

# Environmental Protection Expenditures in the Business Sector



2006

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# Environmental Protection Expenditures in the Business Sector

2006

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November 2008

Catalogue no. 16F0006X

ISSN 1701-6282

Frequency: Biennial

Ottawa

La version française de cette publication est disponible sur demande (n° 16F0006X au catalogue).

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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
- 0 true zero or a value rounded to zero
- 0<sup>s</sup> value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- 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

## Acknowledgements

The contributions of survey respondents were critical to the successful completion of this publication and are gratefully acknowledged.

This report was prepared by the Environment Accounts and Statistics Division under the direction of **Rob Smith**, 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.

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## Preface

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This publication presents estimates from the Survey of Environmental Protection Expenditures (SEPE), 2006. The survey provides a measure of the cost to Canadian industry to comply with present or anticipated environmental regulations, conventions and voluntary agreements. The survey also collects information on environmental management practices and environmental technologies used by industry for the purpose of preventing, abating or controlling pollution.

Environmental regulations, current and anticipated, play a major role in the evolution of industry spending on environmental protection. Governments in Canada impose 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 SEPE has been conducted since 1994. It was started in order 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 SEPE was changed from an annual to a biennial survey, partly in an effort to reduce respondent burden.

In 2006, the survey introduced new material with the purpose of collecting data on industry's initiatives with respect to improving energy efficiency.

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## Highlights

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- Businesses operating in Canada spent \$8.6 billion in 2006 to protect the environment. Following a long-standing trend, the largest share of these expenditures was spent to deal with pollutants after they were created.
- The oil and gas extraction industry spent more on environmental protection than any other industry, accounting for almost one-third of the total. Provincially, Alberta businesses spent the most to protect the environment, once again surpassing Ontario, the largest spender up until 2002.
- Of the \$3.8 billion in capital expenditures made for environmental protection, just over 40% was for pollution prevention.
- The oil and gas extraction industry invested more than any other industry to protect the environment. Investments by Canadian oil and gas producers, most of which operate in Alberta, in areas such as pollution abatement and control, waste management, pollution prevention, and reclamation and decommissioning totalled over \$1.7 billion in 2006.
- Nationally, the petroleum and coal products industry was the second largest investor in environmental protection (\$596 million) as that industry continued to upgrade refineries to meet new sulphur regulations.
- Provincially, businesses in Alberta spent the most in capital to protect the environment (\$1.9 billion), followed by Ontario (\$827 million) and Quebec (\$371 million). The large investments in Alberta are mainly due to high expenditures made by the oil and gas extraction industry.
- Operating expenditures for environmental protection were mostly directed towards waste management and sewerage services (\$1.7 billion) followed by pollution abatement and control (\$1.0 billion).
- The oil and gas extraction industry had the highest operating expenditures for 2006, mainly for site reclamation and decommissioning. Provincially, Ontario led the way followed closely by Alberta; \$1.6 billion and \$1.3 billion respectively.
- Businesses spent close to \$2 billion in 2006 on technologies that improve energy efficiency or reduce the use of fossil fuels. Examples include technologies such as cogeneration, waste energy recovery, solar energy and energy management systems.

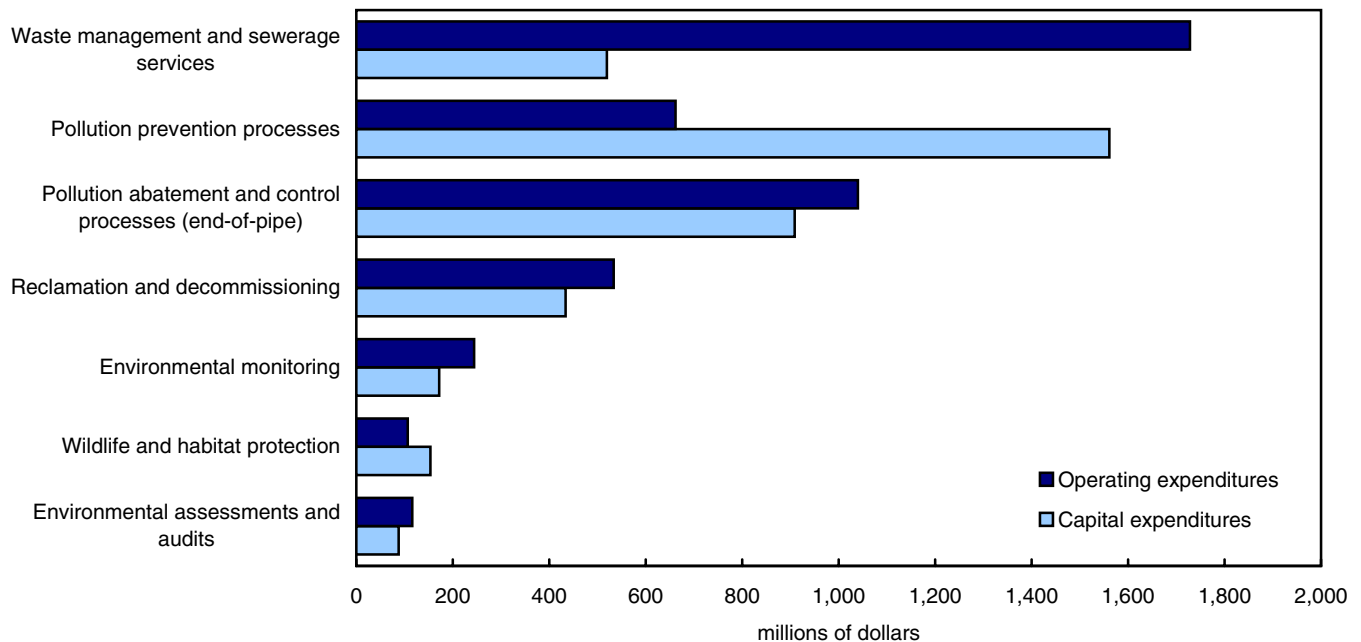


# Analysis

## Total environmental protection expenditures

Businesses<sup>1</sup> operating in Canada spent \$8.6 billion in 2006 to protect the environment. Almost half of this amount was spent on pollution abatement and control<sup>2</sup> and waste management and sewerage services (Chart 1). These results follow a long-standing trend where the largest share of environmental protection expenditures was made to deal with pollutants after they were created.

**Chart 1**  
**Business capital and operating expenditures on environmental protection, 2006**



The oil and gas extraction industry spent more on environmental protection than any other industry, accounting for almost one-third of the total. The second highest spender was the petroleum and coal products industry, accounting for approximately 10% of total environmental protection expenditures.

The oil and gas extraction industry directed the largest proportion of its expenditures for reclamation and decommissioning, while the petroleum and coal products industry concentrated over 71% of its expenditures on pollution prevention processes. In both cases capital expenditures made up the bulk of these expenditures.

Provincially, Alberta businesses spent the most to protect the environment, once again surpassing Ontario, the largest spender up until 2002. The largest proportion of the environmental protection expenditures in Alberta went towards pollution prevention processes. Businesses in Ontario, similar to the national results, spent more for waste management and sewerage services.

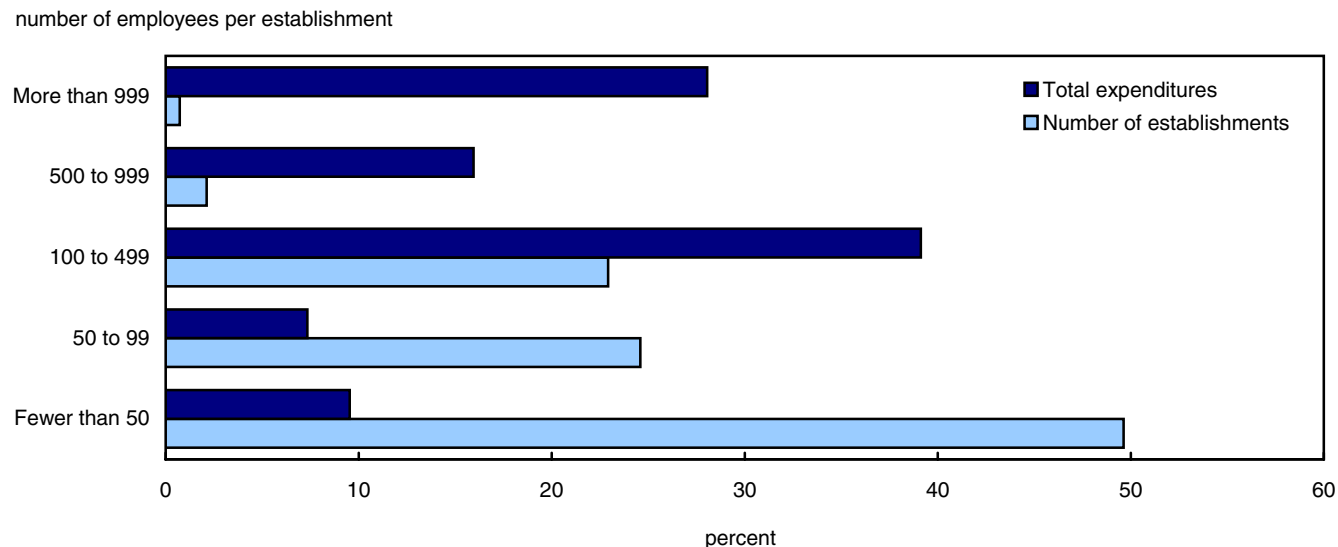
1. For simplicity, 'businesses' will be used to refer to both enterprises and establishments throughout this section of the report. Please see section "Data quality, concepts and methodology — General methodology" for a detailed description of an enterprise and establishment.  
 2. Pollution abatement and control is also referred to as 'end-of-pipe'.

## Total environmental protection expenditures by business size

The Survey of Environmental Protection Expenditures underwent a methodological redesign for the 2006 reference year. The improvements included better quality estimates for small and medium-sized businesses as well as new estimates for businesses with 20 to 50 employees.<sup>3</sup> Very small businesses, those with less than 50 employees, made up almost half of the survey population and accounted for 10% of the total environmental protection expenditures made in 2006 (Chart 2).

Chart 2

### Distribution of total expenditures on environmental protection by establishment size, 2006



Note(s): This chart excludes the 'pipeline transportation' industry category.

Medium sized businesses, those with 100 to 499 employees, made up less than a quarter of the population, but contributed the largest amount to environmental protection (Tables 4 and 6).

Examining the amount businesses spent to protect the environment on an expenditure per employee basis, very large businesses tended to spend the most (Tables 5 and 7). However, very small businesses made large operational expenditures when looked at per employee for waste management and sewerage services. Though all businesses face some costs in dealing with their solid waste and sewage, on an expenditure per employee basis, the smallest businesses made the largest expenditures.

## Business capital expenditures on environmental protection

Although businesses spent the most overall in 2006 to deal with pollutants and waste after they were generated, they made the largest capital expenditures on pollution prevention. Pollution prevention includes technologies, equipment and processes that eliminate pollution and waste at the source before they are created.

Over 40% of investment by businesses for environmental protection in 2006 was for pollution prevention projects (Table 1). In all provinces and most industry groups businesses spent the largest share of environmental protection investments on these types of projects. The exceptions were the oil and gas extraction, mining, wood product manufacturing and primary metals manufacturing industries, for which pollution abatement and control processes received a higher proportion of investment expenditures. Although pollution prevention projects accounted for the largest share of capital expenditures, this type of expenditure was made by only 14% of businesses.

3. Please see the "Data quality, concepts and methodology — General methodology" section for a detailed description of the redesigned survey methodology.

On a provincial basis, Alberta businesses invested nearly \$1.9 billion in environmental protection in 2006, almost half (49%) of the national capital expenditures for this purpose. Ontario businesses reported \$827 million in capital expenditures, followed by those in Quebec (\$371 million).

Alberta's position at the top of environmental protection capital spending was due mainly to high expenditures by the oil and gas extraction industry. Investments by Canadian oil and gas producers, most of which operate in Alberta, in areas such as pollution abatement and control, waste management, pollution prevention, and reclamation and decommissioning totalled over \$1.7 billion in 2006. Put in perspective, for every \$100 invested by the oil and gas extraction industry, \$4 was invested in environmental protection.<sup>4</sup>

Nationally, the petroleum and coal products industry was the second largest investor in environmental protection (\$596 million) as that industry continued to upgrade refineries to meet new sulphur regulations. Environmental protection capital expenditures represented about \$20 out of every \$100 invested by the petroleum and coal products industry.<sup>5</sup>

Combined, the oil and gas extraction and petroleum and coal products industries accounted for almost two-thirds of total investments in environmental protection.

### Capital expenditures on pollution prevention, abatement and control by type of environmental medium

The majority of capital investments made by businesses for both pollution prevention, and pollution abatement and control were made to prevent or reduce those pollutants emitted to air (57% and 60% respectively) (Tables 8 and 9).

The largest investment on the prevention of air pollution was made by the petroleum and coal products industry (\$508 million), predominantly for projects to meet ultra low sulphur diesel regulations. In addition, \$33 million was invested by this industry on pollution abatement and control projects directed at air pollution. These investments went towards projects such as the installation of flare gas recovery systems and low nitrogen oxide burners.

The oil and gas extraction industry made the second largest investment (\$394 million) to address air pollution. Most of its investment was directed towards air pollution abatement and control activities such as reduced flaring and venting of solution gas.

The electric power generation, transmission and distribution industry directed more of their capital investments in pollution prevention to reduce on-site releases to land rather than to air. These investments were typically for containment systems for oil spills and for radioactive waste. The majority of investment for pollution abatement and control made by the electricity generation industry went to the reduction of air emissions.

The majority of capital investments made by the mining industry for both pollution prevention and pollution abatement and control were directed towards pollutants released to surface water. Tailings management and water treatment projects were commonly reported by this industry.

### Business operating expenditures on environmental protection

Businesses across Canada reported \$4.8 billion in operating expenses in 2006 for environmental protection (Table 2).

The oil and gas extraction industry reported the highest operating expenses (\$1.1 billion), mainly for site reclamation and decommissioning, waste management and sewerage services, and pollution abatement and control processes.

Businesses in Ontario reported the highest operating expenses related to environmental protection (\$1.6 billion), while Alberta was a close second.

4. Statistics Canada, CANSIM Table 029-0007 - Capital and repair expenditures, industry sector 21, mining and oil and gas extraction, annual (dollars), [http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII\\_1\\_E.HTM&RootDir=CII/](http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII_1_E.HTM&RootDir=CII/) (accessed August 7, 2008).

