4	5.0	15.8	18.8	29.4	17.5	x	69.1	21.4	11.2	5.6	7.7	x	5.9	**137.6**	**143.7**
Pulp, Paper and Paperboard Mills	43.7	51.1	3.6	5.1	3.3	12.2	11.4	6.8	241.9	263.3	62.8	67.7	8.0	6.0	12.8	13.3	**387.5**	**425.4**
Petroleum and Coal Products	7.3	7.3	2.4	7.0	4.1	11.2	..	0.9	101.5	85.6	56.4	75.5	1.1	9.6	14.4	15.9	**187.3**	**212.9**
Chemicals	25.0	29.9	6.5	6.3	42.3	22.5	1.3	1.1	101.5	106.9	34.5	42.4	2.5	1.8	18.3	21.3	**231.9**	**232.0**
Non-Metallic Mineral Products	2.5	2.9	3.3	1.9	2.8	5.0	1.0	0.7	20.8	21.4	5.9	6.1	2.8	2.8	4.1	2.8	**43.2**	**43.6**
Primary Metals	37.2	40.4	5.8	8.6	16.9	28.4	5.8	2.0	275.7	327.2	61.4	64.4	2.7	4.3	13.6	15.3	**419.2**	**490.6**
Fabricated Metal Products[3]	..	3.1	..	1.5	..	1.5	..	0.1	..	52.8	..	5.2	..	0.4	..	5.0	**..**	**69.6**
Transportation Equipment	5.8	6.5	2.3	4.6	18.0	2.5	0.1	0.1	89.8	119.3	10.8	15.8	0.9	1.5	11.7	19.9	**139.4**	**170.2**
Pipeline Transportation	2.0	5.2	0.7	6.8	4.2	18.2	0.3	3.9	8.1	6.4	4.4	10.1	1.4	3.8	11.2	6.5	**32.2**	**61.0**
Operating expenditures, excluding 'other manufacturing'	**190.2**	**229.8**	**84.3**	**106.8**	**300.1**	**351.7**	**139.2**	**153.8**	**1 304.8**	**1 443.8**	**348.8**	**423.6**	**84.9**	**89.3**	**199.1**	**230.0**	**2 651.4**	**3 028.9**
Other manufacturing[4]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	**338.8**	**241.7**
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 990.2**	**3 270.6**
	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	1998	2000	**1998**	**2000**
	million dollars																	
Capital Expenditures																		
Logging	0.5	0.0	0.1	0.1	0.2	0.1	3.0	3.4	1.5	0.1	2.1	1.2	...	...	...	...	**7.4**	**4.8**
Oil and Gas Extraction	4.3	11.8	9.9	14.1	69.4	73.8	0.9	5.9	55.5	244.8	46.5	114.8	...	...	...	...	**186.5**	**465.1**
Mining	2.1	1.5	5.8	0.8	8.1	5.0	3.8	2.9	33.4	65.0	28.1	67.4	...	...	...	...	**81.2**	**142.6**
Electric Power Generation, Transmission and Distribution[5]	4.9	7.8	19.2	36.5	1.7	..	20.7	4.0	56.5	56.0	21.0	78.1	...	...	...	...	**124.0**	**182.4**
Natural Gas Distribution	0.1	0.2	0.6	1.0	0.6	0.3	0.2	0.2	1.0	0.5	14.5	0.6	...	...	...	...	**16.8**	**2.8**
Food	2.5	3.3	0.9	4.8	1.3	4.7	5.8	0.2	37.6	45.5	12.7	27.8	...	...	...	...	**60.8**	**86.3**
Beverage and Tobacco Products	1.0	0.2	0.2	0.0	0.1	0.2	0.2	0.5	2.6	0.9	1.5	2.5	...	...	...	...	**5.5**	**4.4**
Wood Products[5]	3.1	1.3	0.6	6.7	6.4	..	2.4	1.0	66.0	51.2	17.8	63.1	...	...	...	...	**96.3**	**123.3**
Pulp, Paper and Paperboard Mills	13.2	3.2	0.5	0.9	4.6	2.7	1.1	1.8	89.1	85.8	179.2	140.4	...	...	...	...	**287.7**	**234.8**
Petroleum and Coal Products	0.5	1.6	3.0	0.3	5.4	3.0	1.2	0.3	82.2	119.1	48.6	90.3	...	...	...	...	**141.0**	**214.6**
Chemicals	18.6	4.5	3.3	1.1	7.0	13.4	0.4	0.4	65.7	60.6	94.3	67.5	...	...	...	...	**189.2**	**147.6**
Non-Metallic Mineral Products	4.0	2.0	0.1	2.4	2.5	3.3	..	0.0	32.6	85.5	15.1	13.2	...	...	...	...	**54.3**	**106.3**
Primary Metals	4.6	1.9	0.4	0.5	1.4	1.8	1.3	0.4	102.9	37.1	73.4	63.6	...	...	...	...	**184.0**	**105.3**
Fabricated Metal Products[3]	..	0.6	..	0.1	..	0.5	..	0.1	..	5.7	..	7.9	...	...	...	...	**..**	**14.9**
Transportation Equipment	0.7	0.2	0.2	0.5	1.0	0.8	0.2	0.0	16.3	13.7	30.4	187.9	...	...	...	...	**48.7**	**203.1**
Pipeline Transportation	0.6	1.3	6.4	1.9	2.9	3.0	0.5	0.6	41.6	9.9	63.7	17.4	...	...	...	...	**115.6**	**33.9**
Capital expenditures, excluding 'other manufacturing'	**60.7**	**41.4**	**51.0**	**71.7**	**112.5**	**112.5**	**41.6**	**21.8**	**684.6**	**881.4**	**648.7**	**943.7**	**...**	**...**	**...**	**...**	**1 599.1**	**2 072.5**
Other manufacturing[4]	..	..	..	..	..	..	..	..	..	..	..	..	...	...	...	...	**135.0**	**105.4**
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**...**	**...**	**...**	**...**	**1 734.2**	**2 177.9**

Notes:
Figures may not add up to totals due to rounding.
1. (PAC) Pollution abatement and control. With respect to operating expenditures, purchased waste management and sewerage services are included in this category.
2. Operating expenditures on wildlife and habitat protection are included with expenditures on other.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
4. Detail of the expenditure breakdown by type of environmental protection activity is only available for the listed industries.
5. Capital expenditures on reclamation and decommissioning are included with expenditures on environmental assessments and audits.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Business operating expenditures on environmental protection

Business operating expenditures on environmental protection were $3.3 billion, 9.4% higher than in 1998. This represented 60% of total environmental protection expenditures. Almost half ($1.4 billion) was directed at the operation and maintenance of pollution abatement and control (end-of-pipe) systems and equipment, far exceeding any other category[1] (Table 2.1.2 and Table A.8). In contrast, the next largest expense category was the operation and maintenance of pollution prevention processes and equipment at $423.6 million.

The Primary Metals Industry had the greatest operating expenses directed at environmental protection ($490.6 million). A number of years of high capital expenditures have likely put systems in place that require higher operation and maintenance costs. The Logging Industry experienced a large jump in operating expenses in 2000 compared to 1998, mostly due to an increase in expenses related to wildlife and habitat protection ($70.4 million in 1998 compared with $106.4 million in 2000). This is one of the few industries that reported a majority of operating expenses directed at activities other than PPAC (Table A.5).

Concentration

Total expenditures on environmental protection in 2000 were distributed similarly amongst the top 100 establishments as in 1998[2]. Almost half ($2.5 billion, or 47%) of total spending on the environment was made by the top 100 establishments (Table 2.1.3). The top five establishments were responsible for spending $748.4 million in 2000, or about 14% of total spending, as compared to $526.9 million (11%) in 1998. While total spending in 2000 increased by 15% over 1998 (Table 2.1.2), the distribution of spending remained relatively stable.

The top 15 establishments were responsible for a greater percentage of total capital expenditures on environmental protection in 2000 (34%) compared with 1998 (29%). This suggests that big-spending establishments continued to make large expenditures, while investments by lower-spending establishments remained stable or did not grow by much. The next 85 establishments, rounding out the top 100 spenders, contributed almost 28% to total capital expenditures in 2000, compared to 31% in 1998.

There was little variation in the distribution of environmentally related operational spending between 1998 and 2000. The top five establishments accounted for about 10% of operating expenses on the environment in 2000. This amounted to $332.2 million, as compared to $339.7 million and 11% in 1998. The top 100 establishments spent $1.4 billion in 2000 (43%) versus $1.3 billion, or 44%, in 1998, indicating that although operating expenditures on environmental protection increased from 1998 to 2000, the distribution of spending among establishments remained similar.

Table 2.1.3
Concentration of environmental protection expenditures, 2000

Establishments	Expenditures	Accumulated expenditures[1]	Share of total
	million dollars		percent
Capital expenditures			
Top 5	538.9	538.9	24.7
Next 5	114.0	652.9	30.0
Next 5	83.8	736.7	33.8
Next 85	602.1	1 338.8	61.5
Remaining establishments	839.0	2 177.9	100.0
Operating expenditures			
Top 5	332.2	332.2	10.2
Next 5	148.1	480.3	14.7
Next 5	111.4	591.7	18.1
Next 85	828.7	1 420.4	43.4
Remaining establishments	1 850.2	3 270.6	100.0
Total			
Top 5	748.4	748.4	13.7
Next 5	247.5	995.9	18.3
Next 5	169.2	1 165.1	21.4
Next 85	1 373.7	2 538.8	46.6
Remaining establishments	2 909.6	5 448.4	100.0

Notes:
Figures may not add up to totals due to rounding.
1. Cumulative expenditures of 'expenditures' column.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

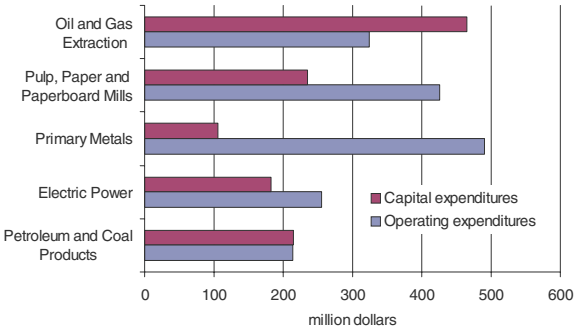
2.2 Environmental protection expenditures by industry[3] and by province and territory

Industry expenditures

The top five biggest spenders, in order, on environmental protection in 2000 were the Oil and Gas Extraction, Pulp, Paper and Paperboard Mills, Primary Metals, Electric Power Generation, Transmission and Distribution, and the Petroleum and Coal Products industries (Figure 2.2.1).

1. Does not include the 'other manufacturing' industry category.
2. Statistics Canada, 2000, *Environmental Protection Expenditures in the Business Sector, 1998,* Catalogue no. 16F0006XIE, Ottawa.
3. Before the 1998 reference year the 1980 Standard Industrial Classification System (SIC) was used for reporting. However, beginning with reference year 1998, industry statistics are based on the North American Industry Classification System (NAICS). For further information, see Chapter 3 – **Concepts, Methodology and Data Quality**.

Figure 2.2.1
Environmental protection expenditures by industry (top 5), 2000



Note:
'Electric Power' refers to the Electric Power Generation, Transmission and Distribution Industry.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Combined, they spent over $2.9 billion on environmental protection in 2000, representing about 54% of total environmental expenditures.

The year 2000 marked the first time since the inception of the Survey of Environmental Protection Expenditures in 1994 that the Pulp, Paper and Paperboard Mills Industry did not make the largest environmental protection expenditures. Increased environmental protection expenditures by the Oil and Gas Extraction Industry in 2000 (from $444.9 million in 1998 to $789.8 million in 2000) coincided with a period of high production and high prices for fossil fuels. Most of the increase was due to large expenditures on pollution prevention and pollution abatement and control capital projects (Table 2.1.2).

The Primary Metals Industry reported higher capital expenditures on environmental protection in 1996 ($250.0 million) and 1997 ($290.4 million) than in recent years ($184.0 million in 1998 and $105.3 million in 2000). The reduction in capital spending in the industry, especially investments in pollution abatement and control measures, mirrored a trend in lower metals production between 1998 and 2000[1]. The lower capital expenditures in 2000 were offset by a 19% increase in operating expenses compared with 1998 ($419.2 million in 1998 compared with $490.6 million in 2000) (Table 2.1.2).

The Transportation Equipment Industry saw a large increase in capital expenditures on environmental protection in 2000 over 1998 (Table 2.1.2). Investments in pollution prevention processes were almost exclusively responsible for this difference ($30.4 million in 1998 and $187.9 million in 2000). Industry sources indicate that most of this increase was due to a small number of large projects in the automotive industry.

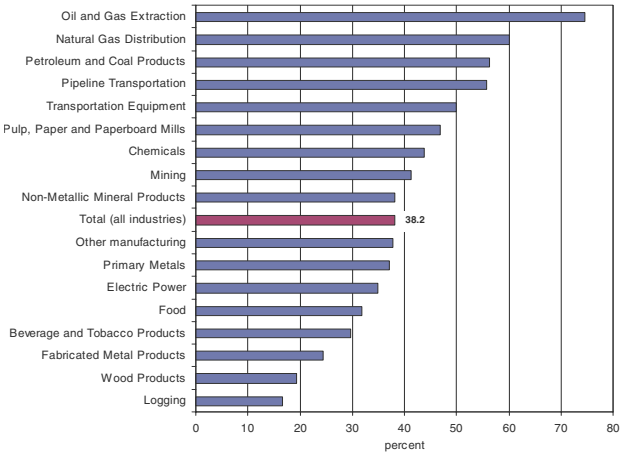
The Logging Industry was one of two industries that did not direct the majority of its operating expenditures at pollution abatement and control and pollution prevention activities. In 2000, the industry spent $106.4 million (approximately 66%) of its operating expenses on wildlife and habitat protection. This represented a large increase when compared to the previous three survey cycles in which spending never surpassed $85 million. The second was the Oil and Gas Extraction Industry, reporting $117.4 million in operating expenses directed at reclamation and decommissioning in 2000, continuing its spending trend over the last several survey cycles.

Cost savings

In some instances, establishments can reduce costs through the implementation of environmental management or pollution prevention practices. In 2000, for the first time, the SEPE asked businesses to indicate if they experienced cost savings due to any of these programs or initiatives.

Across all industries, 38% of establishments who answered reported experiencing cost savings as a result of adopting pollution prevention or environmental management practices in 2000 (Figure 2.2.2). The Oil and Gas Extraction Industry had the largest proportion of establishments (75%) reporting cost savings, while businesses in the Logging Industry were least likely to report cost savings as a result of implementing environmental practices or pollution prevention (17%).

Figure 2.2.2
Establishments reporting cost savings resulting from the implementation of environmental management practices, 2000



Notes:
Values represent the proportion of establishments that answered 'Yes' to realizing cost saving over the number of establishments that provided a response.
'Electric Power' refers to the Electric Power Generation, Transmission and Distribution Industry.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

1. Statistics Canada, CANSIM II, Table 152-0001, 'Metal production in Canada, monthly'.

Establishment size seemed to play a role in whether or not an establishment realized cost savings when adopting pollution prevention or environmental management practices. Larger establishments (based on employment) were more likely to report cost savings (Table 2.2.1). For example, approximately 25% of establishments with less than 100 employees[1] reported cost savings, as compared to 60% of establishments with 1 000 or more employees.