5. Statistics Canada, CANSIM Table 029-0009 - Capital and repair expenditures, industry sectors 31-33 manufacturing, annual (dollars), [http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII\\_1\\_E.HTM&RootDir=CII/](http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII_1_E.HTM&RootDir=CII/) (accessed August 7, 2008).

Waste management and sewerage services accounted for the largest proportion of environmental protection operating expenditures (\$1.7 billion), accounting for 36% of the total. Most businesses had waste management and sewerage expenses, although 14% of respondents reported none. One possible explanation was that, in some circumstances, the waste produced by a business generated enough revenue to cover the costs through recycling and/or the re-sale of waste material. For example, a forestry company may sell wood waste to an electric power company to generate electricity.

Pollution abatement and control expenditures accounted for almost 22% of operating expenditures on environmental protection. Operating expenses associated with pollution abatement and control were higher than those associated with pollution prevention.

## Pollution prevention methods

Overall, just over two-thirds of businesses in Canada used at least one pollution prevention method (text box "**Pollution prevention methods**"). The three most common methods were good operating practices or pollution prevention training; recirculation, on-site recycling, reuse or recovery of materials; and the prevention of leaks and spills (Table 10).

### Pollution prevention methods

The federal government defines pollution prevention as: "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".<sup>1</sup> Using this definition, the Survey of Environmental Protection Expenditures asked businesses to indicate which of the following pollution prevention methods were used in 2006:

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

1. *Canadian Environmental Protection Act*, 1999.

At the industry level, the proportion of businesses that reported the use of at least one pollution prevention method ranged from just under 60% to over 90%. The pipeline transportation industry, the beverage and tobacco industry and the primary metals industry each reported over 90% participation. The most common pollution prevention methods used by these industries reflected the national results.

Excluding the 'other' category, the least reported pollution prevention method was product design or reformulation. However, unlike the overall pattern, a third of businesses in the petroleum and coal products industry reported using this method. This may have been in response to amendments to federal regulations to reduce sulphur levels in diesel fuel. New restrictions were introduced in January 2006 for off-road, rail and marine diesel fuels setting gradually more restrictive limits starting in 2007 through to 2012.<sup>6</sup>

Provincially, the use of pollution prevention methods was highest in Ontario and Alberta where 73% of businesses used at least one method. The percentage of businesses that used at least one method increased with business size,

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6. Canadian Environmental Regulation and Compliance News, February 2006, Vol. 17. No 2.

from only 63% for businesses with less than 50 employees to 97% for businesses with 1,000 or more employees (Table 11).

## Business expenditures on energy-related environmental technologies and their use

Businesses spent close to \$2 billion<sup>7</sup> in 2006 on technologies that improve energy efficiency or reduce the use of fossil fuels. These expenditures were split almost evenly between operating and capital investments (Table 12).

Compared with industry spending on environmental protection, this amount represents a broader set of expenditures. This reflects a motivation by industry to adopt energy-related environmental technologies that exceed responses to environmental regulations, conventions or voluntary agreements.

The oil and gas extraction industry led the way with almost half a billion dollars in expenditures, the majority directed towards capital projects. Between 2004 and 2006, about 2 in 5 businesses in the oil and gas extraction industry reported the adoption of new or significantly improved systems or equipment to improve energy efficiency. Of those businesses, just over half indicated the impact on their energy use was moderate. Examples of technologies reported by the industry included energy management systems, solar energy systems, waste recovery and reuse, cogeneration and alternative fuel systems.

The electric power generation, transmission and distribution industry also spent close to a half a billion dollars, but unlike the oil and gas extraction industry, most was for operating expenses. This industry was the most likely of those surveyed to report the use of renewable energy technologies. Solar, wind and small-scale hydroelectric energy technologies were the most reported technologies. Of the 41% of businesses in the electric power generation, transmission and distribution industry that made modifications to improve energy efficiency between 2004 and 2006, well over half found the impact on their energy use was low.

Provincially, Alberta accounted for almost 40% of total expenditures, mainly attributable to the dominance of the oil and gas industry in this province. Ontario accounted for another 20% of these expenditures, although spending was not concentrated in one particular industry.

Medium sized businesses accounted for more than half the total expenditures made for energy-related environmental systems and equipment (Table 13).

## Distribution of energy-related environmental technology use

Overall, a quarter of businesses used some form of environmental technology to improve energy efficiency or reduce the use of fossil fuels (Table 14). However, no single technology or process showed significant adoption by industry. The most widely reported (between 10% and 12% of businesses) were the use of waste energy recovery technologies; energy management or monitoring systems; and the performance of an energy audit during the previous three years.

Across industries, the results show a large range in the use of energy-related environmental technologies (Table 15). While some industries, such as fabricated metal products and logging, reported little use of these technologies, over 70% of businesses involved in oil and gas extraction used at least one type of energy-related environmental technology.

A larger proportion of businesses in the Northwest Territories, Yukon and Nunavut used an energy-related environmental technology compared to the rest of the country. Almost half the businesses in the territories used an energy management or monitoring system, and 35% used solar energy systems or equipment. Diesel fuel is widely used as an energy source for isolated communities. However, rising fuel costs and a desire to reduce greenhouse gas emissions make alternative energy sources more economically viable in this region.<sup>8</sup>

7. Expenditures for energy-related environmental technologies were not restricted to those made in response to environmental regulations, conventions or voluntary agreements. For more information, please see the "Data quality, concepts and methodology — Concepts and variables measured" section.

8. Government of the Northwest Territories, June 2006, *Energy for the Future. A Discussion Paper on Energy Policy and Planning for the Government of the Northwest Territories*, <http://www.itn.gov.nt.ca/publications/2007/Energy/Whitepaper.pdf>, (accessed September 10, 2008).

The likelihood a business used some kind of energy-related environmental technology increased with the number of people employed. Over 80% of all businesses with 1,000 and more employees used an environmental technology compared to only 15% of businesses with less than 50 employees (Table 16).

### **Efforts to improve energy efficiency**

Energy conservation and energy efficiency are practical methods to save money, protect the environment and reduce greenhouse gas emissions and pollutants created as by-products from the generation and use of energy.

In 2006, 22% of businesses reported the use of innovative<sup>9</sup> methods to improve their energy efficiency (Table 17). Over 40% of businesses in the oil and gas extraction, electric power generation and pipeline transportation industries introduced innovative methods to improve energy efficiency.

Energy efficiency upgrades were most popular in the territories, where 45% of businesses put new or improved systems into operation. Again, this could be driven by the higher cost of energy in the northern regions of the country.

Businesses in Ontario had the second highest proportion, where 28% of businesses implemented systems to reduce energy consumption. This could be partly attributable to the December 2005 launch of powerWISE®, a joint provincial and business incentive program to encourage businesses to complete energy conservation projects.<sup>10</sup>

Nationally almost two-thirds of businesses that introduced new or improved systems or equipment to improve energy efficiency indicated that the impact on their energy use was either moderate or high.

Overall, businesses reported that 3% of their total investments in machinery and equipment in 2006 were made to improve energy efficiency (Table 19).

### **Environmental management practices**

Environmental management is not an attempt to manage the environment, but rather the management of human interaction with the environment and the impact resulting from that interaction. Life cycle management, ISO 14000 certification and implementation of a pollution prevention plan are examples of environmental management.

In 2006, just over one-third of businesses used an environmental management practice in an attempt to reduce their impact on the environment (Table 26). Of these businesses, 14% reported experiencing a cost savings as a result (Table 29). The most commonly used practice was the use of an environmental management system, followed by the implementation of a pollution prevention plan.

Within industries, there was a wide range in the use of management practices (Table 27). Industries related to energy production in general were most likely to have implemented the practices.

Environmental management practices were more likely to be implemented in larger businesses (Table 28). Almost all very large businesses (95%) used a practice compared to less than a quarter of very small businesses.

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9. Innovation is defined as the introduction of new or significantly improved systems or equipment within a three year period, 2004 to 2006.

10. Canadian Environmental Regulation and Compliance News, January 2006, Vol. 17. No 1.

## Related products

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### Selected publications from Statistics Canada

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16-201-X	Human Activity and the Environment: Annual Statistics
16-257-X	Environment Accounts and Statistics Product Catalogue
16-401-X	Industrial Water Use
16F0006P	Environmental Protection Expenditures in the Business Sector, Preliminary Data
16F0024X	Environmental Management and Technologies in the Business Sector

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### Selected CANSIM tables from Statistics Canada

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153-0052	Capital and operating expenditures on environmental protection, by North American Industry Classification System (NAICS) and type of activity, Canada
153-0053	Capital and operating expenditures on environmental protection, by type of activity, Canada, provinces and territories
153-0054	Distribution of capital expenditures on pollution abatement and control (end-of-pipe) and pollution prevention, by North American Industry Classification System (NAICS) and type of environmental medium, Canada
153-0055	Distribution of capital expenditures on pollution abatement and control (end-of-pipe) and pollution prevention, by type of environmental medium, Canada, provinces and territories
153-0056	Capital and operating expenditures on environmental protection, by type of activity and establishment size, Canada

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### Selected surveys from Statistics Canada

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1903	Survey of Environmental Protection Expenditures
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### Selected summary tables from Statistics Canada

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- *Expenditures on environmental protection by industry and activity*

# Statistical tables

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**Table 1**  
**Capital expenditures on environmental protection by type of activity and industry and province or territory, 2006**

	Environ- mental monitoring	Environ- mental assessments and audits	Reclamation and decom- missioning	Wildlife and habitat protection	Waste manage- ment and sewerage services	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total	Share of total
	millions of dollars							percent	
<b>Industry</b>									
Logging	F	F	F	F	0.5	0.8	F	F	F
Oil and gas extraction	132.2	43.1	356.2	126.6	286.1	409.8	377.1	1,730.9	45.1
Mining	5.3	x	9.3	x	26.0	174.5	49.2	269.9	7.0
Electric power generation, transmission and distribution	4.1	30.7	13.9	13.5	18.2	65.8	105.9	252.1	6.6
Natural gas distribution	x	2.9	x	x	x	3.0	54.1	65.7	1.7
Food	1.4	0.4	F	x	F	12.8	41.0	123.8	3.2
Beverage and tobacco products	x	0.0	F	0.0	x	x	3.1	5.4	0.1
Wood products	F	F	F	F	1.8	30.7	18.3	55.5	1.4
Paper manufacturing	1.8	0.1	3.2	0.2	9.5	21.3	52.0	88.0	2.3
Petroleum and coal products	x	F	x	0.0	10.4	45.7	533.1	596.4	15.5
Chemicals	0.6	x	3.0	x	8.8	25.8	44.0	82.4	2.1
Non-metallic mineral products	F	F	F	3.3	0.5	16.1	22.7	61.1	1.6
Primary metals	0.8	x	12.8	x	8.1	68.9	31.1	122.6	3.2
Fabricated metal products	F	x	x	0.0	10.1	3.0	F	F	F
Transportation equipment	0.1	x	x	x	x	15.7	18.7	42.2	1.1
Other manufacturing	0.8	F	0.4	x	F	12.8	73.0	150.2	3.9
Pipeline transportation	1.6	5.6	21.9	4.8	x	x	39.2	75.3	2.0
<b>Total</b>	<b>171.9</b>	<b>87.9</b>	<b>433.8</b>	<b>153.7</b>	<b>519.3</b>	<b>908.7</b>	<b>1,561.1</b>	<b>3,836.4</b>	<b>100.0</b>
<b>Province or territory</b>									
Atlantic provinces <sup>1</sup>	2.9	x	9.8	x	x	84.6	124.7	234.3	6.1
Quebec	4.4	0.6	4.4	1.2	30.4	46.3	283.4	370.7	9.7
Ontario	F	5.4	16.9	5.6	148.6	209.7	418.4	827.1	21.6
Manitoba	0.3	x	9.9	x	x	17.1	38.6	93.0	2.4
Saskatchewan	6.0	9.3	28.1	8.4	30.7	69.5	70.7	222.7	5.8
Alberta	122.7	38.4	321.1	117.7	267.6	432.5	569.7	1,869.8	48.7
British Columbia and the territories <sup>2</sup>	13.1	9.1	43.5	15.8	32.6	49.1	55.7	218.8	5.7
<b>Total</b>	<b>171.9</b>	<b>87.9</b>	<b>433.8</b>	<b>153.7</b>	<b>519.3</b>	<b>908.7</b>	<b>1,561.1</b>	<b>3,836.4</b>	<b>100.0</b>

1. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

2. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Tables 153-0052 and 153-0053.

**Table 2**  
**Operating expenditures on environmental protection by type of activity and industry and province or territory, 2006**

	Environ- mental monitoring	Environ- mental assess- ments and audits	Recla- mation and decom- missioning	Wildlife and habitat protection	Waste manage- ment and sewerage services	Pollution abatement and control processes (end-of- pipe)	Pollution prevention processes	Fees, fines and licences	Other	Total	Share of total
	millions of dollars										percent
<b>Industry</b>											
Logging	2.6	2.5	6.5	32.2	9.3	0.8	5.4	0.8	2.4	62.6	1.3
Oil and gas extraction	50.5	43.3	344.1	16.4	198.4	183.6	117.6	25.3	103.4	1,082.6	22.7
Mining	20.8	8.3	49.8	2.1	54.5	71.3	48.9	11.1	10.2	277.0	5.8
Electric power generation, transmission and distribution	37.9	13.5	58.8	14.5	80.1	43.6	78.7	24.9	29.2	381.2	8.0
Natural gas distribution	0.8	3.4	1.2	0.1	4.1	x	6.7	x	2.2	22.4	0.5
Food	10.8	4.7	F	x	239.5	24.4	19.6	9.2	8.2	317.9	6.7
Beverage and tobacco products	0.2	x	F	x	10.5	F	0.6	3.0	0.2	15.5	0.3
Wood products	4.1	2.4	12.4	F	F	18.8	9.4	2.8	3.4	181.8	3.8
Paper manufacturing	31.1	x	7.8	x	219.0	165.5	56.2	12.3	9.0	508.5	10.7
Petroleum and coal products	7.6	2.0	6.1	x	48.1	123.7	103.1	x	4.7	297.1	6.2
Chemicals	18.8	5.5	10.1	x	123.7	59.8	32.2	F	13.0	280.5	5.9
Non-metallic mineral products	6.2	1.5	2.8	0.1	33.9	16.6	6.4	2.7	2.7	73.0	1.5
Primary metals	34.5	8.6	16.8	1.4	168.6	290.0	76.3	4.5	10.3	610.9	12.8
Fabricated metal products	2.4	2.9	2.1	F	45.7	5.0	8.0	0.7	1.6	68.5	1.4
Transportation equipment	3.6	4.0	x	x	94.9	18.8	6.8	x	10.2	142.1	3.0
Other manufacturing	9.6	5.5	F	F	294.1	13.1	F	2.5	3.8	379.0	7.9
Pipeline transportation	2.6	2.7	6.6	2.0	6.6	1.3	39.4	0.4	6.7	68.3	1.4
<b>Total</b>	<b>244.3</b>	<b>116.1</b>	<b>533.6</b>	<b>106.7</b>	<b>1,728.2</b>	<b>1,039.8</b>	<b>661.7</b>	<b>117.5</b>	<b>221.1</b>	<b>4,769.0</b>	<b>100.0</b>
<b>Province or territory</b>											
Atlantic provinces <sup>1</sup>	19.4	4.3	14.0	9.1	95.0	81.1	82.8	6.3	8.3	320.5	6.7
Quebec	35.1	11.5	19.8	34.3	354.3	165.7	81.1	7.0	17.5	726.4	15.2
Ontario	77.0	29.5	73.5	11.9	701.3	372.2	240.5	28.9	49.4	1,584.1	33.2
Manitoba	8.2	3.6	4.0	1.6	44.5	24.7	8.5	4.1	7.3	106.4	2.2
Saskatchewan	11.2	8.3	44.6	2.1	75.8	36.1	30.1	10.4	9.2	228.0	4.8
Alberta	68.5	38.9	346.3	20.3	284.7	256.6	170.0	19.2	114.6	1,319.1	27.7
British Columbia and the territories <sup>2</sup>	25.1	19.9	31.3	27.4	172.4	103.4	48.6	41.6	14.8	484.5	10.2
<b>Total</b>	<b>244.3</b>	<b>116.1</b>	<b>533.6</b>	<b>106.7</b>	<b>1,728.2</b>	<b>1,039.8</b>	<b>661.7</b>	<b>117.5</b>	<b>221.1</b>	<b>4,769.0</b>	<b>100.0</b>

1. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

2. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Tables 153-0052 and 153-0053.

**Table 3**  
**Expenditures on environmental protection by type of activity and province or territory, 2006**

	Total capital expenditures	Share of total capital expenditures	Total operating expenditures	Share of total operating expenditures
	millions of dollars	percent	millions of dollars	percent
Newfoundland and Labrador	121.9	3.2	70.5	1.5
Prince Edward Island	0.7	0.0 <sup>s</sup>	4.0	0.1
Nova Scotia	42.3	1.1	84.1	1.8
New Brunswick	69.3	1.8	161.9	3.4
Quebec	370.7	9.7	726.4	15.2
Ontario	827.1	21.6	1,584.1	33.2
Manitoba	93.0	2.4	106.4	2.2
Saskatchewan	222.7	5.8	228.0	4.8
Alberta	1,869.8	48.7	1,319.1	27.7
British Columbia	214.7	5.6	472.8	9.9
Yukon, Northwest Territories and Nunavut	4.1	0.1	11.8	0.2
<b>Total</b>	<b>3,836.4</b>	<b>100.0</b>	<b>4,769.0</b>	<b>100.0</b>

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 4**  
**Capital expenditures on environmental protection by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
	millions of dollars				
Environmental monitoring	x	F	48.7	24.7	x
Environmental assessments and audits	9.5	3.7	25.9	13.8	29.4
Reclamation and decommissioning	37.8	22.2	154.8	104.7	92.4
Wildlife and habitat protection	16.9	14.5	38.6	x	x
Waste management and sewerage services	47.6	F	148.5	F	142.6
Pollution abatement and control processes (end-of-pipe)	F	32.4	277.1	87.6	450.5
Pollution prevention processes	98.9	79.8	785.7	319.0	238.5
<b>Total</b>	<b>276.0</b>	<b>263.8</b>	<b>1,479.4</b>	<b>675.6</b>	<b>1,066.2</b>

**Note(s):** Figures may not add up to totals due to rounding. This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Table 153-0056.

**Table 5**  
**Capital expenditures on environmental protection per employee by establishment size, 2006**

	Number of employees per establishment					Total
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999	
	dollars per employee					
Environmental monitoring	x	F	64	109	x	94
Environmental assessments and audits	37	13	34	61	107	45
Reclamation and decommissioning	146	77	202	462	337	227
Wildlife and habitat protection	65	50	50	x	x	82
Waste management and sewerage services	184	F	194	F	520	x
Pollution abatement and control processes (end-of-pipe)	F	112	362	386	1,643	x
Pollution prevention processes	381	277	1,027	1,407	870	839
<b>Total</b>	<b>1,064</b>	<b>916</b>	<b>1,934</b>	<b>2,979</b>	<b>3,890</b>	<b>2,074</b>

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 6**  
**Operating expenditures on environmental protection by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
	millions of dollars				
Environmental monitoring	15.1	16.6	100.7	37.0	72.3
Environmental assessments and audits	16.2	7.4	36.3	19.7	33.8
Reclamation and decommissioning	31.1	24.6	240.4	52.0	178.9
Wildlife and habitat protection	F	F	64.6	8.5	14.6
Waste management and sewerage services	348.5	218.5	680.8	187.8	286.0
Pollution abatement and control processes (end-of-pipe)	11.1	27.5	349.3	250.2	400.5
Pollution prevention processes	45.6	31.2	261.2	77.6	206.7
Fees, fines and licences	35.2	19.0	33.4	11.3	18.2
Other	14.7	9.0	64.2	30.0	96.5
<b>Total</b>	<b>530.6</b>	<b>357.6</b>	<b>1,830.9</b>	<b>674.0</b>	<b>1,307.6</b>

**Note(s):** Figures may not add up to totals due to rounding. This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Table 153-0056.

**Table 7**  
**Operating expenditures on environmental protection per employee by establishment size, 2006**

	Number of employees per establishment					Total
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999	
	dollars per employee					
Environmental monitoring	58	58	132	163	264	133
Environmental assessments and audits	62	26	47	87	123	63
Reclamation and decommissioning	120	85	314	229	653	291
Wildlife and habitat protection	F	F	84	37	53	58
Waste management and sewerage services	1,343	759	890	828	1,044	949
Pollution abatement and control processes (end-of-pipe)	43	95	457	1,103	1,461	573
Pollution prevention processes	176	108	342	342	754	343
Fees, fines and licences	136	66	44	50	66	65
Other	57	31	84	132	352	118
<b>Total</b>	<b>2,045</b>	<b>1,242</b>	<b>2,394</b>	<b>2,972</b>	<b>4,771</b>	<b>2,592</b>

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 8**  
**Distribution of capital expenditures on pollution prevention by medium and industry and province or territory, 2006**

	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Other	Total
millions of dollars						
<b>Industry</b>						
Logging	F	F	F	F	F	F
Oil and gas extraction	122.9	63.7	x	4.4	x	377.1
Mining	3.2	28.1	15.0	x	x	49.2
Electric power generation, transmission and distribution	36.6	22.7	45.3	x	F	105.9
Natural gas distribution	52.6	x	1.3	x	0.0	54.1
Food	5.4	F	0.9	x	F	41.0
Beverage and tobacco products	x	0.4	0.7	x	x	3.1
Wood products	5.9	5.4	F	F	F	18.3
Paper manufacturing	31.8	11.7	2.3	0.8	5.4	52.0
Petroleum and coal products	508.1	18.8	x	F	x	533.1
Chemicals	27.5	4.9	7.6	0.1	4.0	44.0
Non-metallic mineral products	12.9	3.0	3.0	F	3.5	22.7
Primary metals	19.1	3.8	6.8	0.0	1.5	31.1
Fabricated metal products	F	0.3	F	x	F	F
Transportation equipment	7.1	1.1	F	F	F	18.7
Other manufacturing	24.7	F	F	x	F	73.0
Pipeline transportation	4.4	13.1	16.5	1.6	3.5	39.2
<b>Total</b>	<b>885.2</b>	<b>189.2</b>	<b>203.1</b>	<b>11.4</b>	<b>272.2</b>	<b>1,561.1</b>
<b>Province or territory</b>						
Atlantic provinces <sup>1</sup>	77.2	9.6	F	x	x	124.7
Quebec	216.4	22.0	8.0	0.9	36.1	283.4
Ontario	218.9	54.9	44.1	F	F	418.4
Manitoba	17.8	x	16.6	0.3	x	38.6
Saskatchewan	28.5	x	19.7	x	2.0	70.7
Alberta	286.0	72.2	77.4	x	x	569.7
British Columbia and the territories <sup>2</sup>	40.4	9.1	4.6	0.6	1.1	55.7
<b>Total</b>	<b>885.2</b>	<b>189.2</b>	<b>203.1</b>	<b>11.4</b>	<b>272.2</b>	<b>1,561.1</b>

1. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

2. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Tables 153-0054 and 153-0055.

**Table 9**  
**Distribution of capital expenditures on pollution abatement and control (end-of-pipe) by medium and industry and province or territory, 2006**

	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Total
millions of dollars					
<b>Industry</b>					
Logging	F	F	F	F	0.8
Oil and gas extraction	271.2	61.8	67.4	9.4	409.8
Mining	38.4	129.9	x	x	174.5
Electric power generation, transmission and distribution	52.5	x	x	x	65.8
Natural gas distribution	x	x	x	x	3.0
Food	8.8	x	F	x	12.8
Beverage and tobacco products	x	x	0.0	x	x
Wood products	17.1	x	x	F	30.7
Paper manufacturing	15.7	5.2	x	x	21.3
Petroleum and coal products	33.0	10.8	1.3	0.6	45.7
Chemicals	17.6	5.0	1.8	1.6	25.8
Non-metallic mineral products	14.8	0.9	x	x	16.1
Primary metals	49.5	13.0	5.1	1.2	68.9
Fabricated metal products	2.2	0.1	F	x	3.0
Transportation equipment	10.7	2.1	F	x	15.7
Other manufacturing	10.6	F	F	0.5	12.8
Pipeline transportation	0.2	x	x	x	x
<b>Total</b>	<b>545.6</b>	<b>249.0</b>	<b>94.2</b>	<b>19.9</b>	<b>908.7</b>
<b>Province or territory</b>					
Atlantic provinces <sup>1</sup>	x	x	x	x	84.6
Quebec	30.6	11.7	3.0	1.1	46.3
Ontario	152.6	41.8	7.2	8.1	209.7
Manitoba	x	x	x	F	17.1
Saskatchewan	12.0	F	3.4	0.3	69.5
Alberta	290.8	63.1	68.9	9.8	432.5
British Columbia and the territories <sup>2</sup>	28.6	16.3	3.7	0.5	49.1
<b>Total</b>	<b>545.6</b>	<b>249.0</b>	<b>94.2</b>	<b>19.9</b>	<b>908.7</b>

1. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

2. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division, CANSIM Tables 153-0054 and 153-0055.

**Table 10**  
**Pollution prevention methods by industry and province or territory, 2006**

	Product design or reformulation	Equipment or process modifications	Recirculation, on-site recycling, reuse or recovery	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or training	Other	Total <sup>1</sup>
	percent								
<b>Industry</b>									
Logging	9	19	35	9	20	65	61	9	71
Oil and gas extraction	20	53	48	23	26	77	73	9	87
Mining	16	31	63	23	37	66	65	9	88
Electric power generation, transmission and distribution	23	19	67	28	45	75	75	6	86
Natural gas distribution	10	41	42	20	37	82	85	25	87
Food	9	28	26	4	18	38	42	8	59
Beverage and tobacco products	11	30	76	16	24	66	63	4	94
Wood products	7	7	33	10	17	32	36	5	61
Paper manufacturing	21	32	56	25	30	41	49	2	81
Petroleum and coal products	33	43	58	19	10	61	47	3	87
Chemicals	24	32	52	17	29	59	55	8	76
Non-metallic mineral products	11	19	47	12	24	45	38	10	78
Primary metals	18	46	70	23	28	63	74	5	92
Fabricated metal products	10	18	35	13	24	42	33	5	63
Transportation equipment	18	32	54	32	39	63	55	1	84
Other manufacturing	16	17	40	19	25	32	37	8	65
Pipeline transportation	26	60	58	7	37	95	95	7	95
<b>Total</b>	<b>14</b>	<b>21</b>	<b>41</b>	<b>16</b>	<b>25</b>	<b>41</b>	<b>42</b>	<b>7</b>	<b>68</b>
<b>Province or territory</b>									
Newfoundland and Labrador	10	13	26	12	18	25	29	7	45
Prince Edward Island	6	15	33	9	17	30	37	x	52
Nova Scotia	20	23	24	15	32	32	33	3	57
New Brunswick	13	13	37	11	23	52	46	5	69
Quebec	10	16	39	16	26	33	33	4	62
Ontario	18	25	44	18	25	43	44	8	73
Manitoba	13	21	41	18	22	41	43	8	66
Saskatchewan	8	19	28	15	19	41	34	4	61
Alberta	14	23	45	15	21	49	52	10	73
British Columbia	9	16	35	12	25	48	46	9	63
Yukon, Northwest Territories and Nunavut	15	26	40	29	25	44	46	x	70
<b>Total</b>	<b>14</b>	<b>21</b>	<b>41</b>	<b>16</b>	<b>25</b>	<b>41</b>	<b>42</b>	<b>7</b>	<b>68</b>

1. Percentage of establishments that used at least one pollution prevention method.

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

**Table 11**  
**Distribution of pollution prevention methods by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
	percent				
Product design or reformulation	11	17	17	13	25
Equipment or process modifications	17	20	26	40	63
Recirculation, on-site recycling, reuse or recovery	33	46	49	64	74
Materials, feedstock or solvent substitution	13	16	20	29	50
Improved management or purchasing techniques	22	27	27	23	46
Prevention of leaks and spills	36	39	53	52	83
Good operating practices or training	37	38	55	52	82
Other	6	6	11	6	11
<b>Total<sup>1</sup></b>	<b>63</b>	<b>68</b>	<b>76</b>	<b>86</b>	<b>97</b>

1. Percentage of establishments that used at least one pollution prevention method.

Note(s): This table excludes the 'pipeline transportation' industry category.