Table 2.2.1
Distribution of companies reporting cost savings as a result of adopting environmental management practices by establishment size, 2000

Number of employees per establishment	Establishments reporting cost savings
	percent[1]
<100	25
100 - 499	34
500 - 999	47
>999	60

Notes:
This table includes data reported only.
This table excludes the 'other manufacturing' industry category.
In 1998 the Fabricated Metal Products Industry was included with 'other manufacturing'.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Provincial and territorial expenditures

As in past survey years, Ontario ($1 728.9 million), Alberta ($1 135.6 million) and Quebec ($1 105.9 million) made up almost three-quarters of total environmental protection expenditures in 2000. Businesses in these three provinces accounted for the largest capital and operating expenditures as well (Table 2.1.1).

Businesses in Ontario and Alberta accounted for over half of all capital expenditures on environmental protection ($1 160.5 million or 53.3%). Excluding the 'other manufacturing' industries category, businesses in Alberta reported $569.1 million in capital expenditures, directed mostly at pollution abatement and control projects ($294.0 million) (Table 2.2.2 and Table A.4). Businesses in Ontario spent $546.6 million on capital projects, but directed the majority at pollution prevention projects ($338.5 million). Although businesses in Quebec spent almost $200 million less in capital expenditures on the environment than those in Ontario or Alberta, they still accounted for almost 20% of the total (Table A.2).

All provinces and territories directed the majority of operating expenses towards PPAC processes (including waste management and sewerage services – Table A.6). In Alberta and British Columbia, however, spending was almost equally split between PPAC and other environmental services (about 47% and 48%, respectively), mostly due to significant operating expenses directed at reclamation and decommissioning and wildlife and habitat protection. This is not surprising given the importance of natural resource industries in those provinces.

1. Between 50 and 99 employees.

2.3 Capital expenditures on pollution prevention and pollution abatement and control by type of environmental medium[2]

In 2000, for the first time, the SEPE produced estimates of capital expenditures on pollution prevention and pollution abatement and control by type of environmental medium[3]. This included a breakdown of investments made specifically to abate or prevent air pollution, surface water pollution, on-site contained solid and liquid waste, and noise, radiation and vibration.

Pollution abatement and control

In 2000, capital expenditures on pollution abatement and control projects were directed largely at mitigating the release of air pollutants (about $560 million in 2000) (Table A.10). This accounted for almost 64% of total PAC investments in 2000, compared to 43% in 1998. This ended a period of decline in the proportion of expenditures made on preventing air pollution, which began in 1996 (Figure 2.3.1). Proportionally, more dollars were spent in 2000 on PAC for air pollution than on preventative measures for air pollution (64% of PAC capital expenditures compared to just 51% of pollution prevention capital expenditures – Figures 2.3.1. and 2.3.2).

Most industries contributed to this increase, however, some, most notably Transportation Equipment and Pulp, Paper and Paperboard Mills, directed significantly less spending to end-of-pipe air pollution reduction. This is explained partly by the efforts of the Transportation Equipment Industry to incorporate pollution prevention processes and systems in their production streams, as opposed to end-of-pipe solutions. The Pulp, Paper and Paperboard Mills Industry directed a larger proportion of their 2000 PAC capital expenditures to treat the release of emissions to surface water, compared to 1998 (about 55% in 2000 versus about 28% in 1998).

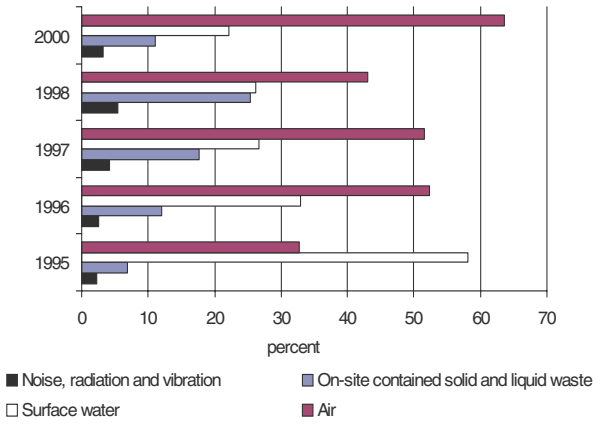
2. These figures do not include the 'other manufacturing' industry category.
3. In 1998, only proportions of expenditures made to each medium were calculated, based solely on reported data. Therefore, despite the fact that 2000 data are estimates of the total amount of spending by medium, comparisons of the 2000 SEPE with previous survey years can only be made by comparing the proportion of the total spent on each medium.

Table 2.2.2
Capital expenditures for pollution prevention and pollution abatement and control by province and territory, 1995-2000

Province/Territory	Pollution prevention processes					Pollution abatement and control (end-of-pipe) processes				
	1995	1996	1997	1998	2000	1995	1996	1997	1998	2000
	million dollars									
Newfoundland and Labrador	0.1	2.7	13.0	2.5	8.3	x	38.4	1.7	7.8	16.6
Prince Edward Island	x	x	0.6	0.2	0.5	0.1	x	x	x	0.2
Nova Scotia	2.3	4.8	6.3	6.2	12.3	26.7	23.0	7.8	5.0	12.1
New Brunswick	16.4	9.9	12.6	11.3	91.1	93.1	66.2	25.7	36.7	110.9
Quebec	71.1	238.7	130.5	71.7	139.6	335.1	148.1	160.6	111.3	165.0
Ontario	77.1	133.4	254.1	203.5	338.5	271.2	240.3	261.8	248.2	173.8
Manitoba	18.6	4.9	17.6	26.1	38.1	31.5	13.6	8.5	14.0	11.6
Saskatchewan	5.2	18.5	24.3	137.7	78.9	38.5	18.5	37.3	25.1	13.4
Alberta	37.0	43.0	91.7	139.5	159.3	233.8	199.5	102.1	121.0	294.0
British Columbia	40.9	225.1	162.4	47.3	63.2	129.6	70.3	82.7	112.6	81.6
Yukon Territory, Northwest Territories and Nunavut	x	x	2.8	2.4	13.9	x	x	x	x	2.3
Canada	**268.9**	**681.8**	**716.0**	**648.4**	**943.7**	**1203.5**	**821.4**	**690.3**	**684.5**	**881.4**

Notes:
Figures may not add up to totals due to rounding.
This table excludes the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Figure 2.3.1
Distribution of capital expenditures on pollution abatement and control, by environmental medium, 1995-2000

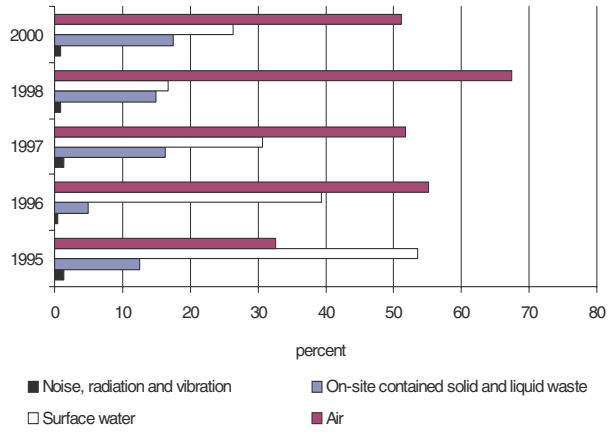


Note:
Data do not include the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Pollution prevention

As in the previous three survey cycles, the majority of pollution prevention capital expenditures in 2000 ($482.8 million) were directed at projects to prevent emissions to air (Table A.12).[1] This was driven in large part by extensive spending in the Transportation Equipment, Pulp, Paper and Paperboard Mills, and Oil and Gas Extraction industries on the prevention of air pollution. Proportionally, however, spending on air pollution prevention in 2000 was lower than in 1998 (Figure 2.3.2). In 2000, just over 50% of pollution prevention capital investment dollars spent went towards prevention of air pollution, compared to just over 67% in 1998. Conversely, the share of expenditures made to control the release of pollutants to surface water and to contain on-site solid and liquid waste were about 26% and 18%, respectively, in 2000 compared to about 17% and 15% in 1998.

Figure 2.3.2
Distribution of capital expenditures on pollution prevention, by environmental medium, 1995-2000



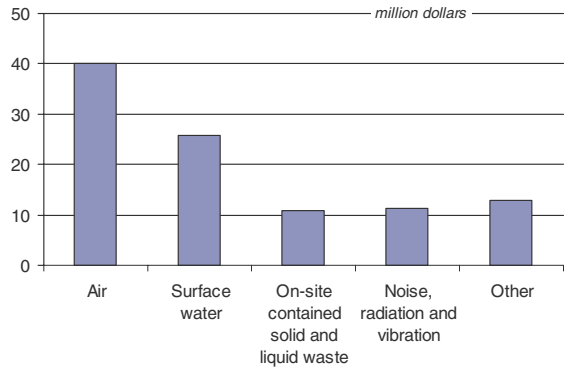
Note:
Data do not include the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division

1. See: Statistics Canada, 2000, *Environment Protection Expenditures in the Business Sector, 1998*, Catalogue no. 16F0006XIE, Ottawa.

Some of the activity to abate or prevent air emissions may be in anticipation of requirements arising from Canada's commitment to the Kyoto Protocol. There has also been increasing awareness in recent years of air quality issues, such as smog in urban centres, which may have influenced industry's decision to direct most of its capital expenditures at reducing air pollution.

Capital spending on pollution abatement and control and pollution prevention (PPAC) in the 'other manufacturing' industries category was directed largely to control of air pollution ($40.2 million) in 2000 (Figure 2.3.3). About $26 million of capital investments went towards mitigating the release of pollutants to surface water, while on-site treatment of solid and liquid waste and noise, radiation and vibration each accounted for just over $10 million of spending.

Figure 2.3.3
Capital expenditures on pollution prevention and pollution abatement and control in the 'other manufacturing' industry category by environmental medium, 2000



Note:
Includes capital expenditures on environmental monitoring.
Source:
Statistic Canada, Environment Accounts and Statistic Division.

2.4 Environmental management practices

Businesses utilize many different environmental management practices to facilitate the reduction or prevention of pollution or to conserve resources. These practices are designed to take into account environmental issues or the impact activities have on the environment. For instance, a company may implement a management structure to assess, control or analyse its processes and operations, or it may follow a set of standards, guidelines or policies set by government or a standards organization (e.g., ISO 14000). Additionally, it may develop a line of environmental products and services. A business may also demonstrate its commitment to the environment by publishing an environmental performance or sustainable development report or by participating in voluntary programs to achieve environmental objectives.

Seventy-two percent of reporting establishments (representing 85% of employment) indicated using at least one environmental management practice in 2000 (Tables B.1 and B.2). The most commonly reported practice was the use of an environmental management system (52% of establishments). The use of an environmental management system was highest amongst energy-related industries. For example, the Natural Gas Distribution (91%), Oil and Gas Extraction (82%) and Pipeline Transportation (81%) industries had the highest participation rates. Overall, this follows similar results in 1998.

Establishments in the Natural Gas Distribution and Pipeline Transportation industries were most likely to report using at least one environmental management practice in 2000 (Table B.2). The most common practices used by these establishments were participation in environmental voluntary agreements, the use of environmental management systems, and the publication of an annual environmental performance report. Industry sources suggest that the low incidence of ISO 14000 certification in these industries may be due to the fact that most establishments have already met strict existing environmental regulations, and therefore see little value in pursuing further accreditation.

Seventy-two percent of establishments across Canada reported using an environmental management practice (Table B.3). Ninety-two percent of establishments in the Yukon and Northwest Territories and Nunavut reported using an environmental management practice, compared to 56% in Prince Edward Island.

Table B.4 indicates that establishments with larger numbers of employees are more likely to participate in environmental management practices than establishments with fewer employees. With the exception of Eco-labelling of products, establishments with 1 000 or more employees were most likely to use each of the environmental management practices.[1]

1. These figures do not include the 'other manufacturing' industry category.

2.5 Pollution prevention methods

Pollution prevention attempts to eliminate waste and pollution before it is created (Text Box 2.5.1). It involves continuous improvement through changes in product design, technology, operations and behaviour. Pollution prevention is seen as a more effective way of protecting the environment compared to the traditional pollution abatement and control (end-of-pipe)[1] methods, as it is often achieved through more efficient processes requiring lower energy or material inputs to the production cycle. As a result, pollution prevention methods may also lead to lower production costs.[2]

Across all industries, almost 90% of establishments reported using some form of pollution prevention method in 2000 (Table B.5).[3] The most commonly used methods were good operating practices and training (79% of establishments) and prevention of leaks and spills (73% of establishments). Less commonly reported were product design or reformulation (24% of establishments) and materials or feedstock substitution (34% of establishments).

Certain pollution prevention methods were more commonly used in some industries than others. For example, about 86% of the establishments in the Oil and Gas Extraction Industry reported they used equipment or process modifications in 2000 to prevent pollution. This contrasts with about 24% of establishments in the Logging Industry using this method (Table B.5).

All reporting establishments in the Yukon Territory, Northwest Territories and Nunavut indicated they had methods in place to prevent leaks and spills and maintained good operating practices or pollution prevention training (Table B.6). Almost 90% indicated they practised the '4R's' (recirculation, recovery, reuse or recycling).[4]

Table B.7 groups establishments into four different size categories based on employment and provides the proportions of establishments in each category that used each pollution prevention method. In general, the larger establishments were more likely to use pollution prevention methods. For example, almost 80% of establishments with 1 000 or more employees indicated they recycled, while this proportion falls to just over 60% of firms with less than 100 employees.[5].

1. End-of-pipe processes are separately identifiable processes whose sole purpose is to abate or control undesirable substances emitted during normal production activities without any incidence on the production process itself.
2. Government of Canada, 2000, *Progress in Pollution Prevention, 4th Annual Report*, Ottawa. See also **Cost Savings** in this report, page 7.
3. Data are the number who answered 'Yes' to a given method over the number who responded to the specific question.
4. Results from the Territories should be used with caution due to the small number of establishments surveyed. Please refer to Chapter 3 – **Concepts, Methodology and Data Quality.**

Text Box 2.5.1
Pollution prevention methods

The federal government defines pollution prevention as: "the use of processes, practices, materials, products or types of energy that hinder or minimize production of pollutants, wastes and wastage, while providing a general decrease in threats to human and environmental well-being."[1] Based on this definition, the SEPE asked businesses to indicate which of the following pollution prevention methods they used in 2000:

- product design or reformulation;
- equipment or process modifications (integrated process);
- recirculation, on-site recycling, reuse or recovery of materials or substances;
- energy conservation;
- materials or feedstock substitution, solvent reduction, elimination or substitution;
- improved inventory management or purchasing techniques;
- prevention of leaks and spills;
- good operating practices or training.

Pollution prevention is sometimes characterized by economic as well as environmental benefits. For instance, energy conservation practices allow businesses to reduce emissions of greenhouse gases while cutting costs.[2] The 2000 survey included a question asking respondents if they realized cost savings as a result of adopting pollution prevention methods or implementing environmental management practices. Please see Section 2.2.

1. Government of Canada, 1995, *Pollution Prevention - A Federal Strategy*, Ottawa.
2. For specific examples of pollution prevention efforts by Canadian businesses, visit Environment Canada, *The Canadian Pollution Prevention Information Clearinghouse* at www3.ec.gc.ca/cppic/index_e.htm.