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

**Table 12**  
**Expenditures on energy-related environmental processes and technologies by industry and province or territory, 2006<sup>1</sup>**

	Operating expenditures	Capital expenditures	Total
millions of dollars			
<b>Industry</b>			
Logging	6.0	F	7.7
Oil and gas extraction	22.5	472.9	495.4
Mining	6.2	16.0	22.2
Electric power generation, transmission and distribution	337.8	155.4	493.2
Natural gas distribution	1.6	0.3	1.9
Food	38.3	36.7	75.0
Beverage and tobacco products	4.0	F	7.2
Wood products	158.0	59.5	217.5
Paper manufacturing	266.6	69.5	336.1
Petroleum and coal products	22.4	33.6	56.0
Chemicals	113.7	19.4	133.1
Non-metallic mineral products	3.5	4.3	7.9
Primary metals	5.2	14.1	19.4
Fabricated metal products	1.6	F	F
Transportation equipment	14.9	4.6	19.5
Other manufacturing	5.5	31.9	37.4
Pipeline transportation	1.4	12.2	13.6
<b>Total</b>	<b>1,009.2</b>	<b>964.0</b>	<b>1,973.2</b>
<b>Province or territory</b>			
Atlantic provinces <sup>2</sup>	x	x	108.4
Quebec	77.5	119.3	196.8
Ontario	239.1	120.6	359.7
Manitoba	x	x	x
Saskatchewan	x	41.3	x
Alberta	183.4	592.2	775.6
British Columbia and the territories <sup>3</sup>	199.5	32.0	231.5
<b>Total</b>	<b>1,009.2</b>	<b>964.0</b>	<b>1,973.2</b>

1. Expenditures for energy-related environmental technologies were not restricted to those made in response to environmental regulations, conventions or voluntary agreements.

2. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

3. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 13**  
**Expenditures on energy-related environmental processes and technologies by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
millions of dollars					
Operating expenditures	31.0	45.5	538.2	205.6	187.5
Capital expenditures	43.1	63.0	476.8	226.7	142.2
<b>Total</b>	<b>74.1</b>	<b>108.5</b>	<b>1,015.0</b>	<b>432.3</b>	<b>329.7</b>

**Note(s):** Figures may not add up to totals due to rounding. This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.



**Table 14**  
**Distribution of energy-related environmental technology use, 2006**

	Percentage of establishments using each technology
	percent
Cogeneration	2
Alternative fuel systems or equipment	2
Fuel substitution	3
Waste energy recovery and reuse (for example, heat recovery)	12
Use of energy management or monitoring system(s)	11
Performed energy audit in the last three years 2004 to 2006	10
Other systems, equipment or employee training that improved energy efficiency	6
<b>Renewable energy technologies</b>	
Small, mini, or micro-hydroelectric facility	0 <sup>s</sup>
Solar energy systems or equipment	1
Wind energy systems or equipment	1
Biomass energy <sup>1</sup>	3
Geothermal	0 <sup>s</sup>
Other renewable energy systems or equipment	1
Total use of renewable energy technologies <sup>2</sup>	5
<b>Total<sup>3</sup></b>	<b>25</b>

1. Examples include energy crops and waste-to-energy.

2. Percentage of establishments that used at least one renewable energy technology.

3. Percentage of establishments that used at least one energy-related environmental technology.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 15**  
**Distribution of energy-related environmental technology use by industry and province or territory, 2006**

	Cogeneration	Alternative fuel systems or equipment	Fuel substitution	Waste energy recovery and reuse	Use of energy management or monitoring systems	Performed energy audit past three years 2004 to 2006	Other systems, equipment or employee training
	percent <sup>1</sup>						
<b>Industry</b>							
Logging	1	7	3	4	9	3	9
Oil and gas extraction	15	21	15	35	39	24	12
Mining	2	3	4	20	25	17	11
Electric power generation, transmission and distribution	13	5	7	12	39	29	28
Natural gas distribution	x	x	13	11	36	9	16
Food	1	1	2	19	17	22	13
Beverage and tobacco products	0	13	x	24	34	10	5
Wood products	8	5	5	26	12	7	2
Paper manufacturing	11	8	11	28	22	29	6
Petroleum and coal products	4	7	21	36	28	24	25
Chemicals	4	5	6	23	14	16	15
Non-metallic mineral products	0	2	5	8	9	10	4
Primary metals	1	4	3	24	37	33	20
Fabricated metal products	0 <sup>s</sup>	1	0 <sup>s</sup>	4	8	4	2
Transportation equipment	x	1	x	9	20	14	7
Other manufacturing	1	0 <sup>s</sup>	2	8	5	5	3
Pipeline transportation	0	21	7	x	37	x	30
<b>Total</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>6</b>
<b>Province or territory</b>							
Newfoundland and Labrador	4	4	4	14	10	4	4
Prince Edward Island	0	x	8	19	10	6	x
Nova Scotia	3	3	3	21	22	7	6
New Brunswick	2	8	6	18	15	12	6
Quebec	3	1	6	14	12	13	5
Ontario	1	1	1	11	11	10	6
Manitoba	2	5	3	9	10	12	10
Saskatchewan	3	4	2	16	12	10	6
Alberta	3	4	2	13	9	8	7
British Columbia	3	4	2	10	8	4	7
Yukon, Northwest Territories and Nunavut	24	26	29	30	46	15	x
<b>Total</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>6</b>

See footnotes at the end of the table.

Table 15 – continued

## Distribution of energy-related environmental technology use by industry and province or territory, 2006

	Renewable energy technologies						Total <sup>3</sup>
	Small, mini- or micro- hydroelectric facility	Solar energy systems or equipment	Wind energy systems or equipment	Biomass energy <sup>2</sup>	Geothermal	Other renewable energy systems or equipment	
	percent <sup>1</sup>						
<b>Industry</b>							
Logging	0	3	0	5	2	2	19
Oil and gas extraction	x	51	4	x	0	3	71
Mining	x	5	0	0	0	x	41
Electric power generation, transmission and distribution	10	11	11	4	x	x	64
Natural gas distribution	0	11	24	20	0	x	50
Food	0	x	0	1	0	1	41
Beverage and tobacco products	0	0	0	0	0	x	38
Wood products	0	1	0	21	1	1	47
Paper manufacturing	3	x	x	16	0	0	42
Petroleum and coal products	0	x	0	x	0	1	59
Chemicals	0	0	0	x	x	1	35
Non-metallic mineral products	0	1	0	1	0	x	24
Primary metals	1	0	0	x	0	1	49
Fabricated metal products	0	0	0	0 <sup>s</sup>	0	x	15
Transportation equipment	0	0 <sup>s</sup>	7	0	0 <sup>s</sup>	0	32
Other manufacturing	0	x	0	x	0 <sup>s</sup>	1	13
Pipeline transportation	0	23	x	0	0	x	40
<b>Total</b>	<b>0<sup>s</sup></b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>0<sup>s</sup></b>	<b>1</b>	<b>25</b>
<b>Province or territory</b>							
Newfoundland and Labrador	4	0	x	7	0	x	23
Prince Edward Island	0	0	x	7	x	0	25
Nova Scotia	x	x	x	4	0	1	31
New Brunswick	x	1	0	15	0	x	41
Quebec	0 <sup>s</sup>	0 <sup>s</sup>	x	2	0 <sup>s</sup>	0 <sup>s</sup>	26
Ontario	0 <sup>s</sup>	0 <sup>s</sup>	1	2	x	1	24
Manitoba	0	x	x	2	3	1	26
Saskatchewan	0	7	1	x	0	0	25
Alberta	1	5	1	2	1	1	25
British Columbia	x	2	1	4	0	1	22
Yukon, Northwest Territories and Nunavut	0	35	0	0	0	0	65
<b>Total</b>	<b>0<sup>s</sup></b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>0<sup>s</sup></b>	<b>1</b>	<b>25</b>

1. Percentage of establishments using each technology.

2. Examples include energy crops and waste-to-energy.

3. Percentage of establishments that used at least one energy conservation process or technology.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 16**  
**Distribution of energy-related environmental technology use by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
	percent <sup>1</sup>				
Cogeneration	1	2	3	8	15
Alternative fuel systems or equipment	1	1	3	7	13
Fuel substitution	2	2	4	8	19
Waste energy recovery and reuse	8	13	19	25	42
Use of energy management or monitoring systems	6	9	19	46	56
Performed energy audit past three years 2004 to 2006	3	9	20	41	50
Other systems, equipment or employee training	2	7	11	13	33
<b>Renewable energy technologies</b>					
Small, mini- or micro-hydroelectric facility	0 <sup>s</sup>	0	0 <sup>s</sup>	4	3
Solar energy systems or equipment	1	1	2	4	14
Wind energy systems or equipment	0 <sup>s</sup>	1	0 <sup>s</sup>	2	5
Biomass energy <sup>2</sup>	2	3	4	9	7
Geothermal	0 <sup>s</sup>	0	1	0	x
Other renewable energy systems or equipment	0 <sup>s</sup>	2	1	2	4
<b>Total <sup>3</sup></b>	<b>15</b>	<b>27</b>	<b>40</b>	<b>57</b>	<b>82</b>

1. Percentage of establishments using each technology.

2. Examples include energy crops and waste-to-energy.

3. Percentage of establishments that used at least one energy conservation process or technology.

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 17**  
**Adoption and impact of new or significantly improved systems or equipment to improve energy efficiency by industry and province or territory, 2006<sup>1</sup>**

	Introduced new or significantly improved systems or equipment	Impact on energy use <sup>2</sup>		
	Yes	Low	Moderate	High
	percent			
<b>Industry</b>				
Logging	12	34	66	0
Oil and gas extraction	43	36	52	13
Mining	28	33	53	14
Electric power generation, transmission and distribution	41	57	24	20
Natural gas distribution	19	x	76	x
Food	24	45	42	13
Beverage and tobacco products	25	13	34	54
Wood products	18	54	32	13
Paper manufacturing	22	24	54	22
Petroleum and coal products	33	19	74	x
Chemicals	30	28	68	4
Non-metallic mineral products	23	46	45	9
Primary metals	39	51	28	21
Fabricated metal products	20	21	65	14
Transportation equipment	38	40	58	2
Other manufacturing	18	39	36	25
Pipeline transportation	42	17	78	x
<b>Total</b>	<b>22</b>	<b>37</b>	<b>46</b>	<b>16</b>
<b>Province or territory</b>				
Newfoundland and Labrador	19	20	80	0
Prince Edward Island	9	51	x	x
Nova Scotia	19	10	82	8
New Brunswick	16	23	68	9
Quebec	18	41	38	21
Ontario	28	36	46	19
Manitoba	19	50	45	5
Saskatchewan	15	28	58	15
Alberta	15	38	56	7
British Columbia	18	46	45	9
Yukon, Northwest Territories and Nunavut	45	74	x	0
<b>Total</b>	<b>22</b>	<b>37</b>	<b>46</b>	<b>16</b>

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.

2. Respondents who answered 'yes' to the adoption of new or significantly improved systems or equipment were asked to rank the impact on energy efficiency as being low, moderate or high.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 18**  
**Adoption and impact of new or significantly improved systems or equipment to improve energy efficiency by establishment size, 2006<sup>1</sup>**

	Introduced new or significantly improved systems or equipment	Impact on energy use <sup>2</sup>			
		Yes	Low	Moderate	High
percent					
<b>Number of employees per establishment</b>					
Fewer than 50	16	42	46	11	
50 to 99	19	31	55	14	
100 to 499	34	39	40	21	
500 to 999	33	24	44	32	
More than 999	56	25	54	21	
<b>Total</b>	<b>22</b>	<b>38</b>	<b>46</b>	<b>16</b>	

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.
2. Respondents who answered 'yes' to the adoption of new or significantly improved systems or equipment were asked to rank the impact on energy efficiency as being low, moderate or high.

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 19**  
**Average proportion of total capital expenditures spent on machinery and equipment to improve energy efficiency by industry and province or territory, 2006**

	Average proportion of total capital expenditures
	percent
<b>Industry</b>	
Logging	3
Oil and gas extraction	6
Mining	3
Electric power generation, transmission and distribution	12
Natural gas distribution	7
Food	F
Beverage and tobacco products	7
Wood products	2
Paper manufacturing	4
Petroleum and coal products	11
Chemicals	4
Non-metallic mineral products	1
Primary metals	6
Fabricated metal products	5
Transportation equipment	F
Other manufacturing	3
Pipeline transportation	12
<b>Total</b>	<b>3</b>
<b>Province or territory</b>	
Newfoundland and Labrador	6
Prince Edward Island	2
Nova Scotia	1
New Brunswick	1
Quebec	3
Ontario	5
Manitoba	4
Saskatchewan	3
Alberta	3
British Columbia	1
Yukon, Northwest Territories and Nunavut	9
<b>Total</b>	<b>3</b>

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 20**  
**Obstacles to the adoption of technologies to improve energy efficiency by industry and province or territory, 2006<sup>1</sup>**

	Lack of information or knowledge	Lack of available new and improved technology	Lack of skilled personnel	High cost of equipment	Lack of financing	Regulatory and policy barriers	Other	Share of establishments in industry, province or territory that reported encountering one or more obstacles	Industry, province or territory share of reported obstacles
percent									
<b>Industry</b>									
Logging	26	43	34	77	54	10	7	59	3
Oil and gas extraction	34	40	26	69	30	25	17	82	2
Mining	42	50	20	58	42	9	12	74	1
Electric power generation, transmission and distribution	25	36	5	86	35	38	8	70	1
Natural gas distribution	8	9	x	57	45	77	x	72	0 <sup>s</sup>
Food	50	22	21	50	37	10	11	74	12
Beverage and tobacco products	34	16	4	72	29	0	21	74	1
Wood products	46	22	11	74	35	12	3	59	7
Paper manufacturing	29	30	10	60	42	3	4	76	3
Petroleum and coal products	31	29	32	74	32	14	12	87	1
Chemicals	31	39	22	80	49	19	11	74	5
Non-metallic mineral products	29	35	17	78	43	19	7	67	4
Primary metals	32	26	22	84	49	2	6	79	2
Fabricated metal products	46	30	8	52	37	4	8	68	15
Transportation equipment	46	46	15	59	45	6	24	72	6
Other manufacturing	52	33	24	62	41	6	4	56	36
Pipeline transportation	21	61	12	58	x	24	9	77	0 <sup>s</sup>
<b>Total</b>	<b>45</b>	<b>32</b>	<b>19</b>	<b>63</b>	<b>40</b>	<b>8</b>	<b>8</b>	<b>64</b>	<b>100</b>
<b>Province or territory</b>									
Newfoundland and Labrador	31	27	17	81	47	8	4	41	1
Prince Edward Island	53	28	15	68	45	10	3	64	0 <sup>s</sup>
Nova Scotia	36	10	26	76	52	2	4	54	2
New Brunswick	31	25	17	73	52	4	5	70	2
Quebec	57	28	19	57	31	7	9	59	21
Ontario	45	33	16	63	47	7	6	68	46
Manitoba	39	34	20	61	43	8	17	63	3
Saskatchewan	49	36	34	71	28	12	11	68	2
Alberta	41	35	31	65	22	6	14	56	9
British Columbia	34	32	16	65	41	18	6	65	13
Yukon, Northwest Territories and Nunavut	17	64	0	75	30	23	8	66	0 <sup>s</sup>
<b>Total</b>	<b>45</b>	<b>32</b>	<b>19</b>	<b>63</b>	<b>40</b>	<b>8</b>	<b>8</b>	<b>64</b>	<b>100</b>