2.6 Environmental processes and technologies

The 2000 edition of the SEPE included a question asking which environmental processes or technologies businesses were using to prevent, abate or control pollution. Of the 1 708 establishments that reported, 66% used energy

5. Between 50 and 99 employees.

conservation processes or technologies (Table B.8), 96% indicated they used solid waste management technologies (Table B.11), 40% used site reclamation and decommissioning technologies (Table B.13), while only 17% used biological treatment biotechnologies (Table B.15).

Energy conservation and efficiency

The most frequently reported energy conservation technology was energy efficient equipment (42%), followed by waste-to-energy systems (21%), clean fuel systems and fuel substitution (about 13% each) (Table B.8).[1] The Oil and Gas Extraction, Natural Gas Distribution and Pipeline Transportation industries were more likely to use energy efficient equipment, not surprisingly since these industries are large energy consumers. Oil and Gas Extraction (48%), Pulp, Paper and Paperboard Mills (45%) and Pipeline Transportation (39%) reported using waste-to-energy systems, while 42% of respondents in the Natural Gas Distribution Industry used clean fuel systems.

Establishments in Alberta, Manitoba and Saskatchewan indicated higher usage of energy efficient equipment (Table B.9) than other provinces, likely due to the prevalence of the Oil and Gas Extraction, Natural Gas Distribution and Pipeline Transportation industries. Yukon Territory, Northwest Territories and Nunavut indicated 67% of businesses used waste-to-energy systems, followed by Prince Edward Island (50%).

The use of renewable energy sources changed little in 2000 compared to 1998. In 2000, biomass energy (8%) and solar power (3%) were the two most commonly utilized renewable energy sources reported by establishments (Table B.8). Combined, 1% of businesses reported using wind power and geothermal sources.

Establishment size did not seem to be as important a factor in the adoption of energy conservation processes compared to the adoption of environmental management practices and pollution prevention methods. Small and medium sized establishments were just as likely as large ones to be engaged in some form of energy conservation process. The only technology that appeared to be used significantly more often by large establishments was solar power (14% of establishments with over 1 000 employees; less than 5% in all other size groups) (Table B.10).

Interestingly, the reported use of biomass as an energy source was highest in the two medium establishment size categories (about 10% in establishments with 100-499 employees and 12% in the 500-999 group). This coincides with the prevalence of the use of biomass technology in the Wood Products and Pulp, Paper and Paperboard Mills industries (34% and 48%, respectively), where establishment sizes are typically in that range.

Text Box 2.6.1
Energy conservation technologies

Cogeneration: a process that converts a fuel into both thermal and electrical energy.

Energy efficient equipment: any equipment that reduces energy requirements compared to previous processes.

Fuel substitution: switching from a carbon fuel such as coal or petroleum to a lower carbon (such as natural gas) or carbon-free fuel.

Clean fuel system: refers to electric, hybrid, fuel cell, natural gas, and other alternative fuels.

Waste energy recovery/reuse: a process that recovers the heat value of combusted waste to generate steam and electric power.

Renewable energy source:

- *Solar:* Active and passive solar systems; photovoltaics; solar generators; solar water and space heating systems.
- *Wind power:* the production of electricity from wind turbines.
- *Geothermal:* energy recovered from the heat of the earth's core.
- *Biomass energy:* wastes such as organic residues from plants and animals obtained primarily from harvesting and processing agricultural and forestry crops that are utilized as fuels.

Establishments in each of the four size groups concentrated on using energy efficient equipment. Sixty percent of businesses in the large establishment group reported that they were using energy efficient equipment compared to 34 percent of smaller establishments (under 100 employees[2]).

Solid waste management

Since all businesses produce some kind of waste, it is not surprising that 96% of establishments indicated they used at least one waste management process or technology in 2000 (Table B.11). The most commonly reported methods of solid waste management industry-wide were container use (63%) and on and off-site recycling (62%).

The use of incineration as a solid waste management tool was reported by almost 20% of establishments across all industries. Pipeline Transportation (46%), Oil and Gas Extraction (44%) and Pulp, Paper and Paperboard Mills (41%) were the greatest users of this method. Provincially, businesses in the Territories and Nunavut most frequently reported using incineration (67%) (Table B.12). This result

1. See Text Box 2.6.1 for a description of energy conservation technologies.

2. Between 50 and 99 employees.

is based on a low number of responses, however, and should be used with caution (see Table 3.3.1).

On and off-site recycling was popular across most industry groups in 2000. The exceptions were in the Logging and Wood Products industries where recycling was only practised by 45% and 47% of establishments respectively. Establishments in Newfoundland and Prince Edward Island were least likely to report using recycling. Only about 30% of these establishments indicated using it in 2000.

Site reclamation and decommissioning

In 2000, 40% of establishments indicated they used site reclamation and decommissioning (Table B.13). Excavation was the most widely used method across all industries (20%), followed by reforestation and revegetation (19%). The energy production and distribution industries were the biggest users of these methods (Excavation: Oil and Gas Extraction, 81%; Natural Gas Distribution, 75%; Pipeline Transportation, 75%. Reforestation: Pipeline Transportation, 84%; Oil and Gas Extraction, 82%; Natural Gas Distribution, 75%). Accordingly, use of excavation and reforestation/revegetation among businesses was also highest in Alberta and Saskatchewan, the two provinces where the energy production and distribution industries are most prevalent (Table B.14).

The Pipeline Transportation industry in general was the greatest user of site reclamation and decommissioning technologies. Reported usage of each technology, except soil washing, was well above the industry total (Table B.13).

3 Concepts, Methodology and Data Quality

Introduction

The following information should be used to ensure a clear understanding of the basic concepts that define the data provided in this product, of the underlying methodology of the survey, and of key aspects of the data quality. This information will provide the user with a better understanding of the strengths and limitations of the data, and of how they can be effectively used and analysed. The information may be of particular importance when making comparisons with data from other surveys or sources of information, and in drawing conclusions regarding change over time.

Data presented in this report are derived from the Survey of Environmental Protection Expenditures (SEPE). The SEPE provides a measure of the cost to Canadian industry to comply with present or anticipated environmental regulations, conventions and voluntary agreements. The SEPE also collects information on environmental management practices and environmental technologies used by industry for the purpose of preventing, abating or controlling pollution.

The SEPE has been conducted on an annual basis since 1994. However, as of reference year 1998 this survey is conducted every two years.

3.1 Data sources and methodology

The SEPE does not cover the entire economy (agriculture, construction, distributive trades, service industries and the government sector are not surveyed). Rather, the survey targets industries in the primary and manufacturing sectors.

The data reported in this study are based upon a survey of 2 750 establishments in primary industries (resource extraction industries), manufacturing industries, the Electric Power Generation, Transmission, and Distribution Industry, the Pipeline Transportation Industry, the Oil and Gas Extraction Industry and the Natural Gas Distribution Industry. In order to be selected for inclusion in the survey, an establishment had to have more than 49 employees[1].

1. In some provinces and territories, in order to obtain minimum coverage, the employment thresholds were reduced.

Reference period

Respondents were given the option of reporting for a **12-month** period ending between April 1, 2000 to March 31, 2001. The results in this report, however, are simply presented as environmental protection expenditures made during 2000.

3.1.1 General methodology

Survey frame

A list of establishments to be surveyed was produced using the frame from Statistics Canada's Annual Survey of Manufactures, the Business Register and other frames that contain establishments or businesses active in the following industries: Oil and Gas Extraction; Pipeline Transportation; Petroleum and Coal Products; Electric Power Generation, Transmission and Distribution; and Natural Gas Distribution. Metal and non-metal mining establishments were added based on Natural Resource Canada's Census of Mines.

Sample selection

Industry classification

In previous years, establishments were selected based on the 1980 Standard Industrial Classification System (SIC). However, beginning with reference year 1998, industry selection was based on the North American Industry Classification System (NAICS).

This new classification system was developed as a cooperative effort between the statistical agencies of Canada, Mexico and the United States. Created against the background of the North American Free Trade Agreement, it is designed to provide common definitions of the industrial structure of the three countries and a common statistical framework to facilitate the analysis of the three economies.[2]

The establishments that were surveyed in both 1997 and 1998 were compared to examine any differences in industry classification resulting from the switch to NAICS. It was found that an insignificant number of establishments were reclassified into different industry groups, thus allowing for comparisons with previous survey years.[3]

2. Statistics Canada, 1997, *North American Industry Classification System,* Catalogue no. 12-501-XPE, Ottawa.
3. For additional information on the impact of the conversion to a NAICS-based classification system from SIC80, please see: Statistics Canada, September 1999, *Private and Public Investment in Canada, Revised Intentions, 1999*, pp. 11-14, Catalogue no. 61-206-XIB.

Text Box 3.1.1
List of Selected Targeted Industries

- Logging (NAICS 113311, 113312)
- Oil and Gas Extraction (NAICS 211)
- Mining (NAICS 2121, 2122, 21239)
- Electric Power Generation, Transmission and Distribution (NAICS 2211)
- Natural Gas Distribution (NAICS 2212)
- Food (NAICS 311)
- Beverage and Tobacco Products (NAICS 312)
- Wood Products (NAICS 321)
- Pulp, Paper, and Paperboard Mills (NAICS 3221)
- Petroleum and Coal Products (NAICS 324)
- Chemicals (NAICS 325)
- Non-Metallic Mineral Products (NAICS 327)
- Primary Metals (NAICS 331)
- Fabricated Metal Products (NAICS 332)
- Transportation Equipment (NAICS 336)
- Pipeline Transportation (NAICS 4861, 4862, 4869)

Coverage and sample selection

The non-manufacturing (primary) and manufacturing sample was a stratified sample based on employment, from which a take-all portion and a take-some portion was identified. The take-all strata included the following industries: Oil and Gas Extraction; Mining (excluding quarrying); Electric Power Generation, Transmission and Distribution; Natural Gas Distribution; Beverage and Tobacco Products; Pulp, Paper and Paperboard Mills; Petroleum and Coal Products; Primary Metals; and Pipeline Transportation. All establishments with over 49 employees in these primary and manufacturing industries were surveyed using a long (more detailed) questionnaire.

The take-some industries included Logging (excluding contract logging), Food, Wood Products, Chemicals, Non-Metallic Mineral Products, Fabricated Metal Products, and Transportation Equipment. Establishments in these industries also received a long questionnaire. The take-all and take-some portions of the sample are determined based on a number of factors found in each industry, such as the average level of environmental protection expenditures per employee greater than $1 000 (at the 4, 5 or 6-digit NAICS level, depending on the industry) and the number of small and medium-sized establishments within the industry group.

A total of 16 industry groups were targeted for increased survey coverage and received the more detailed questionnaire in 2000 based on 4, 5 and 6-digit NAICS industries (Text Box 3.1.1). For the 2000 survey, the Fabricated Metal Products Industry was added to the target industry portion of the sample.

The remaining industries in the manufacturing sector were sampled at the 4-digit NAICS level and grouped into an 'other manufacturing' category. To minimize response burden, establishments (with more than 49 employees) in these industries received a short (less detailed) questionnaire. The industries comprising the 'other manufacturing' category are those with an average level of environmental protection expenditure per employee below $1 000.

Additional information obtained from the annual reports of establishments and Statistics Canada's annual Capital and Repair Expenditure Survey [1] was also used in the sample selection.

The take-some strata were selected by ranking establishments within each 4, 5 or 6-digit NAICS (again depending on the industry group) by total employment. If there were 50 or more establishments in the NAICS category, the top 15% of establishments were selected. If there were between 15 and 49 establishments, the top 20% were selected. Where the total number of establishments fell below 15, all establishments were selected. In some provinces and territories, the employment threshold was reduced to improve coverage. The sample selected the largest establishments in order to maximize the employment covered while minimizing the number of establishments surveyed.

Analysis had shown that there was no correlation between environmental expenditures per employee and establishment size. Therefore, it was assumed that no bias was introduced by sampling the largest establishments in an industry group.

3.2 Concepts and variables measured

The survey questionnaire was designed in consultation with key public and private sector groups and by referencing the experiences from other countries who have conducted similar surveys. Environmental protection expenditures for the purposes of the survey are defined as those made to meet environmental regulations, conventions or voluntary

1. The Capital and Repair Expenditure Survey provided information on industries that had relatively high capital expenditures on assets associated with pollution abatement and control (PAC). In the past, information from surveys in other countries was also used to help determine target industries.

agreements (see the questionnaire in Annex C for further explanation).

Sampled establishments in the 'other manufacturing' industries received a short version of the questionnaire. The short version of the questionnaire requests the breakdown of expenditures into capital (investment) expenditures and operating expenses for:

- pollution abatement and control;
- other environmental protection activities;
- purchase of waste and sewerage management services; environment-related construction and engineering services; non-capital repair and maintenance expenditures; other environmental services;[1]
- polluting prevention methods;
- environmental management practices.

The long questionnaire was provided to establishments in target industries and required a more detailed breakdown of expenditures. In addition to the information asked on the short form, the long form asked respondents to report their capital (investment) expenditures and operating expenses for:

- pollution prevention;
- pollution abatement and control (end-of-pipe);
- environmental monitoring;
- environmental assessments and audits;
- site reclamation and decommissioning;
- protection and restoration of wildlife and habitat;
- environmental charges.

Also included on the questionnaires were three qualitative questions related to pollution prevention, environmental processes and technologies and environmental management practices. Respondents could indicate which pollution prevention methods were used at their establishment. Two new categories of pollution prevention were added to the 2000 questionnaire: Improved management or purchasing techniques and Good operating practices or pollution prevention training. The question on environmental processes and technologies included energy conservation and efficiency, solid waste management, site reclamation and decommissioning and environmental biological treatment. The checkbox options for this question were modified for the 2000 questionnaire to reduce response burden.

1. This information is used for internal purposes only to fill data gaps on the supply side of environmental services.

3.3 Data accuracy

The mailout of the 2000 reference year Survey of Environmental Protection Expenditures took place in October 2001. Data collection took place from the last month of 2001 to the end of the second quarter of 2002. Survey questionnaires were mailed to specific establishments identified by the sample and the responses were returned by mail. The surveys were addressed to a contact person who was either responsible for, or had knowledge of, the environmental operations of the company. In the case of some multi-establishment firms, the survey was mailed to the head office which either forwarded the questionnaire to the appropriate establishment or provided a combined report for all targeted establishments.

Follow-ups via fax and/or telephone were carried out after the due date to remind respondents to return their surveys.

Questionnaires were edited in two steps. First, validity edits were applied to ensure that responses to particular questions fell within a limited range of possible values. Second, consistency edits were applied. Cases where responses in one section of the questionnaire were inconsistent with those given in other sections were identified and edited. These edits were done on an ongoing basis throughout the data collection phase.

Additional follow-ups were carried out to collect missing data and to resolve inconsistencies.

Response rates

Table 3.3.1 shows the response rate for each industry and province and territory, according to both number of reporting establishments and employment, as a percentage of the total number of survey establishments in scope.