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

**Table 21**  
**Obstacles to the adoption of technologies to improve energy efficiency by industry: Innovators versus non-innovators, 2006<sup>1</sup>**

	Lack of information or knowledge		Lack of available new or improved technology		Lack of skilled personnel		High cost of equipment	
	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator
	percent							
Logging	15	15	38	23	x	22	96	39
Oil and gas extraction	33	23	36	30	34	11	69	47
Mining	33	30	28	40	27	10	47	42
Electric power generation, transmission and distribution	16	18	18	30	9	0	70	53
Natural gas distribution	x	x	x	x	x	0	41	40
Food	33	38	24	14	31	11	58	31
Beverage and tobacco products	74	9	16	10	0	4	85	43
Wood products	14	30	13	13	9	6	51	42
Paper manufacturing	18	23	14	26	12	7	62	40
Petroleum and coal products	30	25	15	30	43	20	69	62
Chemicals	33	19	43	23	22	14	61	58
Non-metallic mineral products	7	23	13	27	7	13	81	43
Primary metals	21	28	19	21	15	19	85	54
Fabricated metal products	36	30	17	21	4	5	44	33
Transportation equipment	23	39	26	38	2	16	33	48
Other manufacturing	23	31	20	18	24	11	55	30
Pipeline transportation	22	12	22	64	22	0	78	20
<b>Total</b>	<b>25</b>	<b>30</b>	<b>22</b>	<b>20</b>	<b>17</b>	<b>11</b>	<b>56</b>	<b>36</b>
	Lack of financing		Regulatory and policy barriers		Other			
	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator
	percent							
Logging	73	26	14	5	15	3		
Oil and gas extraction	29	21	33	11	14	14		
Mining	37	29	14	4	0	13		
Electric power generation, transmission and distribution	34	17	30	24	8	4		
Natural gas distribution	x	37	x	65	0	x		
Food	36	24	14	6	15	6		
Beverage and tobacco products	26	20	0	0	0	21		
Wood products	31	19	20	4	x	2		
Paper manufacturing	53	26	8	1	x	3		
Petroleum and coal products	21	31	17	9	24	x		
Chemicals	26	41	24	9	15	5		
Non-metallic mineral products	59	19	4	15	4	5		
Primary metals	53	30	x	2	6	4		
Fabricated metal products	9	29	3	2	0	7		
Transportation equipment	18	41	3	5	35	6		
Other manufacturing	41	19	7	2	x	3		
Pipeline transportation	0	x	0	32	0	12		
<b>Total</b>	<b>34</b>	<b>23</b>	<b>10</b>	<b>4</b>	<b>7</b>	<b>4</b>		

1. Establishments who answered 'yes' to adopting new or significantly improved systems or equipment to improve energy efficiency during the period 2004 to 2006 are considered 'innovators.' Establishments who answered 'no' to adopting new or significantly improved systems or equipment to improve energy efficiency during the period 2004 to 2006 are considered 'non-innovators.'

Source(s): Statistics Canada, Environment Accounts and Statistics Division.



**Table 22**  
**Obstacles to the adoption of technologies to improve energy efficiency by establishment size, 2006<sup>1</sup>**

	Lack of information or knowledge	Lack of available new or improved technology	Lack of skilled personnel	High cost of equipment	Lack of financing	Regulatory and policy barriers	Other	Share of establishments in employment group that reported encountering one or more obstacles	Employment group share of reported obstacles
	percent								
<b>Number of employees per establishment</b>									
Fewer than 50	56	31	19	57	33	6	8	58	45
50 to 99	39	32	17	63	44	11	6	67	26
100 to 499	30	31	21	73	46	9	9	69	25
500 to 999	55	45	17	60	58	10	7	87	3
More than 999	27	20	15	83	56	15	11	83	1
<b>Total</b>	<b>45</b>	<b>32</b>	<b>19</b>	<b>63</b>	<b>40</b>	<b>8</b>	<b>8</b>	<b>64</b>	<b>100</b>

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 23**  
**Drivers to the adoption of technologies to improve energy efficiency by industry and province or territory, 2006<sup>1</sup>**

	Sufficient return on investment	Regulations	Voluntary agreement	Public relations	Corporate policy, culture and awareness	Other	Share of establishments in industry, province or territory that reported encountering one or more drivers	Industry, province or territory share of reported drivers
	percent							
<b>Industry</b>								
Logging	67	45	16	17	49	7	46	3
Oil and gas extraction	73	74	38	52	63	4	79	2
Mining	72	57	34	35	68	9	67	1
Electric power generation, transmission and distribution	68	61	34	46	76	10	83	1
Natural gas distribution	83	78	33	67	82	0	62	0 <sup>s</sup>
Food	83	39	7	15	45	2	59	10
Beverage and tobacco products	99	63	19	40	69	0	80	1
Wood products	74	42	12	17	31	7	59	8
Paper manufacturing	89	30	7	13	38	4	63	3
Petroleum and coal products	76	44	25	29	63	x	80	1
Chemicals	80	38	24	16	38	18	65	5
Non-metallic mineral products	84	41	23	25	43	2	61	4
Primary metals	91	50	26	29	53	4	76	2
Fabricated metal products	80	39	16	8	37	1	61	15
Transportation equipment	81	39	35	13	37	27	59	5
Other manufacturing	72	26	7	11	45	3	50	36
Pipeline transportation	88	79	39	36	48	x	77	0 <sup>s</sup>
<b>Total</b>	<b>77</b>	<b>36</b>	<b>14</b>	<b>15</b>	<b>43</b>	<b>5</b>	<b>57</b>	<b>100</b>
<b>Province or territory</b>								
Newfoundland and Labrador	74	45	20	37	49	0	39	1
Prince Edward Island	74	37	9	18	44	0	51	0 <sup>s</sup>
Nova Scotia	92	34	22	31	44	3	56	2
New Brunswick	76	24	15	22	41	6	59	2
Quebec	77	29	13	14	50	5	57	23
Ontario	79	36	13	11	33	6	59	45
Manitoba	77	43	19	16	48	4	43	3
Saskatchewan	86	60	31	37	54	4	53	2
Alberta	73	40	16	17	55	2	54	10
British Columbia	71	45	13	24	55	5	56	13
Yukon, Northwest Territories and Nunavut	82	46	29	34	51	x	89	0 <sup>s</sup>
<b>Total</b>	<b>77</b>	<b>36</b>	<b>14</b>	<b>15</b>	<b>43</b>	<b>5</b>	<b>57</b>	<b>100</b>

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

Table 24

Drivers to the adoption of technologies to improve energy efficiency by industry: Innovators versus non-innovators, 2006<sup>1</sup>

	Sufficient return on investment		Regulations		Voluntary agreement		Public relations	
	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator	Innovator	Non-innovator
	percent							
Logging	75	25	33	19	18	6	19	6
Oil and gas extraction	71	47	71	49	51	15	66	22
Mining	57	45	48	34	30	20	47	14
Electric power generation, transmission and distribution	73	45	51	50	38	22	42	36
Natural gas distribution	86	43	52	47	72	8	59	37
Food	69	44	15	26	5	4	6	9
Beverage and tobacco products	96	73	23	59	13	16	17	37
Wood products	43	44	40	21	25	3	15	9
Paper manufacturing	90	47	38	14	10	3	17	6
Petroleum and coal products	68	57	37	34	33	14	40	16
Chemicals	78	41	39	18	38	6	23	5
Non-metallic mineral products	77	43	29	23	7	16	16	15
Primary metals	88	58	51	29	43	5	31	16
Fabricated metal products	74	42	28	23	19	8	6	5
Transportation equipment	40	52	18	26	4	31	10	6
Other manufacturing	63	30	25	10	7	3	6	6
Pipeline transportation	89	52	83	44	67	x	50	12
<b>Total</b>	<b>66</b>	<b>38</b>	<b>29</b>	<b>18</b>	<b>15</b>	<b>6</b>	<b>13</b>	<b>8</b>

	Corporate policy, culture and awareness		Other	
	Innovator	Non-innovator	Innovator	Non-innovator
	percent			
Logging		65	17	12
Oil and gas extraction		76	30	7
Mining		73	35	0
Electric power generation, transmission and distribution		74	56	10
Natural gas distribution		76	45	0
Food		45	21	4
Beverage and tobacco products		38	61	0
Wood products		21	18	4
Paper manufacturing		52	16	11
Petroleum and coal products		76	38	x
Chemicals		46	16	21
Non-metallic mineral products		15	30	0
Primary metals		66	24	5
Fabricated metal products		33	19	1
Transportation equipment		17	24	17
Other manufacturing		41	18	7
Pipeline transportation		61	20	0
<b>Total</b>		<b>40</b>	<b>20</b>	<b>7</b>

1. Establishments who answered 'yes' to adopting new or significantly improved systems or equipment to improve energy efficiency during the period 2004 to 2006 are considered 'innovators.' Establishments who answered 'no' to adopting new or significantly improved systems or equipment to improve energy efficiency during the period 2004 to 2006 are considered 'non-innovators.'

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

**Table 25**  
**Drivers to the adoption of technologies to improve energy efficiency by establishment size, 2006<sup>1</sup>**

	Sufficient return on investment	Regulations	Voluntary agreement	Public relations	Corporate policy, culture and awareness	Other	Share of establishments in employment group that reported encountering one or more drivers	Employment group share of reported drivers
	percent							
Number of employees per establishment								
Fewer than 50	72	40	14	12	39	5	50	44
50 to 99	83	23	8	13	41	5	60	26
100 to 499	81	43	17	22	50	2	63	25
500 to 999	71	39	31	24	52	23	87	3
More than 999	88	55	30	34	71	6	87	1
<b>Total</b>	<b>77</b>	<b>36</b>	<b>14</b>	<b>15</b>	<b>43</b>	<b>5</b>	<b>57</b>	<b>100</b>

1. Adoption of new or significantly improved systems or equipment within a three-year period, 2004 to 2006.

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 26**  
**Use of environmental management practices by establishments, 2006**

	Proportion of establishments using the practice	Employment share of establishments using the practice
	percent	
Environmental management system	18	45
Life cycle analysis	5	14
ISO 14000 certification <sup>1</sup>	7	23
ISO 14064 certification	4	5
Implementation of a pollution prevention plan	17	34
Environmental voluntary agreements	7	23
Green procurement policy	7	13
Eco-labelling of products	5	7
Annual environmental performance report	10	33
Other	2	3
<b>Total</b>	<b>34<sup>2</sup></b>	<b>59</b>

1. Percentage of respondents that indicated they are planning to obtain ISO 14064 certification within the next two years 2007 and 2008.

2. Percentage of establishments that used at least one environmental management practice.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 27**  
**Distribution of environmental management practices by industry and province or territory, 2006**

	Environmental management system	Life cycle analysis	ISO 14000 certification	ISO 14064 certification <sup>1</sup>	Implementation of a pollution prevention plan	Environmental voluntary agreements	Green procurement policy	Eco-labelling of products	Annual environmental performance report	Other	Total <sup>2</sup>
	percent										
<b>Industry</b>											
Logging	47	6	20	1	24	22	4	8	8	2	57
Oil and gas extraction	64	25	4	3	37	44	7	5	55	4	79
Mining	51	19	14	3	35	20	15	4	47	5	63
Electric power generation, transmission and distribution	57	30	29	0	41	43	46	28	53	5	81
Natural gas distribution	80	24	6	x	71	26	12	23	51	x	87
Food	16	5	x	x	19	7	5	1	6	1	35
Beverage and tobacco products	19	0	x	0	9	13	3	0	6	x	37
Wood products	19	3	8	5	14	7	6	8	12	5	37
Paper manufacturing	30	3	19	4	27	10	11	11	23	2	50
Petroleum and coal products	54	20	10	8	51	31	9	13	33	6	74
Chemicals	30	15	7	1	38	18	12	9	19	2	59
Non-metallic mineral products	16	3	3	3	14	7	2	2	10	1	27
Primary metals	45	10	31	10	29	13	4	2	26	x	61
Fabricated metal products	10	4	4	4	15	1	7	3	2	1	27
Transportation equipment	36	16	32	12	44	26	12	x	20	1	54
Other manufacturing	8	2	4	4	8	1	6	5	5	2	23
Pipeline transportation	95	35	14	x	58	58	14	0	67	x	100
<b>Total</b>	<b>18</b>	<b>5</b>	<b>7</b>	<b>4</b>	<b>17</b>	<b>7</b>	<b>7</b>	<b>5</b>	<b>10</b>	<b>2</b>	<b>34</b>
<b>Province or territory</b>											
Newfoundland and Labrador	18	4	8	3	7	8	4	x	17	2	25
Prince Edward Island	14	4	0	0	23	4	x	0	7	4	27
Nova Scotia	22	10	4	7	21	11	12	4	15	2	40
New Brunswick	19	4	10	0	17	6	5	6	15	9	38
Quebec	18	5	5	1	21	4	5	4	8	3	33
Ontario	17	6	10	7	16	7	10	6	9	1	37
Manitoba	14	3	4	1	11	8	4	2	12	3	26
Saskatchewan	23	7	3	2	16	18	4	6	21	2	38
Alberta	19	4	4	1	12	10	4	2	13	4	30
British Columbia	20	5	7	1	15	10	3	5	8	1	32
Yukon, Northwest Territories and Nunavut	64	21	0	0	38	45	x	0	41	0	64
<b>Total</b>	<b>18</b>	<b>5</b>	<b>7</b>	<b>4</b>	<b>17</b>	<b>7</b>	<b>7</b>	<b>5</b>	<b>10</b>	<b>2</b>	<b>34</b>

1. Percentage of respondents that indicated they are planning to obtain ISO 14064 certification within the next two years 2007 and 2008.

2. Percentage of establishments that used at least one environmental management practice.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 28**  
**Distribution of environmental management practices by establishment size, 2006**

	Number of employees per establishment				
	Fewer than 50	50 to 99	100 to 499	500 to 999	More than 999
	percent				
Environmental management system	8	14	34	69	83
Life cycle analysis	4	3	8	25	29
ISO 14000 certification	2	2	19	49	47
ISO 14064 certification <sup>1</sup>	3	3	7	3	7
Implementation of a pollution prevention plan	11	12	29	61	59
Environmental voluntary agreements	3	7	12	35	44
Green procurement policy	5	6	10	24	17
Eco-labelling of products	3	5	7	5	9
Annual environmental performance report	3	7	21	61	67
Other	2	2	2	3	7
<b>Total <sup>2</sup></b>	<b>24</b>	<b>31</b>	<b>52</b>	<b>77</b>	<b>95</b>

1. Percentage of respondents that indicated they are planning to obtain ISO 14064 certification within the next two years 2007 and 2008.

2. Percentage of establishments that used at least one environmental management practice.

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

**Table 29**  
**Distribution of establishments that reported cost savings as a result of adopting environmental management practices by establishment size, 2006**

Number of employees per establishment	Establishments reporting cost savings
	percent
Fewer than 50	8
50 to 100	13
100 to 499	24
500 to 999	48
More than 999	66
<b>Total</b>	<b>14</b>

**Note(s):** This table excludes the 'pipeline transportation' industry category.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

## Introduction

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The information in the following sections 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.

The survey underwent a thorough redesign for the 2006 reference year to improve overall methodology and data quality indicators, as well as to improve coverage for smaller businesses. Because of the methodological changes and expanded coverage, comparisons with survey estimates for previous years are not recommended. For more detailed information on the redesign please see the section "Data quality, concepts and methodology — General methodology" that follows.

## Data sources and methodology

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The SEPE targets industries in the primary and manufacturing sectors, traditionally the most important spenders in the economy on environmental protection.

The data reported in this study are based upon a survey of 3,215 units 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.

For the 2006 reference year, one of two sampling units were used, depending on industry group. The pipeline transportation and the oil and gas extraction industries were surveyed at the enterprise unit level. The remaining 14 industry groups were surveyed at the establishment unit level. In order to reduce response burden for very small businesses, an establishment had to have more than 19 employees to be selected for inclusion in the survey.

### Reference period

Respondents were asked to report for a 12-month period ending between April 1, 2006 to March 31, 2007. The results in this report, however, are simply presented as environmental protection expenditures made during 2006. No adjustment to the data is made for companies that do not report a fiscal year ending on December 31<sup>st</sup>.



## General methodology

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The methodology for the Survey of Environmental Protection Expenditures (SEPE) underwent a thorough redesign for the 2006 reference year. The redesign consisted of the adoption of the central Business Register as the survey frame, the use of a probabilistic sampling strategy and an improved coverage of smaller businesses.

The major change for the 2006 reference year was the adoption of a probabilistic sampling approach. In the past, sample selection was based on a stratified sample designed to choose the largest establishments based on employment. The move to a probabilistic sampling methodology resulted in a more representative sample of the entire population, particularly small and medium sized businesses. In order to improve the estimates of smaller businesses further, the survey coverage was also expanded to include businesses with 20 to 49 employees. Prior to the 2006 reference year, businesses with less than 50 employees were not selected.

The change in sampling strategy also resulted in changes to the imputation and estimation processes. For the first time, generalized Statistics Canada programs were used in place of the custom designed divisional edit and imputation programs. Imputation was performed only on partial non-response records for 2006. Total non-response records were not imputed, rather the sampling weights of similar records that responded were readjusted to account for the non-response. Estimation was done by multiplying the readjusted sampling weights to the response values. In the past, imputation was done for partial and total non-response records and estimation was done using the mean environmental protection expenditure per employee ratio.

As a result of these methodological changes and expanded coverage, comparisons with previous estimates from the SEPE are not recommended.

### Survey frame

The Survey frame was constructed from the Survey Universe File (SUF) of the 2006 Unified Enterprise Survey. This establishment level file was produced from Statistics Canada's Business Register file in October, 2006.

### Sample selection

#### Industry classification

The North American Industry Classification System (NAICS) is an industry classification system 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.<sup>1</sup>

### Coverage and sample selection

The survey covers businesses active in primary industries (resource extraction), 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. Although the coverage was expanded to include estimates for smaller businesses, businesses with less than 20 employees were not included in the sample population. This was done in order to minimize response burden.

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1. Statistics Canada, 2002. North American industry Classification System, catalogue no. 12-501-X, Ottawa.

Sample selection was done using two different methods according to industry group. For the oil and gas extraction and the pipeline transportation industries, the sampling unit was the enterprise and a census was taken for all enterprises above the 19 employee threshold. The remaining industry groups were sampled using a stratified sampling strategy at the establishment level.

As a statistical unit, the enterprise is defined as the organisational unit of a business that directs and controls the allocation of resources relating to its domestic operations, and for which consolidated financial and balance sheet accounts are maintained. From these accounts, international transactions, an international investment position and a consolidated financial position for the unit can be derived.

An establishment, as a statistical unit, is defined as the most homogeneous unit of production for which the business maintains accounting records required to compile the full structure of the gross value of production (total sales or shipments, and inventories), the cost of materials and services, and labour and capital used in production.

For simplicity, enterprises and establishments will be referred to as businesses in the Analysis section of this report.

For all industries, with the exception of oil and gas extraction and pipeline transportation industries, establishments were stratified by industry group (NAICS at 3 and 4 digits) and by province. A size measure of total revenues was used as an auxiliary variable.

The must take units; those selected with certainty, met at least one of the following three conditions:

1. The sampling unit was an establishment whose respective enterprise was also in the oil and gas extraction or pipeline transportation industries;
2. The sampling unit had at least 250 employees, or
3. The sampling unit was located in Prince Edward Island, Yukon, Northwest Territories or Nunavut.

A total of 16 industry groups were targeted for increased survey coverage based on 4, 5 and 6-digit NAICS industries (see text box "**List of selected targeted industries**").

The remaining industries in the manufacturing sector were sampled at the 4-digit NAICS level and grouped into an 'other manufacturing' category.

**List of selected targeted industries**

- Logging (NAICS 1133);
- Oil and Gas Extraction (NAICS 211);
- Mining (NAICS 2121, 2122, 212326);
- 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);
- Paper Manufacturing (NAICS 322);
- 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 486).

## Concepts and variables measured

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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 agreements (see text box "**Environmental protection expenditures**" and the questionnaire (see IMDB 1903) for further explanation).

The questionnaire was sent to establishments and enterprises in target industries and it requested that they report a breakdown of expenditures into capital (investment) expenditures and operating expenditures for:

- waste management and sewerage services
- pollution abatement and control (end-of-pipe)
- pollution prevention
- environmental monitoring
- environmental assessment and audits
- site reclamation and decommissioning
- protection and restoration of wildlife and habitat
- environmental charges

The questionnaire also included two qualitative questions related to the use of pollution prevention methods and environmental management practices at the establishment or enterprise.

Questions related to environmental processes and technologies were modified for the 2006 questionnaire to focus on energy efficiency rather than on greenhouse gas emissions. The questions were designed to measure what proportion of overall investments were made to improve energy efficiency, whether or not the businesses introduced new technology (innovative), and the impact of these investments on energy use. In addition, statistics were collected on the types of drivers and obstacles businesses encountered in the adoption of these technologies.

Information was collected on the length of time it took respondents to complete the questionnaire (including the time required to gather the necessary information). This information was used by Statistics Canada to track response burden. Other revisions were made to the 2006 questionnaire where necessary to improve wording, coverage and clarity.

### Expenditures on energy-related environmental technologies

Respondents were asked to report operating and capital expenditures made for selected technologies and methods used to improve energy efficiency or for renewable energy technologies (Questions 12.1, 12.2 and 12.3). For these questions, respondents were not required to restrict their reported expenditures to those made in response to environmental regulation, convention or voluntary agreement.

## Environmental protection expenditures

Environmental protection expenditures are defined as all capital (investment) and operating (current) expenditures<sup>1</sup> incurred by businesses in order to comply with or to anticipate Canadian and international environmental regulations, conventions<sup>2</sup> or voluntary agreements. The challenge in measuring expenditures made on environmental initiatives (for example, 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 an official voluntary agreement.<sup>3</sup> Environmental protection expenditures are classified as follows:

**Waste management and sewerage services:** Expenditures related to the collection, treatment, storage and disposal or recycling of hazardous and non-hazardous waste and sewage;

**Pollution abatement and control processes (end-of-pipe):** 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 impact on the production process itself;

**Pollution prevention:** 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 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 the current compliance of operations 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;

**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<sup>4</sup>.

1. Capital expenditures refer to all costs in 2006 (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 and accruals, incurred during the 2006 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) and Memorandums of Understanding (MOUs).

4. Statistics Canada, 2006/2007, Research and Development in Canadian Industry Survey, Catalogue no. 88-001-X, Ottawa.

## Data accuracy

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The mailout of the 2006 Survey of Environmental Protection Expenditures took place in August, 2007. Data collection was carried out from September 2007 to the end of February 2008. Survey questionnaires were mailed to specific establishments and enterprises identified by the sampling process and the responses were returned by mail. Where possible, 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

Text table 1 "Response rates by industry and by province, 2006", shows the response rate for each industry and province and territory, according to the number of reporting establishments as a percentage of the total number of survey establishments in scope.

For the 2006 reference year, there were 2,412 reports received for 3,215 surveyed establishments and enterprises. The response rate for the 2006 survey was 75%.

Response rates by industry ranged from a high of 91% in the pipeline transportation industry to a low of 59% in the beverage and tobacco products industry. Response rates by province and territory ranged from a low of 57% in Newfoundland and Labrador to a high of 79% in both Quebec and Saskatchewan.

**Text table 1**  
**Response rates by industry and by province or territory, 2006**

	According to number of reporting units		
	Responses	Total <sup>1</sup>	Response as a percentage of total <sup>1</sup>
	number		percent
<b>Industry</b>			
Logging	119	186	64
Oil and gas extraction	203	249	82
Mining	92	112	82
Electric power generation, transmission and distribution	77	95	81
Natural gas distribution	45	54	83
Food	258	347	74
Beverage and tobacco products	38	64	59
Wood products	177	252	70
Paper manufacturing	173	206	84
Petroleum and coal products	51	67	76
Chemicals	150	189	79
Non-metallic mineral products	170	241	71
Primary metals	132	167	79
Fabricated metal products	246	332	74
Transportation equipment	110	150	73
Other manufacturing	328	457	72
Pipeline transportation	43	47	91
<b>Total</b>	<b>2,412</b>	<b>3,215</b>	<b>75</b>
<b>Province or territory</b>			
Newfoundland and Labrador	56	98	57
Prince Edward Island	56	80	72
Nova Scotia	116	161	72
New Brunswick	114	154	74
Quebec	440	555	79
Ontario	552	728	76
Manitoba	158	228	69
Saskatchewan	141	179	79
Alberta	407	538	76
British Columbia	354	469	76
Yukon, Northwest Territories and Nunavut	18	25	72
<b>Total</b>	<b>2,412</b>	<b>3,215</b>	<b>75</b>

1. The total excludes out of scope establishments, mergers, closed or sold establishments.

Source(s): Statistics Canada, Environment Accounts and Statistics Division.

## Verification, imputation and estimation

Returned data were first checked using an automated edit-check program immediately after capture. This first procedure verified that all mandatory cells had been filled in, that certain values were within acceptable ranges, that questionnaire flow patterns had been respected, and that totals equalled the sum of their components. Collection officers evaluated the edit failures and concentrated follow-up efforts accordingly. Consistency edit rules were performed on the data for each usable record. These rules ensured that all the variables had valid responses and were complete and coherent both within the questionnaire and across questionnaires.

Five methods of imputation were used for partial non-response records.

**Manual imputation** was used to impute mandatory cells when one or more were still missing after editing and information was available from the company's annual or environmental reports or other sources.

**Deterministic imputation** was used for cells where there was only one possible value for the cell. For example total environmental protection expenditures must equal the sum of the capital and operating expenditures.

**Historical imputation** was used when data from the previous survey cycle were available for the record. A growth factor calculated for the industry and province was applied to the data to impute values for the current reference year.

**Ratio imputation** was used to impute the missing components of environmental protection expenditures as a proportion of total expenditures based on records that responded in the same province and industry group.

**Donor imputation**, using a nearest neighbour approach to find, for each record requiring imputation, the valid record that is most similar to it. The donor method, like the ratio method, used various combinations of the industry group and geographical location to find donors.

Estimates for the target population were calculated by multiplying the response values for the sampled units by their sampling weight. This weight takes into account a number of factors, including the probability of the unit being selected in the sample. A rising factor, or rate adjustment was used in the estimation process to account for respondents who could not be contacted or who did not respond to the survey.

## 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 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 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.

Due to the change in sample design for the 2006 reference year, this is the first reference year that coefficients of variation were calculated. However, the type of expenditures this survey measures, are by their very nature variable. Unlike salaries and wages, not every business will have expenditures for environmental monitoring or site reclamation and decommissioning for example, and for those that do, this would not necessarily be an annual expense. As a result, the participation rate (the percentage of respondents that had an expense for each activity compared to the total number of respondents) has been calculated for each environmental protection expenditure activity by industry group and by province. The participation rate was published to provide data users with more information with which to judge the quality of the estimate beyond the coefficient of variation.