For the 2000 reference year, there were 2 280 reports received for 2 750 surveyed establishments. The response rate for the 2000 survey was 83%, based on the number of reporting establishments, and 88% based on employment covered. This matches the response rates for the 1998 reference year survey. Response rates for the Survey of Environmental Protection Expenditures have generally improved in each survey year. For example, the response rate for the 1996 survey was 73%, based upon the number of reporting establishments, and 76% in 1997.

Response rates by province and territory ranged from 71% in Prince Edward Island to 93% in Saskatchewan and the Yukon Territory, Northwest Territories and Nunavut.

Qualitative data

The Survey of Environmental Protection Expenditures has a number of qualitative questions. These qualitative questions are specifically 7c, 12 and 13. Currently, this information is collected, verified for data quality and released as reported values only. No estimation is done for non-response or for the non-surveyed portion of the sample. Since the larger establishments (based on employment) are more likely to be sampled, they have the greatest impact on the qualitative results. Analysis indicates that the larger establishments are generally more likely to use pollution prevention methods (Question 7c), environmental processes and technologies (Question 12) and environmental management practices (Question 13). Users should note that the results likely over-estimate the use of these environmental methods, technologies and practices for industries comprising predominantly larger establishments.

Of the 2 750 long and short questionnaires sent to businesses, 2 280 provided responses. Of those, 2 061 provided responses to Question 7c. The overall response rate for this question was 75%. For the 2000 reference year, the question on environmental management practices was also included on the short form (Question 13 on the long questionnaire, Question 8 on the short questionnaire). Of the 2 280 establishments that responded, 2 196 provided answers to Question 13 (Question 8 short form), representing a response rate of 80%.

Of the 2 078 long questionnaires sent to respondents[1], 1 708 establishments returned the questionnaire with at least one response to Question 12. This represents a response rate of 82%.

Verification, imputation and estimation

After data capture was complete, further validation of the data was performed to ensure that totals were correct and to verify that there were no outliers. The latter validation was performed by comparing figures with those from the previous year.

Imputation for non-response was performed in four stages.

First, all possible related information was assembled (e.g., information from the Capital and Repairs Expenditure Survey, Business Register, *Pulp and Paper Canada*[2] and from company annual reports) and some establishments were re-contacted to help provide further indicators that would allocate expenditures by province or industry where this information was missing.

Second, when possible, the previous year's operating expenditure data were used to impute for 2000 operating expenditure data. An industry growth factor was calculated for establishments within the industry that responded for both years (1998 and 2000). The appropriate industry growth factor was then applied to impute operating expenditure data for records that were a non-response in the current cycle but responded in the previous cycle[3].

Third, total environmental protection expenditures were estimated on a per-employee basis. The mean of environmental expenditures per employee by industry (4-digit NAICS for 'other manufacturing' records) and province or region[4] was used to estimate for non-responding establishments. If there were not enough donors at the industry and province/region level, then imputation was based on the mean of the environmental expenditure per employee ratio for a more aggregated group of donors: 1) industry and Canada; 2) pooled (similar) industries and province/region; 3) pooled industry and Canada; or 4) total for Canada.

Finally, the missing components of environmental protection expenditures were estimated as a proportion of total expenditures using donors from the same industry.

Table 3.3.2 shows the proportion of imputed value over the total value of environmental protection expenditures (value for complete and partial responses + imputed value for non-response), by industry and by province and territory. Imputation rates by industry ranged from 21.3% in the Logging Industry to 0.3% in the Electric Power Generation, Transmission and Distribution and Natural Gas Distribution industries. Table 3.3.3 provides the same information by expenditure category. Imputation rates by expenditure category were fairly consistent ranging from a high of 15.4% to a low of 5.3%.

Estimation was done for establishments that had 49 or more employees but were not surveyed. The mean of the environmental protection expenditures to employment ratio was used for estimation in a manner similar to that for imputation. No estimation or imputation was done for the qualitative information collected in questions 7c, 12 or 13.

Sampling and non-sampling errors

There are two general categories of error in surveys. The first, sampling error, arises from the fact that a sample or subset of the target population is used to represent the population. The size of sampling error is quantifiable. The second category is referred to as non-sampling error and is not as easily quantified. Non-sampling error refers to all the

1. The 2000 Survey of Environmental Protection Expenditures short questionnaire did not include a question on environmental processes and technologies.
2. *Pulp and Paper Canada,* 103:1-10 (2002).
3. Regression analysis has shown that using the previous year's operating expenditures is a reasonable predictor of future operating expenditures.
4. The mean of environmental protection expenditures to employment ratio by region was used when there were not enough donors at the provincial level.

other kinds of error that arise in surveys. For example, incomplete or inaccurate lists of the general population, respondent misinterpretation of questions, provision of erroneous information, failure or refusal to respond, information processing errors and so on.

Typically the sampling error is measured by the expected variability of the estimate from the true value, expressed as a percentage of the estimate. This measure is referred to as the coefficient of variation or the standard deviation. However, in the case of the Survey of Environmental Protection Expenditures, the sample is not randomly chosen. Rather, a minimal sample number was calculated, and the establishments with the largest number of employees were sampled. This methodology was used in order to survey the largest proportion of employment in each target industry while keeping response burden to a minimum. Given the nature of the sampling process, no coefficient of variation was produced.

Every attempt was made to eliminate the non-sampling error. For example, establishments brought into the survey for the first time were researched and contact information was verified. Instructions and definitions were further refined to be more clear and straightforward. The returned questionnaires were verified and validated before data capture. The data was edited and tabulated automatically. Extensive follow-up was carried out for incomplete responses and for non-response. For the 2000 reference year, the Survey of Environmental Protection Expenditures was converted to a new capture and editing system that is being adopted across all Statistics Canada business surveys. The new capture and edit system brings new tools and efficiencies that will improve the quality of the data.

As 2000 represents the 6th year this survey has been conducted, many establishments have received it in the past and are more familiar with the concepts, and as a result their responses are more accurate. In fact, in some cases establishments have modified their accounting practices in order to provide, as accurately as possible, the information required by the survey.

The most common difficulty reported by respondents was the inability of their record-keeping systems to isolate the environmental protection component of their expenditures. Expenditures made either for capital investment or for current operations often provide a combination of benefits, such as increased efficiency and reduced waste. In these circumstances, it is difficult to determine what proportion of the expenditure to credit towards environmental protection. Consequently, respondents may over-estimate or under-estimate that proportion. Another example of such bias is the inclusion of health protection expenditures in the reported environmental protection expenditures, because of the respondent's inability to distinguish between the two sets of costs.

Table 3.3.1
Response rates by industry and by province and territory, 2000

	According to number of reporting units			According to employment		
Industry	Responses	**Total[1]**	Response as a percentage of total[1]	Number of employees	**Total[1]**	Response as a percentage of total[1]
Logging	67	84	80	9 962	13 204	75
Oil and Gas Extraction	70	94	74	20 309	23 305	87
Mining	127	145	88	38 875	41 626	93
Electric Power Generation, Transmission and Distribution	69	78	88	72 270	74 929	96
Natural Gas Distribution	12	13	92	12 659	12 727	99
Food	149	186	80	61 506	72 004	85
Beverage and Tobacco Products	80	93	86	18 047	19 943	90
Wood Products	179	222	81	34 921	44 373	79
Pulp, Paper and Paperboard Mills	122	137	89	49 371	55 699	89
Petroleum and Coal Products	40	43	93	8 118	8 437	96
Chemicals	267	301	89	47 968	53 683	89
Non-Metallic Mineral Products	88	115	77	14 342	17 433	82
Primary Metals	205	241	85	76 186	84 593	90
Fabricated Metal Products	108	145	74	32 864	41 395	79
Transportation Equipment	110	133	83	132 904	148 412	90
Pipeline Transportation	45	48	94	83 544	84 966	98
Other manufacturing	542	672	81	219 226	264 100	83
Total	**2 280**	**2 750**	**83**	**933 072**	**1 060 829**	**88**
Province/Territory	Responses	**Total[1]**	Response as a percentage of total[1]	Number of employees	**Total[1]**	Response as a percentage of total[1]
Newfoundland and Labrador	29	32	91	9 929	10 175	98
Prince Edward Island	10	14	71	2 155	2 675	81
Nova Scotia	38	51	75	15 503	17 456	89
New Brunswick	50	62	81	17 670	20 489	86
Quebec	543	674	81	224 615	259 425	87
Ontario	995	1 186	84	424 226	480 068	88
Manitoba	85	100	85	37 538	42 454	88
Saskatchewan	62	67	93	38 582	39 367	98
Alberta	258	311	83	103 119	115 237	89
British Columbia	197	239	82	57 352	70 755	81
Yukon Territory, Northwest Territories and Nunavut	13	14	93	2 383	2 728	87
Canada	**2 280**	**2 750**	**83**	**933 072**	**1 060 829**	**88**

Note:
1. The total excludes out of scope establishments, mergers, closed and/or sold establishments, etc.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table 3.3.2
Imputation for non-response as a share of total environmental protection expenditures by industry and by province and territory, 2000

Industry	Imputed value as a percentage of total value (including the imputation value)
Logging	21.3
Oil and Gas Extraction	7.7
Mining	9.5
Electric Power Generation, Transmission and Distribution	0.3
Natural Gas Distribution	0.3
Food	13.7
Beverage and Tobacco Products	9.5
Wood Products	13.7
Pulp, Paper and Paperboard Mills	11.0
Petroleum and Coal Products	2.4
Chemicals	7.2
Non-Metallic Mineral Products	18.7
Primary Metals	8.6
Fabricated Metal Products	20.4
Transportation Equipment	10.5
Pipeline Transportation	0.6
Other manufacturing	11.7
Total	**8.3**

Province/Territory	Imputed value as a percentage of total value (including the imputation value)
Newfoundland and Labrador	2.3
Prince Edward Island	21.6
Nova Scotia	9.5
New Brunswick	2.8
Quebec	10.9
Ontario	6.9
Manitoba	12.3
Saskatchewan	0.5
Alberta	7.5
British Columbia	15.5
Yukon Territory, Northwest Territories and Nunavut	10.5
Canada	**8.3**

Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table 3.3.3
Imputation for Non Response as a Share of Total Environmental Protection Expenditures by Industry and by Category, 2000

Expenditure category excluding other manufacturing industries	Imputed value as a percentage of total value (including the imputation value)
Environmental monitoring - Operating	7.5
Environmental monitoring - Capital	9.5
Environmental monitoring - Total	7.8
Environmental assessments and audits - Operating	7.9
Environmental assessments and audits - Capital	5.3
Environmental assessments and audits - Total	7.0
Site reclamation and decommissioning - Operating	6.7
Site reclamation and decommissioning - Capital	10.1
Site reclamation and decommissioning - Total	7.6
Protection and restoration of wildlife and habitat - Operating	15.4
Protection and restoration of wildlife and habitat - Capital	10.5
Protection and restoration of wildlife and habitat - Total	14.7
Treatment and control of pollution (end-of-pipe processes) - Operating	8.3
Treatment and control of pollution (end-of-pipe processes) - Capital	7.5
Treatment and control of pollution (end-of-pipe processes) - Total	8.0
Pollution prevention (integrated processes) - Operating	7.7
Pollution prevention (integrated processes) - Capital	8.9
Pollution prevention (integrated processes) - Total	8.5
Environmental charges - Operating	8.8
Other environmental protection expenditures - Operating	5.8
Total expenditures on environmental protection - Operating	**8.1**
Total expenditures on environmental protection - Capital	**8.3**
Total expenditures on environmental protection - Total	**8.2**
Other manufacturing	
Pollution abatement and control expenditures - Operating	12.8
Pollution abatement and control expenditures - Capital	10.0
Pollution abatement and control expenditures - Total	11.9
Other environmental protection expenditures - Operating	9.9
Other environmental protection expenditures - Capital	10.4
Other environmental protection expenditures - Total	10.0
Total expenditures on environmental protection - Operating	**12.5**
Total expenditures on environmental protection - Capital	**10.0**
Total expenditures on environmental protection - Total	**11.7**

Source:
Statistics Canada, Environment Accounts and Statistics Division.

Annex A

Environmental Protection Expenditure Tables

Table A.1
Capital expenditures on environmental protection by industry, 2000

Industry	Pollution prevention, abatement and control expenditures (PPAC)[1]	Other environmental protection expenditures[2]	**Total**	Share of total
	million dollars			percent
Logging	1.3	3.6	**4.8**	0.2
Oil and Gas Extraction	371.4	93.7	**465.1**	21.4
Mining	134.0	8.6	**142.6**	6.5
Electric Power Generation, Transmission and Distribution	141.9	40.6	**182.4**	8.4
Natural Gas Distribution	1.3	1.5	**2.8**	0.1
Food	76.6	9.7	**86.3**	4.0
Beverage and Tobacco Products	3.6	0.8	**4.4**	0.2
Wood Products	115.5	7.8	**123.3**	5.7
Pulp, Paper and Paperboard Mills	229.5	5.4	**234.8**	10.8
Petroleum and Coal Products	211.0	3.6	**214.6**	9.9
Chemicals	132.7	14.9	**147.6**	6.8
Non-Metallic Mineral Products	100.7	5.7	**106.3**	4.9
Primary Metals	102.6	2.7	**105.3**	4.8
Fabricated Metal Products[3]	14.2	0.7	**14.9**	0.7
Transportation Equipment	201.8	1.3	**203.1**	9.3
Pipeline Transportation	28.5	5.4	**33.9**	1.6
Capital expenditures, excluding 'other manufacturing'	**1 866.5**	**206.0**	**2 072.5**	**95.2**
Other manufacturing	100.9	4.4	**105.4**	4.8
Total	**1 967.4**	**210.4**	**2 177.9**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
1. Capital expenditures on pollution prevention, abatement and control (PPAC) include capital expenditures on pollution abatement and control (PAC) processes (also referred to as end-of-pipe processes), pollution prevention processes and environmental monitoring.
2. Capital expenditures on other environmental protection include capital expenditures on environmental assessments and audits, site reclamation and decommissioning, and wildlife and habitat protection.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.2
Capital expenditures on environmental protection by province and territory, 2000

Province/Territory	Pollution prevention, abatement and control expenditures (PPAC)[1]	Other environmental protection expenditures[2]	**Total**	Share of total
	million dollars			percent
Newfoundland and Labrador	26.2	6.9	**33.1**	1.5
Prince Edward Island	0.7	0.0	**0.7**	0.0
Nova Scotia	26.3	2.6	**28.9**	1.3
New Brunswick	203.9	1.7	**205.6**	9.4
Quebec	360.8	34.0	**394.8**	18.1
Ontario	562.4	25.5	**587.9**	27.0
Manitoba	53.3	24.7	**78.0**	3.6
Saskatchewan	93.7	3.9	**97.6**	4.5
Alberta	472.0	100.6	**572.6**	26.3
British Columbia	151.9	8.9	**160.8**	7.4
Yukon Territory, Northwest Territories and Nunavut	16.3	1.6	**18.0**	0.8
Canada	**1 967.4**	**210.4**	**2 177.9**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
This table includes the 'other manufacturing' industry category.
1. Capital expenditures on pollution prevention, abatement and control (PPAC) include capital expenditures on pollution abatement and control (PAC) processes (also referred to as end-of-pipe processes), pollution prevention processes and environmental monitoring.
2. Capital expenditures on other environmental protection include capital expenditures on environmental assessments and audits, site reclamation and decommissioning, and wildlife and habitat protection.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.3
Capital expenditures on environmental protection by type of activity and industry, 2000

Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	**Total**	Share of total
	million dollars							percent
Logging	0.0	0.1	0.1	3.4	0.1	1.2	**4.8**	0.2
Oil and Gas Extraction	11.8	14.1	73.8	5.9	244.8	114.8	**465.1**	21.4
Mining	1.5	0.8	5.0	2.9	65.0	67.4	**142.6**	6.5
Electric Power Generation, Transmission and Distribution[1]	7.8	36.5	..	4.0	56.0	78.1	**182.4**	8.4
Natural Gas Distribution	0.2	1.0	0.3	0.2	0.5	0.6	**2.8**	0.1
Food	3.3	4.8	4.7	0.2	45.5	27.8	**86.3**	4.0
Beverage and Tobacco Products	0.2	0.0	0.2	0.5	0.9	2.5	**4.4**	0.2
Wood Products[1]	1.3	6.7	..	1.0	51.2	63.1	**123.3**	5.7
Pulp, Paper and Paperboard Mills	3.2	0.9	2.7	1.8	85.8	140.4	**234.8**	10.8
Petroleum and Coal Products	1.6	0.3	3.0	0.3	119.1	90.3	**214.6**	9.9
Chemicals	4.5	1.1	13.4	0.4	60.6	67.5	**147.6**	6.8
Non-Metallic Mineral Products	2.0	2.4	3.3	0.0	85.5	13.2	**106.3**	4.9
Primary Metals	1.9	0.5	1.8	0.4	37.1	63.6	**105.3**	4.8
Fabricated Metal Products[2]	0.6	0.1	0.5	0.1	5.7	7.9	**14.9**	0.7
Transportation Equipment	0.2	0.5	0.8	0.0	13.7	187.9	**203.1**	9.3
Pipeline Transportation	1.3	1.9	3.0	0.6	9.9	17.4	**33.9**	1.6
Capital expenditures, excluding 'other manufacturing'	**41.4**	**71.7**	**112.5**	**21.8**	**881.4**	**943.7**	**2 072.5**	**95.2**
Other manufacturing[3]	..	..	..	..	..	..	**105.4**	4.8
Total	**..**	**..**	**..**	**..**	**..**	**..**	**2 177.9**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
1. Capital expenditures on reclamation and decommissioning are included with capital expenditures on environmental assessments and audits.
2. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
3. Detail of the expenditure breakdown by type of environmental protection activity is only available for the listed industries.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.4
Capital expenditures on environmental protection by type of activity and province and territory, 2000

Province/Territory	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	**Total**	Share of total
	million dollars							percent
Newfoundland and Labrador	1.2	x	x	x	16.6	8.3	**33.1**	1.6
Prince Edward Island	0.0	x	0.0	x	0.2	0.5	**0.7**	0.0
Nova Scotia	0.6	0.8	1.5	0.2	12.1	12.3	**27.5**	1.3
New Brunswick	1.0	0.5	0.9	0.3	110.9	91.1	**204.6**	9.9
Quebec	8.2	23.6	6.5	2.1	165.0	139.6	**345.1**	16.7
Ontario	10.8	3.8	17.3	2.3	173.8	338.5	**546.6**	26.4
Manitoba	1.1	x	2.8	x	11.6	38.1	**75.3**	3.6
Saskatchewan	0.6	1.5	2.2	0.1	13.4	78.9	**96.7**	4.7
Alberta	15.3	20.2	73.6	6.6	294.0	159.3	**569.1**	27.5
British Columbia	2.5	1.2	3.5	4.0	81.6	63.2	**156.0**	7.5
Yukon Territory, Northwest Territories and Nunavut	0.2	x	x	x	2.3	13.9	**18.0**	0.9
Canada	**41.4**	**71.7**	**112.5**	**21.8**	**881.4**	**943.7**	**2 072.5**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
This table excludes the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.5
Operating expenditures on environmental protection by industry, 2000

Industry	Pollution prevention, abatement and control expenditures (PPAC)[1]	Other environmental protection expenditures[2]	Total	Share of total
	million dollars			percent
Logging	11.4	149.9	**161.4**	4.9
Oil and Gas Extraction	136.6	188.1	**324.7**	9.9
Mining	169.5	98.1	**267.6**	8.2
Electric Power Generation, Transmission and Distribution	144.3	111.5	**255.8**	7.8
Natural Gas Distribution	2.3	3.8	**6.1**	0.2
Food	111.4	29.4	**140.7**	4.3
Beverage and Tobacco Products	16.3	7.1	**23.4**	0.7
Wood Products	88.8	54.9	**143.7**	4.4
Pulp, Paper and Paperboard Mills	382.2	43.3	**425.4**	13.0
Petroleum and Coal Products	168.4	44.6	**212.9**	6.5
Chemicals	179.1	52.9	**232.0**	7.1
Non-Metallic Mineral Products	30.4	13.2	**43.6**	1.3
Primary Metals	432.0	58.6	**490.6**	15.0
Fabricated Metal Products[3]	61.1	8.4	**69.6**	2.1
Transportation Equipment	141.6	28.6	**170.2**	5.2
Pipeline Transportation	21.7	39.3	**61.0**	1.9
Operating expenditures, excluding 'other manufacturing'	**2 097.2**	**931.7**	**3 028.9**	**92.6**
Other manufacturing	218.1	23.6	**241.7**	7.4
Total	**2 315.3**	**955.3**	**3 270.6**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
1. Operating expenditures on pollution prevention, abatement and control (PPAC) include operating expenditures on pollution abatement and control (PAC) processes (also referred to as end-of-pipe processes), pollution prevention processes, environmental monitoring, and purchase of waste management and sewerage services.
2. Operating expenditures on other environmental protection include operating expenditures on environmental assessments and audits, site reclamation and decommissioning, wildlife and habitat protection, fees, fines and licences, and other environmental activities.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.6
Operating expenditures on environmental protection by province and territory, 2000

Province/Territory	Pollution prevention, abatement and control expenditures (PPAC)[1]	Other environmental protection expenditures[2]	Total	Share of total
	million dollars			percent
Newfoundland and Labrador	34.6	9.7	**44.3**	1.4
Prince Edward Island	2.6	0.5	**3.1**	0.1
Nova Scotia	37.5	15.8	**53.3**	1.6
New Brunswick	85.2	21.4	**106.6**	3.3
Quebec	559.7	151.4	**711.2**	21.7
Ontario	917.1	223.9	**1 141.0**	34.9
Manitoba	64.9	18.4	**83.3**	2.5
Saskatchewan	79.0	36.8	**115.7**	3.5
Alberta	299.4	263.5	**562.9**	17.2
British Columbia	217.6	203.4	**421.1**	12.9
Yukon Territory, Northwest Territories and Nunavut	17.7	10.4	**28.0**	0.9
Canada	**2 315.3**	**955.3**	**3 270.6**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
This table includes the 'other manufacturing' industry category.
1. Operating expenditures on pollution prevention, abatement and control (PPAC) include operating expenditures on pollution abatement and control (PAC) processes (also referred to as end-of-pipe processes), pollution prevention processes, environmental monitoring, and purchase of waste management and sewerage services.
2. Operating expenditures on other environmental protection include operating expenditures on environmental assessments and audits, site reclamation and decommissioning, wildlife and habitat protection, fees, fines and licences, and other environmental activities.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.7
Operating expenditures on environmental protection by type of activity and industry, 2000

Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe), waste management and sewerage services	Pollution prevention processes	Fees, fines and licences	Other	**Total**	Share of total
	million dollars									percentage
Logging	3.8	9.4	29.6	106.4	3.8	3.8	1.2	3.4	**161.4**	4.9
Oil and Gas Extraction	19.7	15.0	117.4	3.0	81.2	35.7	12.9	39.7	**324.7**	9.9
Mining	25.5	14.4	53.2	4.1	99.9	44.1	8.7	17.7	**267.6**	8.2
Electric Power Generation, Transmission and Distribution	9.1	16.4	23.0	6.8	106.3	28.9	10.5	54.9	**255.8**	7.8
Natural Gas Distribution[1]	0.2	0.3	0.5	..	1.7	0.4	0.1	3.0	**6.1**	0.2
Food	15.5	3.6	7.6	0.5	84.8	11.1	13.4	4.2	**140.7**	4.3
Beverage and Tobacco Products[1]	1.1	1.1	0.0	..	14.0	1.1	4.7	1.3	**23.4**	0.7
Wood Products	8.5	5.0	18.8	17.5	69.1	11.2	7.7	5.9	**143.7**	4.4
Pulp, Paper and Paperboard Mills	51.1	5.1	12.2	6.8	263.3	67.7	6.0	13.3	**425.4**	13.0
Petroleum and Coal Products	7.3	7.0	11.2	0.9	85.6	75.5	9.6	15.9	**212.9**	6.5
Chemicals	29.9	6.3	22.5	1.1	106.9	42.4	1.8	21.3	**232.0**	7.1
Non-Metallic Mineral Products	2.9	1.9	5.0	0.7	21.4	6.1	2.8	2.8	**43.6**	1.3
Primary Metals	40.4	8.6	28.4	2.0	327.2	64.4	4.3	15.3	**490.6**	15.0
Fabricated Metal Products[2]	3.1	1.5	1.5	0.1	52.8	5.2	0.4	5.0	**69.6**	2.1
Transportation Equipment	6.5	4.6	2.5	0.1	119.3	15.8	1.5	19.9	**170.2**	5.2
Pipeline Transportation	5.2	6.8	18.2	3.9	6.4	10.1	3.8	6.5	**61.0**	1.9
Operating expenditures, excluding 'other manufacturing'	**229.8**	**106.8**	**351.7**	**153.8**	**1 443.8**	**423.6**	**89.3**	**230.0**	**3 028.9**	**92.6**
Other manufacturing[3]	..	..	..	..	..	..	..	..	**241.7**	7.4
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**3 270.6**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
1. Operating expenditures on wildlife and habitat protection are included with operating expenditures on other.
2. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
3. Detail of the expenditure breakdown by type of environmental protection activity is only available for the listed industries.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.8
Operating expenditures on environmental protection by type of activity and province and territory, 2000

Province/Territory	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe), waste management and sewerage services	Pollution prevention processes	Fees, fines and licences	Other	**Total**	Share of total
	million dollars									percent
Newfoundland and Labrador	3.0	2.2	2.6	1.7	14.4	17.0	0.6	2.6	**44.1**	1.5
Prince Edward Island[1]	0.9	0.1	0.0	..	1.3	0.4	0.1	0.3	**3.1**	0.1
Nova Scotia	2.8	1.6	2.7	2.7	25.3	5.9	1.8	6.3	**49.1**	1.6
New Brunswick	8.6	1.8	7.7	5.7	54.9	20.1	1.9	4.0	**104.8**	3.5
Quebec	57.1	22.7	49.2	17.9	335.4	83.7	11.8	42.2	**619.9**	20.5
Ontario	64.2	24.5	64.8	33.2	609.9	144.4	21.9	67.3	**1 030.2**	34.0
Manitoba	6.6	1.5	3.7	0.9	29.3	20.1	5.9	5.8	**73.9**	2.4
Saskatchewan	7.2	6.0	15.8	1.1	54.4	16.0	6.7	7.0	**114.2**	3.8
Alberta	39.2	24.1	134.2	22.0	173.0	77.4	20.5	61.8	**552.2**	18.2
British Columbia	35.6	18.2	69.0	68.4	138.0	33.3	16.5	30.3	**409.2**	13.5
Yukon Territory, Northwest Territories and Nunavut	4.5	4.2	2.0	0.3	7.9	5.3	1.5	2.3	**28.0**	0.9
Canada	**229.8**	**106.8**	**351.7**	**153.8**	**1 443.8**	**423.6**	**89.3**	**230.0**	**3 028.9**	**100.0**

Notes:
Figures may not add up to totals due to rounding.
This tables excludes the 'other manufacturing' industry category.
1. Operating expenditures on wildlife and habitat protection are included with operating expenditures on other.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.9
Total expenditures on pollution abatement and control and pollution prevention by region and industry, 2000

Industry	Atlantic Provinces[1]		Quebec		Ontario		Western Provinces[2]		British Columbia and Territories		Canada
	Pollution abatement and control	Pollution prevention	Pollution abatement and control	Pollution prevention	Pollution abatement and control	Pollution prevention	Pollution abatement and control	Pollution prevention	Pollution abatement and control	Pollution prevention	Total
	million dollars										
Logging	0.3	0.4	0.2	0.3	0.5	0.7	0.1	0.2	2.8	3.5	**8.9**
Oil and Gas Extraction	x	x	0.0	0.0	x	x	308.8	138.4	x	x	**476.6**
Mining	4.2	21.1	36.4	17.9	43.6	17.2	46.0	30.3	34.7	25.0	**276.5**
Electric Power Generation, Transmission and Distribution	x	0.5	x	x	x	x	31.0	26.7	x	x	**269.3**
Natural Gas Distribution	0.0	0.0	0.0	x	x	x	1.3	0.6	x	x	**3.2**
Food	5.7	1.7	25.5	6.7	60.2	15.4	28.5	12.2	10.4	2.8	**169.1**
Beverage and Tobacco Products	0.9	0.1	x	x	5.0	1.7	4.1	0.4	2.0	0.3	**18.6**
Wood Products	9.8	4.6	45.4	42.5	10.7	5.8	16.7	5.2	37.8	16.2	**194.6**
Pulp, Paper and Paperboard Mills	54.1	18.4	128.6	47.1	59.6	34.5	20.7	76.9	86.1	31.2	**557.3**
Petroleum and Coal Products	x	x	14.3	15.5	31.9	29.4	29.4	19.6	x	x	**370.5**
Chemicals	0.5	0.4	26.2	26.4	77.9	47.1	60.9	34.9	2.0	1.1	**277.4**
Non-Metallic Mineral Products	3.7	0.9	42.7	5.7	51.5	10.1	3.9	1.4	5.0	1.2	**126.2**
Primary Metals	x	x	126.8	44.9	208.7	48.5	9.4	15.4	x	x	**492.3**
Fabricated Metal Products[3]	1.3	0.3	11.8	3.1	38.3	7.6	5.6	1.7	1.5	0.3	**71.6**
Transportation Equipment	2.2	3.6	15.4	7.6	106.3	182.7	5.4	4.4	3.7	5.3	**336.7**
Pipeline Transportation	x	x	x	x	x	4.5	3.9	21.5	x	0.9	**43.7**
Canada	**235.5**	**155.6**	**500.5**	**223.3**	**783.7**	**482.9**	**575.7**	**389.9**	**229.7**	**115.7**	**3692.5**

Notes:
Figures may not add up to totals due to rounding.
This table excludes the 'other manufacturing' industry category.
1. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.
2. Includes Manitoba, Saskatchewan and Alberta.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.10
Distribution of capital expenditures on pollution abatement and control (end-of-pipe) by medium and industry, 2000