Text table 2

Participation rate for capital expenditures on environmental protection by type of activity and industry and province or territory, 2006<sup>1</sup>

	Environ- mental monitoring	Environ- mental assess- ments and audits	Reclamation and decom- miss- ioning	Wildlife and habitat protection	Waste management and sewerage services	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total
	percent							
<b>Industry</b>								
Logging	2	5	2	1	9	4	10	14
Oil and gas extraction	29	42	56	31	52	37	55	84
Mining	16	8	10	3	26	28	27	53
Electric power generation, transmission and distribution	20	10	13	23	14	15	44	57
Natural gas distribution	17	38	27	18	32	31	67	76
Food	5	2	0 <sup>s</sup>	x	9	6	14	27
Beverage and tobacco products	13	0	x	0	2	8	26	28
Wood products	2	3	2	0 <sup>s</sup>	8	8	6	22
Paper manufacturing	3	1	2	1	8	12	14	25
Petroleum and coal products	7	7	x	0	14	29	43	45
Chemicals	4	1	3	x	17	14	21	40
Non-metallic mineral products	3	1	1	1	4	14	21	33
Primary metals	8	4	2	x	24	28	27	50
Fabricated metal products	0 <sup>s</sup>	0 <sup>s</sup>	0 <sup>s</sup>	0	11	4	12	19
Transportation equipment	2	x	0 <sup>s</sup>	x	2	16	13	30
Other manufacturing	2	1	0 <sup>s</sup>	x	8	2	12	18
Pipeline transportation	33	28	63	40	19	26	84	93
<b>Total</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>10</b>	<b>7</b>	<b>14</b>	<b>24</b>
<b>Province or territory</b>								
Atlantic provinces <sup>2</sup>	3	2	1	1	6	6	13	18
Quebec	3	1	1	0 <sup>s</sup>	10	9	11	25
Ontario	3	2	0 <sup>s</sup>	0 <sup>s</sup>	9	6	16	24
Manitoba	1	1	2	1	7	5	16	22
Saskatchewan	8	10	16	4	13	11	14	28
Alberta	5	5	7	4	15	9	14	28
British Columbia and the territories <sup>3</sup>	4	3	3	1	9	5	16	24
<b>Total</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>10</b>	<b>7</b>	<b>14</b>	<b>24</b>

1. The participation rate is the percentage of establishments that reported an expenditure for a particular activity.

2. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

3. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

Text table 3

**Participation rate for operating expenditures on environmental protection by type of activity and industry and province or territory, 2006<sup>1</sup>**

	Environ- mental monitoring	Environ- mental assess- ments and audits	Reclamation and decommis- sioning	Wildlife and habitat protection	Waste manage- ment and sewerage services	Pollution abatement and control processes (end-of- pipe)	Pollution prevention processes	Fees, fines and licences	Other	Total
	percent									
<b>Industry</b>										
Logging	17	19	9	17	49	15	40	20	27	76
Oil and gas extraction	67	62	52	28	87	36	50	47	56	97
Mining	68	48	49	24	86	54	45	45	50	93
Electric power generation, transmission and distribution	52	53	31	31	87	24	48	34	52	95
Natural gas distribution	42	62	37	11	83	9	47	64	73	87
Food	29	18	3	0s	92	12	28	21	18	92
Beverage and tobacco products	27	22	x	x	100	21	49	25	21	100
Wood products	24	19	3	6	77	14	21	20	14	79
Paper manufacturing	28	24	7	2	91	32	25	25	21	92
Petroleum and coal products	46	31	22	7	83	46	54	43	31	93
Chemicals	46	31	7	3	90	19	42	21	28	98
Non-metallic mineral products	22	16	9	2	82	23	27	19	19	86
Primary metals	52	36	11	3	96	35	37	26	32	97
Fabricated metal products	10	9	1	x	93	9	23	7	13	93
Transportation equipment	26	32	1	x	98	31	32	25	15	98
Other manufacturing	8	7	0s	0s	85	8	20	5	6	87
Pipeline transportation	84	70	65	51	91	28	74	35	81	100
<b>Total</b>	<b>19</b>	<b>16</b>	<b>4</b>	<b>3</b>	<b>86</b>	<b>14</b>	<b>26</b>	<b>14</b>	<b>14</b>	<b>89</b>
<b>Province or territory</b>										
Atlantic provinces <sup>2</sup>	16	16	7	5	77	12	18	19	11	81
Quebec	17	14	5	3	92	15	21	10	12	95
Ontario	19	16	2	1	86	14	29	12	16	87
Manitoba	17	10	3	2	83	9	22	11	9	87
Saskatchewan	23	21	15	7	89	13	22	14	20	91
Alberta	22	20	9	6	89	18	30	13	18	93
British Columbia and the territories <sup>3</sup>	18	12	5	4	79	13	24	22	13	84
<b>Total</b>	<b>19</b>	<b>16</b>	<b>4</b>	<b>3</b>	<b>86</b>	<b>14</b>	<b>26</b>	<b>14</b>	<b>14</b>	<b>89</b>

1. The participation rate is the percentage of establishments that reported an expenditure for a particular activity.

2. Includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.

3. Includes British Columbia, Yukon, Northwest Territories and Nunavut.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

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 for them 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. The capture and edit system continues to introduce new tools and efficiencies that improve the quality of the data. Each survey iteration has benefited from ongoing improvements to the system.

Given that the Survey of Environmental Protection Expenditures has been conducted since the early 1990s, many establishments have received it in the past and are now familiar with the concepts, and as a result their responses are quite 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.

An additional difficulty encountered by respondents is the separation of expenditures on environmental protection made in response to environmental regulation, convention or voluntary agreement from those that benefit the environment beyond compliance. In some cases, respondents may have included expenditures on the environment that were beyond the context of the survey.



# Survey of Environmental Protection Expenditures, 2006

**Confidential when completed.**

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

*Si vous préférez ce questionnaire en français, veuillez cocher*

**Correct as required**

Company name

Establishment name

C / O

Address

City

Province/Territory

Postal code

### Please read before completing

#### PURPOSE OF THE SURVEY

This survey provides a measure of the expenditures made by industry for environmental protection in Canada in response to 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. These data will be aggregated with information from other sources to produce official estimates of environmental protection expenditures.

The results of this survey will be published in the Statistics Canada publication *Environmental Protection Expenditures in the Business Sector, 2006*, Catalogue No. 16F0006X1E.

#### 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.

#### FAX OR OTHER ELECTRONIC TRANSMISSION DISCLOSURE

Statistics Canada advises you that there could be a risk of disclosure during the facsimile or other electronic transmission. However, upon receipt, Statistics Canada will provide the guaranteed level of protection afforded to all information collected under the authority of the *Statistics Act*.

#### 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 refer to the Guide to Definitions and Classification Details found at the end of this questionnaire or contact:

**Operations and Integration Division  
Statistics Canada  
Ottawa, ON, Canada, K1A 0T6**  
Telephone (toll-free): **1-800-255-7726**  
Fax: **1-800-755-5514**  
Email: **enviro.oid.exp@statcan.ca**

**The questionnaire is available in an electronic 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 Guide to Definitions and Classification Details included at the end of this form 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 45 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

Rec.     
Y M D

Ed.     
Y M D

Kyd.     
Y M D

Bat.

Coll.

FSC

## How to report expenditure figures:

*Expenditures reported should be rounded to thousands of Canadian dollars*

If the operating expense is \$1,456,728 ..... Report: \$     ,     
Millions Thousands

If the operating expense is \$253,023 ..... Report: \$    ,     
Millions Thousands

If the expenditure is zero "0",  
 or less than \$500 ..... Report: \$  ,     
Millions Thousands

### 1. Reporting year

Report must cover your most recent fiscal year that **ended** any time between **April 1, 2006** and **March 31, 2007**.

Year      Month      Day                                  Year      Month      Day

From <sup>010</sup>    /    to <sup>040</sup>    /

*If the reporting period is less than 12 months, please indicate the circumstances in the Comments section at the end of the questionnaire.*

### 2. Hazardous and non-hazardous waste and sewage collection, treatment, storage, disposal and recycling. Refer to page 14 of this questionnaire for more information. If the expenditure is zero, please write "0" in corresponding box.

**Include:**

- ◆ All expenditures related to waste collection, treatment, storage and disposal, including recycling done by your establishment's employees and services provided by a private contractor or a federal, provincial or local government body
- ◆ All expenditures related to the installation of sewage infrastructure and expenditures related to the use collection, treatment and disposal of sewage
- ◆ All expenditures on sewerage services provided by a federal, provincial or local government body

**Exclude:**

- Expenditures on on-site recycling (to be included in Question 4)

<b>Operating expenses</b>	<b>Capital expenditures</b>	<b>TOTAL</b>
220 \$ <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="X"/> <input type="text" value="X"/> <input type="text" value="X"/>	+ \$ <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="X"/> <input type="text" value="X"/> <input type="text" value="X"/>	= \$ <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="0"/> <input type="text" value="0"/> , <input type="text" value="X"/> <input type="text" value="X"/> <input type="text" value="X"/>
Millions      Thousands	Millions      Thousands	Millions      Thousands

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

Abatement and control of pollution are performed by using end-of-pipe equipment or installations.

**These end-of-pipe processes treat pollution after they are produced and are not an integral part of production;** their sole purpose is to abate or to control undesirable substances resulting from normal production. *Refer to page 14 of this questionnaire for more information.*

Do not include waste management or sewerage-related expenditures reported in Question 2.

#### 3.1 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

**Exclude:**

- Expenditures specific to workers' health and safety
- Expenditures on waste management already reported in Question 2
- Expenditures on sewage treatment or services already reported in Question 2

Operating expenses		Capital expenditures		TOTAL
250 \$ <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	+	260 \$ <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	=	270 \$ <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> , <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Millions    Thousands		Millions    Thousands		Millions    Thousands

#### 3.2 Did you report capital expenditures in Question 3.1 (cell 260)?

275    1     Yes    3     No    →    Go to Question 4  
 ↓

**What proportion of capital expenditures reported in Question 3.1 (cell 260) was spent on reducing or abating each of the following?** *Refer to page 14 of this questionnaire.*

Substances released to air		Substances released to surface waters		On-site releases to land/underground injection		Noise, vibration or radiation
280 <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> %	+	290 <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> %	+	300 <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> %	+	310 <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> %
						=    100 %

#### 4. 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 is the elimination or minimization of pollutants and waste before they are created.”

*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. **Refer to page 14 of this questionnaire for more information.**

##### 4.1 Pollution prevention methods

If you prevented or reduced waste, pollutants or conserved resources in your fiscal year 2006, please indicate how it was achieved by checking the appropriate box(es). Please include all projects whether or not they are required by regulation, convention or voluntary agreement. Refer to page 15 of this questionnaire for a description of each method.

		Yes	No
Product design or reformulation .....	810	1 <input type="radio"/>	3 <input type="radio"/>
Equipment or process modifications (integrated process).....	830	1 <input type="radio"/>	3 <input type="radio"/>
Recirculation, on-site recycling or reuse or recovery of materials or substances.....	850	1 <input type="radio"/>	3 <input type="radio"/>
Materials or feedstock substitution, solvent reduction, elimination or substitution .....	870	1 <input type="radio"/>	3 <input type="radio"/>
Improved inventory management or purchasing techniques .....	875	1 <input type="radio"/>	3 <input type="radio"/>
Prevention of leaks and spills .....	880	1 <input type="radio"/>	3 <input type="radio"/>
Good operating practices or pollution prevention training .....	885	1 <input type="radio"/>	3 <input type="radio"/>
<b>Other (Please specify)</b> <input type="text"/>	890	1 <input type="radio"/>	3 <input type="radio"/>
<input type="text"/>			
<input type="text"/>			
<input type="text"/>			

## 4.2 Expenditures on pollution prevention

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

### Include:

- ◆ Expenditures for equipment or facilities integrated in 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 extensions; 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
- ◆ Expenditures related to operational or process changes aimed at pollution prevention. Examples include product re-design (e.g., feedstock/raw material substitution), good operating practices (e.g., modification of process, staff training), etc.

### Exclude:

- Expenditures specific to workers' health and safety
- Expenditures already included in Question 2

Operating expenses			Capital expenditures			TOTAL		
500	\$		510	\$		520	\$	
	,			,			,	
		X X X			X X X			X X X
Millions	Thousands		Millions	Thousands		Millions	Thousands	

## 4.3 Did you report capital expenditures in Question 4.2 (cell 510)?

525 1  Yes 3  No → Go to Question 5



What proportion of capital expenditures reported in Question 4.2 (cell 510) was spent on preventing or minimizing each of the following? Refer to page 14 of this questionnaire.

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



## 5. 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
100 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	110 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	120 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X
Millions    Thousands	Millions    Thousands	Millions    Thousands

## 6. 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
130 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	140 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	150 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X
Millions    Thousands	Millions    Thousands	Millions    Thousands

## 7. Site reclamation and decommissioning

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

Expenditures on site reclamation and decommissioning made during your fiscal year 2006 for any active or inactive site belonging to your establishment. Please include expenditures on site decommissioning even if site closed before 2006.

### Exclude:

- Fines or compensation for environmental damage (this is to be reported in Question 9)
- Provisions for future environmental liability

Operating expenses	Capital expenditures	TOTAL
160 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	170 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X	180 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> X X X
Millions    Thousands	Millions    Thousands	Millions    Thousands

### 8. 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 7
- Expenditures for aesthetic purposes

Operating expenses	Capital expenditures	TOTAL
190 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input checked="" type="text"/> <input checked="" type="text"/> <input checked="" type="text"/>	200 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input checked="" type="text"/> <input checked="" type="text"/> <input checked="" type="text"/>	210 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input checked="" type="text"/> <input checked="" type="text"/> <input checked="" type="text"/>
Millions      Thousands	Millions      Thousands	Millions      Thousands

### 9. Environmental charges

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

**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

Operating expenses
760 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input checked="" type="text"/> <input checked="" type="text"/> <input checked="" type="text"/>
Millions      Thousands

### 10. Other environmental protection expenditures

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

**Include:**

- ◆ The operating costs of administrating your environmental program not included elsewhere
- ◆ Environmental training and information programs not included elsewhere
- ◆ Any other additional expenditures not specified elsewhere that are required to comply with environmental regulations, conventions or voluntary agreements

**Exclude:**

- Research and development expenditures

Operating expenses
770 \$ <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input checked="" type="text"/> <input checked="" type="text"/> <input checked="" type="text"/>
Millions      Thousands

### 11. 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 10.

Cell 802: includes total from capital expenditures reported in questions 2 to 8.

They should also include all data for which breakdowns were not available.

Operating expenses				Capital expenditures				TOTAL												
801	\$		,		,	X X X	+	\$		,		,	X X X	=	\$		,		,	X X X
		Millions		Thousands					Millions		Thousands					Millions		Thousands		

**11.1** In order to help us reduce the need for further follow-up inquiries, please provide a **brief** explanation to account for significant changes in environmental protection expenditures made by your establishment (either increased or decreased compared to previous reporting periods). (e.g., "We installed low-NO<sub>x</sub> burners in 2006 - Question 4")

For information only

## 12. Environmental technologies

### 12.1 Did you use one or more of the following systems or equipment in your fiscal year 2006?

Please check all that apply. Refer to page 15 of this questionnaire for a description of each technology or process.