Industry	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Total
	million dollars				
Logging	0.1	0.0	0.0	0.0	**0.1**
Oil and Gas Extraction	x	x	x	x	**244.8**
Mining	x	32.5	29.2	x	**65.0**
Electric Power Generation, Transmission and Distribution	15.9	18.2	x	x	**56.0**
Natural Gas Distribution	x	0.0	x	0.0	**0.5**
Food	7.0	32.9	5.0	0.6	**45.5**
Beverage and Tobacco Products	x	x	x	x	**0.9**
Wood Products	43.7	0.5	6.8	0.3	**51.2**
Pulp, Paper and Paperboard Mills	24.0	47.0	14.7	0.2	**85.8**
Petroleum and Coal Products	93.3	19.2	5.2	1.4	**119.1**
Chemicals	35.0	14.4	6.0	5.3	**60.6**
Non-Metallic Mineral Products	72.6	4.7	0.2	8.0	**85.5**
Primary Metals	22.0	9.8	4.9	0.3	**37.1**
Fabricated Metal Products[1]	x	1.2	2.0	x	**5.7**
Transportation Equipment	6.2	6.8	0.5	0.2	**13.7**
Pipeline Transportation	x	x	0.6	x	**9.9**
Total	**560.4**	**194.8**	**98.2**	**27.9**	**881.4**

Notes:
Figures may not add up to totals due to rounding.
This table excludes capital expenditures on the environmental monitoring category.
1. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.11
Distribution of capital expenditures on pollution abatement and control (end-of-pipe) by medium and province and territory, 2000

Province/Territory	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	**Total**
			million dollars		
Newfoundland and Labrador	x	x	0.9	0.3	**16.6**
Prince Edward Island	0.1	0.1	0.0	0.0	**0.2**
Nova Scotia	2.2	1.5	8.3	0.1	**12.1**
New Brunswick	x	x	1.7	0.2	**110.9**
Quebec	81.3	55.9	23.7	4.1	**165.0**
Ontario	71.9	68.3	17.4	16.3	**173.8**
Manitoba	4.9	3.0	x	x	**11.6**
Saskatchewan	1.7	5.3	x	x	**13.4**
Alberta	256.9	15.7	17.3	4.1	**294.0**
British Columbia	44.9	15.4	20.3	0.9	**81.6**
Yukon Territory, Northwest Territories and Nunavut	0.1	1.7	x	x	**2.3**
Canada	**560.4**	**194.8**	**98.2**	**27.9**	**881.4**

Notes:
Figures may not add up to totals due to rounding.
This table excludes capital expenditures on the environmental monitoring category.
The distribution of capital expenditures on pollution abatement and control (end-of-pipe) do not include the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.12
Distribution of capital expenditures on pollution prevention by medium and industry, 2000

Industry	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Other	**Total**
			million dollars			
Logging	x	0.5	0.4	0.0	x	**1.2**
Oil and Gas Extraction	62.0	29.5	17.5	3.2	2.5	**114.8**
Mining	21.5	23.8	21.8	x	x	**67.4**
Electric Power Generation, Transmission and Distribution	52.6	20.7	3.9	x	x	**78.1**
Natural Gas Distribution	x	x	x	x	x	**0.6**
Food	14.5	8.2	2.4	1.0	1.8	**27.8**
Beverage and Tobacco Products	0.1	0.8	1.4	0.0	0.2	**2.5**
Wood Products	16.4	3.2	40.4	0.2	2.9	**63.0**
Pulp, Paper and Paperboard Mills	65.7	42.5	21.0	0.0	11.3	**140.4**
Petroleum and Coal Products	x	x	x	0.4	2.3	**90.3**
Chemicals	x	32.3	13.8	x	x	**67.5**
Non-Metallic Mineral Products	9.1	1.9	1.3	0.5	0.3	**13.2**
Primary Metals	23.8	9.6	25.6	1.1	3.5	**63.6**
Fabricated Metal Products[1]	3.2	1.2	0.4	0.3	2.8	**7.9**
Transportation Equipment	108.8	62.2	8.2	0.0	8.7	**187.9**
Pipeline Transportation	7.5	7.9	x	x	x	**17.4**
Total	**482.8**	**248.6**	**164.8**	**8.4**	**39.1**	**943.7**

Notes:
Figures may not add up to totals due to rounding.
This table excludes capital expenditures on the environmental monitoring category.
1. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.13
Distribution of capital expenditures on pollution prevention by medium and province and territory, 2000

Province/Territory	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Other	**Total**
			million dollars			
Newfoundland and Labrador	x	3.7	1.1	x	x	**8.3**
Prince Edward Island	0.2	0.1	0.1	0.0	0.0	**0.5**
Nova Scotia	x	1.2	2.7	0.0	x	**12.3**
New Brunswick	x	x	13.3	0.0	x	**91.1**
Quebec	41.7	37.3	54.6	0.7	5.4	**139.6**
Ontario	173.1	111.3	37.1	1.2	15.9	**338.5**
Manitoba	28.4	8.1	1.1	0.1	0.5	**38.1**
Saskatchewan	66.4	4.7	7.1	x	x	**78.9**
Alberta	72.0	52.5	26.9	4.7	3.2	**159.3**
British Columbia	23.5	13.6	19.5	1.1	5.5	**63.2**
Yukon Territory, Northwest Territories and Nunavut	x	x	1.3	x	x	**13.9**
Canada	**482.8**	**248.6**	**164.8**	**8.4**	**39.1**	**943.7**

Notes:
Figures may not add up to totals due to rounding.
This table excludes the 'other manufacturing' industry category.
This table excludes capital expenditures on the environmental monitoring category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Annex B

Environmental Management and Technology Tables

Table B.1
Use of environmental management practices by business, 2000

Environmental management practice	Establishments using the practice	Proportion of establishments using the practice[1]	Employment share of establishments using the practice
	number	percent	
Environmental management system	1 117	52	69
Life cycle analysis or Design for Environment	222	10	23
ISO 14000 Certification	239	11	22
Environmental voluntary agreements	607	29	48
Green procurement policy	280	13	20
Eco-labelling of products	107	5	6
Annual environmental performance report	814	38	56
Other	78	10	11
Total	**1 576**	**72[2]**	**85[2]**

Notes:
This table includes reported data only.
This table includes the 'other manufacturing' industry category, therefore, comparisons with previous survey years should be made with caution.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
2. Number of establishments indicating they used at least one environmental practice as a percentage of the total number of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.2
Distribution of environmental management practices by industry, 2000

Industry	Environmental management system	Life cycle analysis	ISO 14000 certification	Environmental voluntary agreements	Green procurement policy	Eco-labelling of products	Annual environmental performance report	Other	**Total[2]**
	percent[1]								
Logging	76	2	50	26	9	17	61	12	**86**
Oil and Gas Extraction	82	23	10	82	27	5	62	13	**92**
Mining	66	16	3	49	16	2	67	20	**84**
Electric Power Generation, Transmission and Distribution	53	14	17	47	18	8	44	14	**73**
Natural Gas Distribution	91	30	0	82	46	10	80	x	**100**
Food	48	10	4	10	14	3	25	10	**64**
Beverage and Tobacco Products	41	1	3	23	7	1	36	10	**67**
Wood Products	42	5	11	23	13	11	38	7	**63**
Pulp, Paper and Paperboard Mills	65	12	25	57	11	11	71	15	**89**
Petroleum and Coal Products	71	36	15	46	13	24	61	15	**80**
Chemicals	60	15	5	36	14	7	46	14	**78**
Non-Metallic Mineral Products	60	8	2	18	17	4	36	9	**78**
Primary Metals	55	9	11	34	10	1	38	8	**74**
Fabricated Metal Products[3]	41	8	7	13	8	6	15	5	**57**
Transportation Equipment	65	16	30	20	19	0	33	11	**76**
Pipeline Transportation	81	14	0	93	14	0	86	0	**100**
Total, excluding 'other manufacturing'	**58**	**12**	**11**	**34**	**14**	**6**	**45**	**11**	**75**
Other manufacturing	32	7	10	10	12	3	17	8	**60**
Total	**52**	**10**	**11**	**29**	**13**	**5**	**38**	**10**	**72**

Notes:
This table includes reported data only.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
2. Number of establishments indicating they used at least one environmental practice as a percentage of the total number of establishments that provided a response.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.3
Distribution of environmental management practices by province and territory, 2000

Province/Territory	Environmental management system	Life cycle analysis	ISO 14000 certification	Environmental voluntary agreements	Green procurement policy	Eco-labelling of products	Annual environmental performance report	Other	**Total[2]**
	percent[1]								
Newfoundland and Labrador	61	15	11	30	18	0	41	0	**68**
Prince Edward Island	33	22	0	11	0	0	44	0	**56**
Nova Scotia	56	3	8	41	9	9	33	7	**69**
New Brunswick	52	13	13	33	9	13	62	31	**78**
Quebec	44	10	10	25	7	4	27	8	**66**
Ontario	50	11	11	24	15	4	35	10	**70**
Manitoba	32	6	2	22	14	3	34	10	**67**
Saskatchewan	72	7	5	43	4	4	60	25	**83**
Alberta	68	14	8	52	21	7	53	10	**84**
British Columbia	62	5	23	28	13	11	52	11	**75**
Yukon Territory, Northwest Territories and Nunavut	64	25	0	50	18	18	83	25	**92**
Total	**52**	**10**	**11**	**29**	**13**	**5**	**38**	**10**	**72**

Notes:
This table includes reported data only.
This table includes the 'other manufacturing' industry category, therefore, comparisons with previous survey years should be made with caution.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
2. Number of establishments indicating they used at least one environmental practice as a percentage of the total number of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.4
Distribution of environmental management practices by establishment size, 2000

Number of employees per establishment	Environmental management system	Life cycle analysis	ISO 14000 certification	Environmental voluntary agreements	Green procurement policy	Eco-labelling of products	Annual environment performance report	Other	**Percentage of total employees**
	percent[1]								percent[2]
<100	42	8	6	24	13	4	33	11	**64**
100 - 499	59	10	11	32	12	7	43	10	**78**
500 - 999	70	21	18	50	19	6	63	15	**89**
>999	88	25	27	69	25	4	73	17	**98**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
2. Employment of establishments indicating they used at least one environmental practice, as a percentage of total employment of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.5
Pollution prevention methods by industry, 2000

Industry	Product design or reformulation	Equipment or process modifications	Recirculation, recovery, reuse or recycling	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or training	Other	**Total[2]**
	percent[1]								
Logging	0	24	46	20	35	79	78	28	**89**
Oil and Gas Extraction	18	86	76	36	58	96	91	26	**97**
Mining	10	40	84	33	51	92	92	18	**97**
Electric Power Generation, Transmission and Distribution	21	40	62	39	55	79	84	19	**79**
Natural Gas Distribution	25	78	56	0	56	100	82	0	**89**
Food	22	46	61	26	36	65	72	12	**95**
Beverage and Tobacco Products	6	41	52	11	33	76	80	10	**90**
Wood Products	24	47	70	27	42	67	75	17	**92**
Pulp, Paper and Paperboard Mills	17	68	83	36	34	87	89	16	**87**
Petroleum and Coal Products	48	54	76	34	44	91	94	6	**91**
Chemicals	40	54	77	40	45	82	88	15	**97**
Non-Metallic Mineral Products	22	48	73	31	40	66	76	22	**94**
Primary Metals	16	57	76	34	33	78	80	10	**89**
Fabricated Metal Products[3]	13	39	60	29	34	68	77	15	**98**
Transportation Equipment	33	59	69	53	58	82	88	22	**100**
Pipeline Transportation	40	49	49	35	55	98	95	11	**88**
Total, excluding 'other manufacturing'	**24**	**52**	**70**	**33**	**43**	**79**	**83**	**16**	**91**
Other manufacturing	26	40	56	37	41	55	67	11	84
Total	**24**	**48**	**67**	**34**	**42**	**73**	**79**	**14**	**89**

Notes:
This table includes reported data only.
1. Number of establishments indicating they used the pollution prevention method as a percentage of all establishments that provided a response.
2. Number of establishments that indicated they used at least one pollution prevention method as a percentage of the total number of establishments that provided a response.
3. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.6
Pollution prevention methods by province and territory, 2000

Province/Territory	Product design or reformulation	Equipment or process modifications	Recirculation, recovery, reuse or recycling	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or training	Other	**Total[2]**
	percent[1]								
Newfoundland and Labrador	27	38	57	39	40	67	68	18	**74**
Prince Edward Island	33	75	80	25	33	80	80	..	**83**
Nova Scotia	16	59	80	43	62	73	82	7	**94**
New Brunswick	13	63	73	24	36	80	82	25	**91**
Quebec	16	40	64	33	33	66	67	14	**87**
Ontario	30	49	65	36	45	72	82	13	**89**
Manitoba	35	54	63	38	49	65	82	14	**89**
Saskatchewan	16	47	77	36	42	80	86	15	**91**
Alberta	26	60	73	35	52	87	89	17	**95**
British Columbia	18	48	66	27	35	79	82	22	**89**
Yukon Territory, Northwest Territories and Nunavut	29	29	89	14	50	100	100	25	**100**
Total	**24**	**48**	**67**	**34**	**42**	**73**	**79**	**14**	**89**

Notes:
This table includes reported data only.
This table includes the 'other manufacturing' industry category, therefore, comparisons with previous survey years should be made with caution.
1. Number of establishments indicating they used the pollution prevention method as a percentage of all establishments that provided a response.
2. Number of establishments that indicated they used at least one pollution prevention method as a percentage of the total number of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.
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Table B.7
Distribution of pollution prevention methods by establishment size, 2000

Number of employees per establishment	Product design or reformulation	Equipment or process modifications	Recirculation, recovery, reuse or recycling	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or training	Other	**Percentage of total employees**
	percent[1]								**percent[2]**
<100	23	42	61	27	40	71	76	13	**86**
100 - 499	22	50	72	31	41	80	85	16	**93**
500 - 999	25	70	79	42	46	85	86	22	**94**
>999	39	71	78	56	62	94	94	20	**99**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Number of establishments indicating they used the pollution prevention method as a percentage of all establishments that provided a response.
2. Employment of establishments indicating they used at least one pollution prevention method, as a percentage of total employment of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.8
Energy conservation processes and technologies by industry, 2000

						Renewable energy source					
Industry	Cogeneration	Energy efficient equipment	Fuel substitution	Clean fuel system	Waste-to-energy system	Solar power	Wind power	Geothermal	Biomass	Other[1]	**Total[2]**
	percent[3]										
Logging	3	26	3	2	10	0	0	0	6	5	**39**
Oil and Gas Extraction	19	78	40	25	48	35	4	0	0	2	**84**
Mining	2	44	10	10	21	6	0	0	2	16	**74**
Electric Power Generation, Transmission and Distribution	12	51	15	12	12	3	10	0	4	13	**72**
Natural Gas Distribution	0	67	33	42	0	8	0	0	0	0	**83**
Food	5	51	3	17	20	0	0	1	2	8	**69**
Beverage and Tobacco Products	4	31	3	9	6	1	0	0	0	20	**55**
Wood Products	8	33	22	10	26	0	0	0	34	6	**69**
Pulp, Paper and Paperboard Mills	20	45	34	18	45	0	0	0	48	11	**88**
Petroleum and Coal Products	8	48	18	18	38	0	2	0	0	22	**78**
Chemicals	8	42	9	12	20	0	0	0	0	11	**63**
Non-Metallic Mineral Products	0	36	11	9	17	0	0	0	1	11	**57**
Primary Metals	2	35	9	14	11	0	0	0	0	12	**59**
Fabricated Metal Products[4]	2	32	6	7	15	0	0	0	0	13	**50**
Transportation Equipment	2	48	7	9	11	4	0	0	0	17	**69**
Pipeline Transportation	7	54	0	23	39	34	0	0	0	11	**77**
Total	**6**	**42**	**12**	**13**	**21**	**3**	**1**	**0**	**8**	**11**	**66**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Other includes establishments that reported using other energy conservation processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one energy conservation process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
4. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.9
Energy conservation processes and technologies by province and territory, 2000

Province/Territory	Cogeneration	Energy efficient equipment	Fuel substitution	Clean fuel system	Waste-to-energy system	Renewable energy source: Solar power	Renewable energy source: Wind power	Renewable energy source: Geothermal	Renewable energy source: Biomass	Other[1]	**Total[2]**
	percent[3]										
Newfoundland and Labrador	0	32	7	4	14	0	0	0	11	14	**54**
Prince Edward Island	10	50	30	20	50	0	10	0	20	0	**70**
Nova Scotia	3	37	20	7	20	0	0	0	7	23	**70**
New Brunswick	13	51	36	8	28	2	0	0	21	11	**79**
Quebec	2	14	12	20	18	1	0	0	12	14	**55**
Ontario	6	47	8	8	16	1	0	0	4	12	**66**
Manitoba	2	61	18	14	25	2	0	4	9	16	**81**
Saskatchewan	7	60	12	19	21	16	3	0	5	3	**71**
Alberta	12	61	17	19	36	12	2	0	6	6	**77**
British Columbia	10	46	18	8	21	3	0	0	16	9	**67**
Yukon Territory, Northwest Territories and Nunavut	0	33	17	17	67	8	8	0	0	8	**83**
Total	**6**	**42**	**12**	**13**	**21**	**3**	**1**	**0**	**8**	**11**	**66**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Other includes establishments that reported using other energy conservation processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one energy conservation process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.10
Distribution of energy conservation processes and technologies by establishment size, 2000

Number of employees per establishment	Cogeneration	Energy efficient equipment	Fuel substitution	Clean fuel system	Waste-to-energy system	Renewable energy source: Solar power	Renewable energy source: Wind power	Renewable energy source: Geothermal	Renewable energy source: Biomass	Other	**Percentage of total employees**
	percent[1]										**percent[2]**
<100	4	34	9	11	13	2	0	0	3	10	**54**
100 - 499	6	41	12	11	22	2	1	0	10	12	**69**
500 - 999	10	57	20	18	33	5	1	0	12	12	**82**
>999	10	60	19	22	28	14	3	0	6	13	**93**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
2. Employment of establishments indicating they used at least one energy conservation process or technology, as a percentage of total employment of establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.11
Solid waste management processes and technologies by industry, 2000

Industry	Container	Dehydration	Packaging	Modification/ preparation for landfill or waste sites	Compacting	Shredding	Grinding	Crushing	Screening	Degritting	On and off-site recycling	Incineration	Other[1]	Total[2]
						percent[3]								
Logging	44	0	0	26	13	24	3	6	3	0	45	32	6	**85**
Oil and Gas Extraction	85	40	24	62	32	48	7	24	26	4	71	44	9	**97**
Mining	57	0	9	32	16	20	2	7	4	2	68	22	10	**94**
Electric Power Generation, Transmission and Distribution	60	3	8	21	12	40	4	6	0	0	61	15	9	**93**
Natural Gas Distribution	67	0	17	25	8	25	0	0	8	8	75	17	17	**100**
Food	63	8	20	16	54	31	5	5	25	5	54	8	6	**97**
Beverage and Tobacco Products	61	3	22	10	61	47	5	26	17	1	65	4	10	**97**
Wood Products	59	5	9	21	9	31	17	2	13	2	47	30	7	**91**
Pulp, Paper and Paperboard Mills	57	33	9	32	38	11	5	3	17	13	75	41	16	**99**
Petroleum and Coal Products	65	12	22	22	28	35	12	18	8	2	62	12	15	**100**
Chemicals	60	8	17	17	40	34	4	10	2	1	65	24	12	**97**
Non-Metallic Mineral Products	72	12	6	18	24	26	6	18	14	1	60	10	10	**94**
Primary Metals	64	6	10	17	20	23	5	9	11	2	62	8	14	**98**
Fabricated Metal Products[4]	58	9	13	18	31	26	4	2	2	0	54	8	12	**94**
Transportation Equipment	70	7	26	15	61	36	3	9	9	2	74	10	8	**100**
Pipeline Transportation	89	16	25	46	34	48	0	0	2	0	70	46	7	**100**
Total	**63**	**10**	**14**	**22**	**32**	**30**	**6**	**9**	**10**	**3**	**62**	**20**	**10**	**96**

Notes:
This table includes reported data only.
1. Other includes establishments that reported using other solid waste management processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one solid waste management process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
4. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.12
Solid waste management processes and technologies by province and territory, 2000

Province/Territory	Container	Dehydration	Packaging	Modification/ preparation for landfill or waste sites	Compacting	Shredding	Grinding	Crushing	Screening	Degritting	On and off-site recycling	Incineration	Other[1]	Total[2]
						percent[3]								
Newfoundland and Labrador	57	11	11	25	25	18	4	18	11	4	29	25	7	**86**
Prince Edward Island	50	10	30	30	20	10	10	0	20	10	30	40	20	**90**
Nova Scotia	63	7	3	30	17	40	10	20	13	3	73	20	10	**100**
New Brunswick	57	0	13	19	23	47	8	13	13	0	70	30	6	**98**
Quebec	80	15	12	13	26	16	9	5	10	5	52	14	11	**96**
Ontario	58	7	15	17	41	34	4	8	8	2	65	10	11	**97**
Manitoba	53	10	12	23	25	39	7	14	14	5	63	16	9	**96**
Saskatchewan	59	9	17	40	26	28	0	12	7	2	64	28	19	**98**
Alberta	66	14	19	39	24	38	5	11	11	2	69	34	11	**96**
British Columbia	52	6	8	33	26	28	8	12	14	5	62	43	8	**93**
Yukon Territory, Northwest Territories and Nunavut	42	0	25	42	17	25	0	8	0	0	42	67	17	**92**
Total	**63**	**10**	**14**	**22**	**32**	**30**	**6**	**9**	**10**	**3**	**62**	**20**	**10**	**96**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Other includes establishments that reported using other solid waste management processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one solid waste management process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.13
Site reclamation and decommissioning processes and technologies by industry, 2000

Industry	Reforestation/ revegetation	Underground storage tanks handling	Excavation	Solvent extraction systems	Vapour extraction systems	Geomembrane	Injection grouting technology	Soil washing	Reduction	Incineration	Other[1]	**Total[2]**
						percent[3]						
Logging	61	10	37	2	0	14	0	8	2	18	5	**73**
Oil and Gas Extraction	82	71	81	21	37	32	7	24	29	18	10	**93**
Mining	54	16	37	1	1	8	2	1	4	6	10	**78**
Electric Power Generation, Transmission and Distribution	15	16	30	10	8	3	0	2	3	12	8	**49**
Natural Gas Distribution	75	25	75	8	8	8	0	8	0	25	17	**100**
Food	1	1	4	1	1	0	1	0	0	0	9	**15**
Beverage and Tobacco Products	1	5	8	0	1	0	0	0	0	0	3	**16**
Wood Products	15	9	13	4	2	1	0	2	3	5	7	**36**
Pulp, Paper and Paperboard Mills	21	7	14	0	1	4	0	1	0	7	10	**43**
Petroleum and Coal Products	12	12	22	0	12	2	0	0	2	5	15	**38**
Chemicals	4	6	15	4	2	2	0	1	2	1	14	**32**
Non-Metallic Mineral Products	17	8	23	1	0	4	0	1	2	1	3	**40**
Primary Metals	9	11	13	0	2	2	0	0	1	2	11	**34**
Fabricated Metal Products[4]	0	3	6	4	2	1	0	1	0	2	3	**13**
Transportation Equipment	3	7	8	5	6	0	0	0	1	2	8	**24**
Pipeline Transportation	84	57	75	11	30	32	23	0	34	34	4	**95**
Total	**19**	**12**	**20**	**3**	**4**	**5**	**1**	**2**	**3**	**5**	**9**	**40**

Notes:
This table includes reported data only.
1. Other includes establishments that reported using other site reclamation processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one site reclamation process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
4. In 1998, the Fabricated Metal Products Industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.14
Site reclamation and decommissioning processes and technologies by province and territory, 2000

Province/Territory	Reforestation/ revegetation	Underground storage tanks handling	Excavation	Solvent extraction systems	Vapour extraction systems	Geomembrane	Injection grouting technology	Soil washing	Reduction	Incineration	Other[1]	**Total[2]**
						percent[3]						
Newfoundland and Labrador	18	11	29	0	4	4	0	4	4	7	4	**46**
Prince Edward Island	10	0	0	0	0	0	0	0	0	0	0	**10**
Nova Scotia	40	17	37	0	0	0	0	0	0	0	7	**57**
New Brunswick	21	6	28	0	2	0	2	0	0	11	6	**45**
Quebec	13	13	17	2	3	5	1	1	1	4	13	**43**
Ontario	8	5	11	2	1	1	0	0	1	1	7	**26**
Manitoba	16	9	16	4	7	2	2	2	2	5	10	**42**
Saskatchewan	47	17	40	5	16	16	9	5	9	14	9	**69**
Alberta	41	30	43	9	14	12	3	5	13	7	9	**56**
British Columbia	37	14	26	5	4	6	0	6	6	16	8	**56**
Yukon Territory, Northwest Territories and Nunavut	17	25	42	17	17	42	8	0	17	17	25	**75**
Total	**19**	**12**	**20**	**3**	**4**	**5**	**1**	**2**	**3**	**5**	**9**	**40**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
1. Other includes establishments that reported using other site reclamation processes or technologies not elsewhere specified.
2. Number of establishments that indicated they used at least one site reclamation process or technology as a percentage of the total number of establishments that provided a response.
3. Number of establishments indicating they used the process or technology as a percentage of all establishments that provided a response.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table B.15
Distribution of environmental technology use, 2000

Technology	Number of establishments	Proportion of establishments that used each technology
	number	percent
Energy conservation and efficiency		
Cogeneration	106	6
Energy efficient equipment	720	42
Fuel substitution	214	13
Clean fuel system	216	13
Waste energy recovery/reuse (from non-renewable energy sources)	359	21
Renewable energy source		
Solar power	55	3
Wind power	11	1
Geothermal	3	0
Biomass energy	133	8
Other	195	11
Total - energy conservation and efficiency	**1 134**	**66**
Solid waste management		
Container	1 073	63
Dehydration	164	10
Packaging	238	14
Modification or preparation for landfill or waste treatment site	384	22
Compacting	538	31
Shredding	510	30
Grinding	100	6
Crushing	148	9
Screening	174	10
Degritting	47	3
On and off-site recycling	1 055	62
Incineration	339	20
Other	180	11
Total - solid waste management	**1 640**	**96**
Site reclamation and decommissioning		
Reforestation/revegetation	327	19
Underground storage tanks	203	12
Excavation	349	20
Solvent extraction system	58	3
Vapour extraction system	74	4
Geomembrane	81	5
Injection grouting technology	19	1
Soil washing	34	2
Reduction	58	3
Incineration	88	5
Other	151	9
Total - site reclamation	**687**	**40**
Biological treatment		
Microbiologically enhanced recovery of material(s)	43	3
Phytoremediation	14	1
Bioremediation	130	9
Biofiltration	30	2
Natural or constructed wetland	45	3
Bioleaching	5	0
Bio-pulping	1	0
Bio-bleaching	3	0
Biodesulphurization	5	0
Other	84	6
Total - biological treatment	**265**	**17**

Notes:
This table includes reported data only.
This table excludes the 'other manufacturing' industry category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.


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Annex C

Questionnaire


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Environment Accounts and Statistics Division

Survey of Environmental Protection Expenditures, 2000

Confidential when completed

Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.

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Please read before completing

PURPOSE OF SURVEY

This survey provides a measure of the cost imposed on industry by environmental protection in Canada through Canadian and international environmental regulations, conventions and voluntary agreements. The survey also aims at identifying environmental management practices and technologies used in Canadian industry for the purpose of preventing or abating pollution.

The results of this survey will be published in the Statistics Canada publication *Environmental Protection Expenditures in the Business Sector, 2000,* Catalogue No. 16F0006XIE.

CONFIDENTIALITY

Statistics Canada is prohibited by law from publishing any statistics which would divulge information obtained from this survey that relates to any identifiable respondent, without the previous written consent of that respondent. The data reported will be treated in strict confidence, used for statistical purposes and published in aggregate form only. The confidentiality provisions of the Statistics Act are not affected by either the Access to Information Act or any other legislation.

AUTHORITY

This survey is conducted under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19. **COMPLETION OF THIS QUESTIONNAIRE IS A LEGAL REQUIREMENT UNDER THE STATISTICS ACT.**

INQUIRIES

If you require assistance in completing this questionnaire or if you have any questions or comments regarding this survey, please contact:

Operations and Integration Division
Statistics Canada
Ottawa, ON, Canada, K1A 0T6

Telephone (toll-free): **1-800-255-7726 (within Canada)**
Fax: **1-800-755-5514 (within Canada)**
E-mail address : **enviro.oid.exp@statcan.ca**

The questionnaire is available in an electronic spreadsheet format. Please contact the Operations and Integration Division if you prefer to use this reporting option.

In all correspondence concerning this questionnaire, please quote the identification number that appears on the address label.

Important : Please read the Definitions and concepts on page 11 before answering. If your response for an item is zero, please write "0" in the corresponding box rather than leaving the cell blank.

Please return this questionnaire within 30 days of receipt.

If you are unable to do so, kindly inform the Operations and Integration Division of the expected completion date.

For Statistics Canada use only

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4-2300-2.1: 2001-07-30 STC / NAD - 475-04244

Statistics Canada Statistique Canada

Canada

Please report in thousands of Canadian dollars

1. Reporting year

Report must cover your fiscal year ending between **April 1, 2000 and March 31, 2001.**

	Day	Month	Year		Day	Month	Year
From	010	020	030	to	040	050	060

2. Environmental monitoring

If the expenditure is zero, please write "0" in corresponding box.

Include

- Expenditures related to equipment, supplies, labour and purchased services required for monitoring pollutants emitted by this establishment. Expenditures associated with participation in the National Pollutant Release Inventory (NPRI) and other similar programs are to be included

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
100	+	110	=	120

3. Environmental assessment and audits

If the expenditure is zero, please write "0" in corresponding box.

Include

- Expenditures for reviews of current operations for compliance with regulations (audits)
- Expenditures to evaluate the environmental impact of proposed programs or projects (assessments)
- Expenditures for associated legal and consulting costs

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
130	+	140	=	150

4. Site reclamation and decommissioning

If the expenditure is zero, please write "0" in corresponding box.

a) Expenditures on site reclamation made during the fiscal year 2000 for any active site belonging to your establishment

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
161	+	171	=	181

b) Expenditures on site decommissioning made during the fiscal year 2000 following the closing down of a site (even if closing occurred before 2000)

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
162	+	172	=	182

A list of processes and technologies associated with site reclamation and decommissioning is provided in Question 12c.

Exclude

- Fines or compensation for environmental damage (this is to be reported in Question 8)
- Provisions for future environmental liability

Please report in thousands of Canadian dollars

5. Protection and restoration of wildlife and habitat

If the expenditure is zero, please write "0" in corresponding box.

Include

- Expenditures made to protect or restore wildlife and habitat that could be or have been adversely affected by this establishment's operations

Exclude

- Expenditures for site reclamation and decommissioning which are already reported in Question 4
- Expenditures for aesthetic purposes

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
190	+	200	=	210

6. Pollution abatement and control (end-of-pipe processes)

Abatement and control of pollution are performed using end-of-pipe equipment or installations. **These end-of-pipe processes are not an integral part of production**; their sole purpose is to abate or to control undesirable substances resulting from normal production.

a) Pollution abatement and control expenditures

If the expenditure is zero, please write "0" in corresponding box.

Include

- Expenditures for equipment or facilities that are separately identifiable and that have been installed exclusively to reduce or eliminate pollutants resulting from production
- Expenditures related to waste collection, removal and treatment done by your establishment's or company's employees not already reported in Question 4 or 5
- Purchases of waste services not already reported in Question 4 or 5. Any sewerage management services or any other purchase of services reported in Question 11

Exclude

- Expenditures specific to workers' health and safety
- Expenditures on waste management or services reported in Question 4 or 5
- Expenditures for on-site recycling (Question 7)

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
250	+	260	=	270

b) Did you report capital expenditures in Question 6a?

1 ◯ Yes 2 ◯ No ▶ *Go to Question 7*

▼

1. What proportion of capital expenditures reported in cell 260 was spent on machinery and equipment imported from outside Canada?

%

275

2. What proportion of capital expenditures reported in cell 260 was spent on reducing or abating each of the following?

Substances released to air		Substances released to surface waters		On-site contained solid/ liquid waste/ underground injection		Noise, vibration or radiation	
%		%		%		%	
280	+	290	+	300	+	310	= **100%**

Please report in thousands of Canadian dollars

7. Pollution prevention

"Pollution prevention is the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment."

Pollution Prevention - A Federal Strategy for Action, Government of Canada (1995)

This question identifies expenditures and methods used for the purpose of preventing or minimizing pollution and waste, or promoting resource conservation.

a) Expenditures on pollution prevention

If the expenditure is zero, please write "0" in corresponding box.

Include

- Expenditures for equipment or facilities integrated to a production process that avoid or minimize the production of pollutants and waste
- Expenditures for equipment or facilities related to leak and spill prevention. They may include expenditures on the following: spill containments; dyke extentions; and accessories (valves, pumps)
- Expenditures for equipment or facilities used for conserving energy or water
- Expenditures for equipment or facilities associated with recirculation, recovery, reuse and **on-site** recycling of materials or substances

Exclude

- Expenditures specific to worker's health and safety
- Expenditures already included in Questions 2 to 6

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
500	+	510	=	520

b) Did you report capital expenditures in Question 7a?

1 ◯ Yes 2 ◯ No ▶ *Go to Question 7c*

▼

1. What proportion of capital expenditures reported in cell 510 was spent on machinery and equipment imported from outside Canada?

%

525

2. What proportion of capital expenditures reported in cell 510 was spent on preventing or minimizing each of the following?

Substances released to air		Substances released to surface waters		On-site contained solid/ liquid waste/ underground injection		Noise, vibration or radiation		Other	
%		%		%		%		%	
530	+	540	+	550	+	560	+	570	= 100 %

Please report in thousands of Canadian dollars

7. Pollution prevention - Concluded

c) Pollution prevention methods

If you have prevented or reduced waste, pollutants or conserved resources in fiscal year 2000, please indicate how it was achieved by checking the appropriate box(es). Please include all projects regardless of whether they are required by regulation, convention or voluntary agreement.

		Yes	No
Product design or reformulation	810	☐	☐
Equipment or process modifications (integrated process)	830	☐	☐
Recirculation, on-site recycling or reuse or recovery of materials or substances [1]	850	☐	☐
Energy conservation	860	☐	☐
Materials or feedstock substitution, solvent reduction, elimination or substitution	870	☐	☐
Improved inventory management or purchasing techniques	875	☐	☐
Prevention of leaks and spills	880	☐	☐
Good operating practices or training	885	☐	☐
Other (*please specify*)	890	☐	☐

_____

_____

_____

1. Recirculation, recovery, reuse or recycling: recirculation, reuse, recovery or recycling of water, materials or substances generated during production, **excluding materials transferred or recycled off-site.**
Examples: vapour recovery, recovery of sludge, water recirculation, reuse of water for refrigeration condenser operation.

8. Environmental charges

If the expenditure is zero, please write "0" in corresponding box.

$ 000

760 _____

Include

- Permits, fees, levies, special assessment and related fees
- Any fines, penalties, or damage awards paid to government agencies or to individuals
- Other charges paid to regulating bodies in order to allow operations to take place at this establishment

9. Other environmental protection expenditures

If the expenditure is zero, please write "0" in corresponding box.

Include

$ 000

770 _____

- The costs of administration for an environmental affairs division
- Training and information programs
- Any other additional expenditures that are required to comply with environmental regulations or conventions

Exclude

- Research and development expenditures

Please report in thousands of Canadian dollars

10. Total expenditures on environmental protection

If the expenditure is zero, please write "0" in corresponding box.

Cell 801: includes total from operating expenses reported in questions 2 to 9.
Cell 802: includes total from capital expenditures reported in questions 2 to 7.
They should also include all data for which breakdowns were not available.

Operating expenses		Capital expenditures		Total
$ 000		$ 000		$ 000
801	+	802	=	803

11. Purchase of environmental services

If the expenditure is zero, please write "0" in corresponding box.

From the total environmental protection expenditures reported in Question 10, what was the amount of environmental services purchased from a private contractor or a government?

a) Waste management services or sewerage services performed by contractors or a government

$ 000 — 240

Include

- Expenditures related to the use of a waste collection, disposal or treatment service, or an off-site recycling service provided by a private contractor or federal, provincial or local government body
- Expenditures related to the use of a sewerage service provided by a federal, provincial or local government body

Exclude

- Expenditures for waste management activities done by your establishment's or company's employees (own-account work) (Question 4, 5 or 6)
- Expenditures for recycling on-site (Question 7)

b) Environment-related construction performed by contractors

$ 000 — 805

Include

- Installation of new and used environment-related construction assets that have been capitalized
- Renovation, retrofit, refurbishing, overhauling and rehabilitation that have been capitalized
- Environment-related machinery and equipment that have been capitalized

Exclude

- Expenditures for own-account environmental construction work
- Non-capital repair and maintenance expenditures on environmental assets

c) Non-capital repair and maintenance expenditures on environmental assets performed by contractors

$ 000 — 815

d) Other environmental services performed by contractors not already reported

$ 000 — 804

Examples:

- Purchase of services for environmental monitoring
- Purchase of environmental assessment and audit services
- Purchase of services for site reclamation and decommissioning
- Purchase of services associated with wildlife and habitat protection and restoration

e) Total environmental services performed by contractors

$ 000 — 806

Include

- Sum of cells 240, 805, 815 and 804

Exclude

- Expenditures for environmental services provided by the employees of your establishment or your company

12. Environmental processes and technologies

Indicate how this establishment has prevented, abated or controlled pollution in fiscal year 2000 resulting from normal production by checking the appropriate boxes. If you used a process not already specified, please report it next to the "Other" category.

a) Energy conservation and efficiency

Did you use one or more of the following energy conservation methods?
If yes, please check the appropriate box(es).

Cogeneration	1282	☐
Energy efficient equipment	1283	☐
Fuel substitution	1284	☐
Clean fuel system	1286	☐
Waste energy recovery/reuse (from non-renewable energy sources)	1285	☐

Renewable energy source:

Solar	1288	☐
Wind power	1289	☐
Geothermal	1290	☐
Biomass energy (e.g. waste-to-energy (industrial; agricultural; municipal; forestry wastes) and energy crops)	1291	☐

Other *(please specify)* _____ 1292 ☐

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b) Solid waste management

Did you use one or more of the following solid waste management processes?
If yes, please check the appropriate box(es).

Container	1312	☐
Dehydration	1313	☐
Packaging	1314	☐
Modification or preparation for landfill or waste treatment sites	1315	☐
Compacting	1317	☐
Shredding	1318	☐
Grinding	1319	☐
Crushing	1320	☐
Screening	1321	☐
Degritting	1322	☐
On and off-site recycling	1323	☐
Incineration	1326	☐

Other (*please specify*) _____ 1331 ☐

12. Environmental processes and technologies - Concluded

c) Site reclamation and decommissioning (including treatment of soils)

Did you use one or more of the following processes for site reclamation or decommissioning?
If yes, please check the appropriate box(es).

Reforestation/revegetation	1301 ☐
Underground storage tanks handling	1293 ☐
Excavation	1294 ☐
Solvent extraction system	1295 ☐
Vapour extraction systems	1296 ☐
Geomembrane	1297 ☐
Injection grouting technology	1298 ☐
Soil washing	1299 ☐
Reduction	1300 ☐
Incineration	1310 ☐
Other *(please specify)*	1311 ☐

d) Environmental biological treatment

Did you use biotechnology to abate, prevent or manage pollution or waste resulting from normal production in fiscal year 2000?

Yes 1400 ☐ No ☐ Go to Question 13

If yes, please indicate which biotechnology was used by checking the appropriate box(es).

Microbiologically enhanced recovery of material(s)	1401 ☐
Phytoremediation	1402 ☐
Bioremediation	1403 ☐
Biofiltration	1404 ☐
Natural or constructed wetland	1405 ☐
Bioleaching	1406 ☐
Bio-pulping	1407 ☐
Bio-bleaching	1408 ☐
Biodesulphurization	1409 ☐
Other *(please specify)*	1410 ☐

13. Environmental management practices

Please indicate the environmental management practices adopted or utilised by this establishment in fiscal year 2000 to avoid or minimise pollution or to conserve resources.

		Yes	No
a) Did this establishment use an environmental management system?	951	☐	☐
b) Did this establishment use Life Cycle Management, Life Cycle Assessment or Design for Environment (DfE) for decision making?	965	☐	☐
c) Was this establishment ISO 14000 certified?	953	☐	☐
d) Did this establishment implement any environmental voluntary agreement, or did it participate in any voluntary environmental program? Examples include ARET (Accelerated Reduction/Elimination of Toxics) or Voluntary Challenge and Registry (VCR). If yes, please list programs, accords or agreements.	955	☐	☐
e) Did this establishment have a "green" procurement policy?	957	☐	☐
f) Were any of the goods produced by this establishment certifed by an environmental program, such as the "Enviro Choice Program" operated by Terrachoice Inc.?	959	☐	☐
g) Did this establishment publish or contribute to annual or other reports on its environmental performance or sustainable development?	963	☐	☐
h) Did this establishment experience any cost savings as a result of implementing any of the environmental management practices outlined in this question or pollution prevention methods outlined in Question 7?	969	☐	☐
i) **Other** (*please specify*)	967	☐	☐

Certification

I certify that, to the best of my knowledge, the information provided in this questionnaire is correct and complete.

900	Signature X	Date (D / M / Y)	910	Title	
905	Name of person completing this questionnaire (Type or print)		915	Telephone No.	920 Fax No.
925	E-mail address		930	Web Site Address	

How long did it take to collect the data and to complete this form? 935 hours

Comments

Please provide any comments you may have about this survey (e.g., length, ease of completion, suggestions for future questions, suggestions about the format). Also, please use this space if you wish to provide additional information about your environmental protection activities.

If you have any questions, please contact us.
Telephone (toll free) 1-800-255-7726 (within Canada)
Fax: 1-800-755-5514 (within Canada)
Email: enviro.oid.exp@statcan.ca

PLEASE RETURN THIS QUESTIONNAIRE IN THE ENVELOPE PROVIDED

Thank you for your cooperation

Definitions and concepts

Environmental protection expenditures are defined in this survey as all operating expenses and capital, and repair expenditures that are incurred in order to anticipate or to comply with Canadian or international environmental regulations, conventions or voluntary agreements. They consist of expenditures for pollution prevention, abatement and control and expenditures for restoring wildlife and habitat, expenditures for environmental monitoring, environmental assessments and audits, and expenditures for reclamation and decommissioning of sites. Expenditures to improve employee health, workplace safety and site beautification are excluded.

Expenditures to produce pollution prevention, abatement and control equipment for sale are also excluded as they would appear twice in the expenditure data produced by Statistics Canada. Expenditures for environment-related research and development are also excluded since they are collected elsewhere in Statistics Canada.

Environmental conventions or voluntary agreements refer to any formal, multi-party commitment by an industry or an industry association for instance, to meet specific targets in terms of habitat protection, waste reduction, or the elimination or reduction of specific materials that are considered to be harmful or toxic to the natural environment in Canada. Examples include the following: the National Packaging Protocol (reduction of packaging by 50 percent by the year 2000); the Montreal Protocol (elimination of CFCs by 1998); the Canada-U.S. Air Quality Agreement; the "Responsible Care" program from the Canadian Chemical Producers Association; the Accelerated Reduction/Elimination of Toxics (ARET) Program; the Voluntary Challenge and Registry (VCR) Program on climate change; etc.

Environmental regulations refer to any current Canadian federal, provincial, municipal law or international legislation that is intended to protect or to restore the environment in Canada. Expenditures related to anticipated legislation may be included as long as its provisions are known.

How to report

Please report expenditures in **thousands of Canadian dollars.** If, for certain categories, no expenditures have been incurred, **please write "0" in the corresponding box**.

Where precise data are not available, your best estimate is acceptable. If additional information is available in an annual report or an environmental performance report, **please include a copy** when you return the questionnaire.

TO REPORT CAPITAL EXPENDITURES

Report expenditures made during the 2000 fiscal year.

Include all relevant outlays for machinery and equipment and their installation and repair, as well as for the construction of non-residential facilities (contractors or own employees). For construction, include all costs associated with demolition, planning and design (such as engineering and construction fees), any materials supplied to construction contractors for installation and any costs associated with the purchase of land that are neither amortised nor depreciated.

Exclude any provisions for future environmental liability.

TO REPORT OPERATING EXPENSES

Include all cash expenses, rather than accruals, incurred during your 2000 fiscal year for labour, fuel and electricity, materials and supplies, maintenance and repair, and purchased services.

FOR LOGGING ACTIVITIES

Use Question 5 to report additional expenditures for logging caused by environmental regulation or convention. **Include** the extra cost of any practice that would not otherwise be followed in the absence of environmental regulation or convention. **Exclude** the foregone revenues resulting from regulations or conventions that reduce the allowable harvest.

FOR MINING ACTIVITIES

Use Question 6 or 11a to report any expenditures that are related to the handling and treatment of mine tailings and that are required by environmental regulation. Even if some of these activities are now considered to be "standard practice", include related expenditures if they are required by regulation or convention. Use Question 9 to report imputed interest on funds held in trust against future environmental liabilities. Report only actual expenditures.

FOR PETROLEUM OPERATIONS

Please report separately, if possible, environmental protection expenditures associated with different petroleum operations: exploration, refining, chemical products, pipeline transportation.