		Yes	No
1. Cogeneration .....	1282	1 <input type="radio"/>	3 <input type="radio"/>
2. Alternative fuel systems or equipment .....	2006	1 <input type="radio"/>	3 <input type="radio"/>
3. Fuel substitution .....	1284	1 <input type="radio"/>	3 <input type="radio"/>
4. Waste energy recovery/reuse (e.g., heat recovery) .....	2031	1 <input type="radio"/>	3 <input type="radio"/>
5. Use of energy management or monitoring system(s) to improve efficiency....	2032	1 <input type="radio"/>	3 <input type="radio"/>
6. Performed energy audit in the last three years (2004-2006) .....	2033	1 <input type="radio"/>	3 <input type="radio"/>
7. Other systems, equipment or employee training that improved energy efficiency. Please specify most important _____	1292	1 <input type="radio"/>	3 <input type="radio"/>
<b>Renewable energy source:</b>			
8. Small, mini- or micro-hydroelectric facility .....	2004	1 <input type="radio"/>	3 <input type="radio"/>
9. Solar energy systems or equipment .....	1288	1 <input type="radio"/>	3 <input type="radio"/>
10. Wind energy systems or equipment .....	1289	1 <input type="radio"/>	3 <input type="radio"/>
11. Biomass energy (e.g., energy crops and waste-to-energy) .....	1285	1 <input type="radio"/>	3 <input type="radio"/>
12. Geothermal .....	1290	1 <input type="radio"/>	3 <input type="radio"/>
13. Other renewable energy systems or equipment Please specify most important _____	2005	1 <input type="radio"/>	3 <input type="radio"/>

### 12.2 Did you answer "Yes" to any part of Question 12.1?

2007 1  Yes 3  No → Go to Question 12.4

### 12.3 What were your operating expenses and capital expenditures in fiscal year 2006 on the systems or equipment reported in Question 12.1?

If the expenditure is zero, please write "0" in the corresponding box.  
Your best estimate is acceptable. Please exclude fuel costs.

Operating expenses				Capital expenditures				TOTAL																
2008	\$							+	\$								=	\$						
		Millions	Thousands			Millions	Thousands			Millions	Thousands			Millions	Thousands									

**12.4 What proportion of your total capital expenditures in fiscal year 2006 on machinery and equipment was spent to improve energy efficiency?**

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

Your best estimate is acceptable.

2011

%

**12.5 During the last three years, 2004 to 2006, did this establishment put into operation new or significantly improved systems or equipment that improved energy efficiency?**

*Refer to page 16 of this questionnaire for a description of "new or significantly improved".*

2012

1  Yes

3

No → Go to Question 12.6



**Rank the overall impact of these new or significantly improved systems or equipment that improved energy efficiency. Please check the appropriate box.**

2013  Low

2014  Moderate

2015  High

**12.6 Obstacles and drivers**

**During the last three years, 2004 to 2006, which of the following factors were obstacles or drivers to the adoption of new or significantly improved systems or equipment to improve energy efficiency? Please check all that apply.**

**Possible obstacles**

*Indicate the obstacles even if the system or equipment was not adopted.*

- 1. Lack of information or knowledge related to new or significantly improved systems or equipment ..... 2016
- 2. Lack of available new or significantly improved systems or equipment ..... 2017
- 3. Lack of skilled personnel to put new or significantly improved systems or equipment into operation ..... 2018
- 4. High cost of equipment ..... 2019
- 5. Lack of financing (internal, private or government) ..... 2020
- 6. Regulatory/policy barriers ..... 2021
- 7. Other (Please specify)  ..... 2022
- 8. None ..... 2023

**Possible drivers**

- 1. Sufficient return on investment. .... 2024
- 2. Regulations ..... 2025
- 3. Voluntary agreement ..... 2026
- 4. Public relations ..... 2027
- 5. Corporate policy/culture/awareness ..... 2028
- 6. Other (Please specify)  ..... 2029
- 7. None ..... 2030


### 13. Environmental management practices

Please indicate the environmental management practices adopted or utilized by this establishment in your fiscal year 2006 to avoid or minimize pollution or to conserve resources. Refer to page 16 of this questionnaire for a description of each practice.

- |   |     | Yes                     | No                      |
|---|-----|-------------------------|-------------------------|
| 1. Did this establishment use an environmental management system? .....   | 951 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 2. Did this establishment use Life Cycle Management, Life Cycle Assessment or Design for Environment for decision making? .....   | 965 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 3. Was this establishment ISO 14000 certified? .....  | 953 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 4. Is this establishment planning to obtain ISO 14064 certification within the next 2 years? .....  | 971 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 5. Did this establishment develop and implement a pollution prevention plan? .....  | 970 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 6. Did this establishment implement any environmental voluntary agreement, or did it participate in any voluntary environmental program? .....  | 955 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| <p>Examples include Environmental Performance Agreements (EPAs), Canadian GHG Reductions Registry© or Canadian Industry Program for Energy Conservation. <i>If yes, please list programs, accords or agreements.</i></p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> |     |                         |                         |
| 7. Did this establishment have a “green” procurement policy? .....  | 957 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 8. Were any of the goods produced by this establishment certified by an environmental program, such as the “Enviro Choice Program” and Ecologo? ...   | 959 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 9. Did this establishment publish or contribute to annual or other reports on its environmental performance or sustainable development? .....   | 963 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 10. Did this establishment experience any cost savings as a result of implementing any of the environmental management practices outlined in this question or environmental technologies outlined in Question 12 or pollution prevention methods outlined in Question 4? .....                    | 969 | 1 <input type="radio"/> | 3 <input type="radio"/> |
| 11. <b>Other</b> (Please specify) .....   | 967 | 1 <input type="radio"/> | 3 <input type="radio"/> |

## Certification

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

Signature  _____ 0015	Date    Year    Month    Day 0015 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Name of person completing this questionnaire ( <i>type or print</i> ) 0013    _____ 0013	Telephone    Ext. 0017 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 0027 <input type="text"/> <input type="text"/> <input type="text"/>
Title 0014    _____ 0014	Fax 0016 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Website address 0020    _____ 0020	Email address 0018    _____ 0018

Approximately how long did it take to collect the data and complete this survey?

935      Hour(s)    936      Minutes

In the future, would you prefer to receive this survey in electronic format?

862    1     Yes    3     No

## Comments

We invite your comments or suggestions on the following or any other topics related to the Survey of Environmental Protection Expenditures. We appreciate your assistance.

- Questionnaire content
- New questions of interest to your industry
- Clarity of questions and provision of sufficient examples
- Order and flow of questions
- Timing of receipt of questionnaire and the period given for response
- Alternative sources of information to further reduce response burden
- Potential for electronic data reporting

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

Please return this questionnaire in the envelope provided

**Thank you for your cooperation !**

# **Guide to Definitions and Classification Details**

## **Establishment**

An establishment is defined as the most homogeneous unit of production for which a business maintains accounting records. From these accounting records, it is possible to assemble all the data elements required to compile the total sales or shipments, inventories, cost of materials and services, labour and capital used in production.

## **Environmental protection expenditures**

Environmental protection expenditures are defined 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, expenditures for protecting and restoring wildlife and habitat, expenditures for environmental monitoring, environmental assessments and audits, and expenditures for reclamation and decommissioning of sites. **Environmental protection expenditures incurred that are not in response to current or anticipated Canadian or international regulations, conventions or voluntary agreements *should be excluded*. In addition, expenditures to improve employee health, workplace safety and site beautification *should also be 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 Canada-U.S. Air Quality Agreement; the "Responsible Care" program from the Canadian Chemical Producers Association; the Canadian GHG Reductions Registry® ; etc.

**Environmental regulations** refer to any current Canadian federal, provincial or 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 for your 2006 fiscal year**. If, for certain categories, no expenditures have been incurred, **please write "0" in the corresponding box. Do not leave the box blank**. 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**

**Include** all relevant outlays for machinery and equipment and their installation and repair that have been capitalized, 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 consulting fees), any materials supplied to construction contractors for installation and any costs associated with the purchase of land that are neither amortized nor depreciated.

**Exclude** any provisions for future environmental liability.

## **To report operating expenses**

**Include** all expenses related to environmental protection incurred for labour, materials and supplies, maintenance and repair, and purchased services (include fuel and electricity expenses for machinery and equipment whose sole purpose is to protect the environment).

**Exclude** depreciation on machinery and equipment.



## **For logging activities**

Use Question 8 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 3 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 10 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.

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## **Question 2) Hazardous and non-hazardous waste and sewage collection, treatment, storage, disposal and recycling**

### **What is waste?**

There have been several definitions of waste proposed in recent years. One common thread among these definitions is the concept that waste is a material that is unwanted by its producer. The unwanted materials may be by-products of a production process - fly ash from a furnace, for example. Alternatively they might be products, the inherent value of which has been consumed from the perspective of the current holder - for example, a newspaper that has been read, a package that has been opened and emptied of its contents or an apple eaten to the core are all similar insofar as they have lost their original inherent value from the consumers perspective.

### **Hazardous waste**

Includes all materials that may be hazardous to human health or the environment, due to their nature or quantity, and which require special handling techniques as specified by the Transportation of Dangerous Goods Regulations (1985), The Canadian Environmental Protection Act (1988), The Basel Convention (1989), or the Export and Import of Hazardous Waste Regulations (1992).

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## **Question 3) Pollution abatement and control**

**3.1** Pollution abatement and control (end-of-pipe processes) can be described as equipment and processes that treat pollution and wastes *after* they have been created. Examples of these types of equipment or processes include scrubbers at the end of emission stacks, biological and chemical systems for treating water (such as a water treatment plant), filtration systems, cyclones or other barrier systems. 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.

**3.2** **Substances released to air** - emissions of pollutants (including greenhouse gases) to the atmosphere.

**Substances released to surface waters** - releases of pollutants to water bodies.

**On-site releases to land/underground injection** - releases of pollutants to land and/or injected into the ground within the boundaries of your establishment.

**Noise, vibration or radiation** - control of noise, vibration or radiation.

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## **Question 4) Pollution prevention**

Pollution prevention is technologies, equipment or processes that reduce or eliminate pollution and waste at the source instead of at the end-of-pipe or stack before the pollution or waste is created. Examples include the installation of more efficient processes that consume less energy or inputs, the redesign or reformulation of the production process to reduce pollution or emissions, reuse, recirculation or recycling of materials on-site (does not include materials sent off-site for recycling).

## 4.1 Pollution prevention methods

Examples are listed for each category of pollution prevention. *Note:* lists are not exhaustive.

**Product design or reformulation** - changing product specifications to reduce or eliminate the use of toxic substances; modifying product design or composition to make them more environmentally friendly; modify packaging.

**Equipment or process modifications (integrated process)** - instituting recycling within a process; switching from the use of solvents to mechanical paint-stripping devices; modified or installed rinse systems; improved rinse equipment design; improved rinse equipment operation; modifying equipment, layout or piping; use of a different process catalyst; institute better controls on operating bulk containers or changing from small volume containers to bulk containers to minimize discarding of empty containers.

**Recirculation, on-site recycling or reuse or recovery of materials or substances generated during production** - such as using a small distillation unit to reclaim solvents on-site; vapour recovery; recovery of sludge; water recirculation; reuse of water for refrigeration condenser operation. *Excludes materials transferred or recycled off-site.*

**Materials or feedstock substitution, solvent reduction, elimination or substitution** - the use of aqueous-based rather than solvent-based cleaners; increased purity of raw materials; substituted raw materials; other raw material modifications.

**Improved inventory management or purchasing techniques** - avoiding the unnecessary generation of waste by ensuring that materials do not stay in inventory beyond shelf life; eliminate shelf-life requirements for stable materials; instituting better labelling procedures; instituting a clearinghouse to exchange materials that would otherwise be discarded.

**Prevention of leaks and spills** - taking measures to prevent releases such as installing splash guards and drip trays around equipment; modified containment procedures for cleaning units; improved draining procedures; improved storage or stacking procedures; improved procedures for loading, unloading and transfer operations; installed overflow alarms or automatic shut-off valves; installed vapour recovery systems; implemented inspection or monitoring program of potential spill or leak sources.

**Good operating practices or pollution prevention training** - changing production schedules to minimize equipment and feedstock changeovers; improved maintenance scheduling, record keeping or procedures; training staff to recognize and implement pollution prevention opportunities.

**Other, specify** - please specify your pollution prevention activities if they are not listed in the preceding categories.

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## Question 12) Environmental technologies

Examples are listed for each of the technologies and processes found in Question 12. *Note:* lists are not exhaustive.

### 12.1 Description of the systems and equipment listed in Question 12.1:

- 1. Cogeneration** - systems and equipment used to produce both heat and electricity from biomass (organic matter from forest and agricultural sources), waste and industrial residues, and other fuel sources.
- 2. Alternative fuel systems or equipment** - process equipment for production or use of biofuels (ethanol, biodiesel); clean fuel systems (reformulated fuel and oxygenated fuels); fuel cell technologies; hydrogen (production, storage, distribution and use, infrastructure); and advanced batteries. Also included are industrial equipment and engine systems that use alternative fuels.
- 3. Fuel substitution** - switching from a carbon fuel such as coal or petroleum to a lower carbon (such as natural gas) or carbon-free fuel.
- 4. Waste energy recovery/reuse (e.g., heat recovery)** - a conservation system whereby some space heating or water heating is done by actively capturing byproduct heat that would otherwise be ejected into the environment.
- 5. Use of energy management or monitoring systems** - an energy conservation feature that uses computers, instrumentation, control equipment and software to manage a building's energy use for heating, ventilation, air-conditioning, lighting and for business-related processes.

6. **Performed energy audit in the last three years (2004-2006)** - an analysis of the energy consuming systems within a facility and the identification of potential areas for reducing energy consumption.
7. **Other systems, equipment or employee training that improved energy efficiency** - please specify any other equipment or systems not listed in Question 12.1 that improved energy efficiency or energy conservation. Examples include: installation of more efficient process equipment such as boilers, turbines and furnaces; process control equipment; energy efficient engines and motors; low NO<sub>x</sub> burners.
8. **Small, mini- or micro-hydroelectric facility** - Micro-hydro = less than 100 kW; Mini-hydro = 100 kW to 1 000 kW (1MW); Small hydro = 1 MW to 25 MW (50 MW in British Columbia).
9. **Solar energy systems or equipment** - active and passive solar systems; photovoltaics; solar thermal generators; solar water and space heating systems.
10. **Wind energy systems or equipment** - horizontal and vertical axis turbines; towers and other types of equipment used to generate energy and electricity.
11. **Biomass energy** - systems and equipment (turbines, boilers, process equipment) that use organic matter such as forest and agricultural residues to produce electricity, steam, or heat.
12. **Geothermal** - hot water or steam extracted from the Earth's interior and used for geothermal heat pumps, water heating or electricity generation.
13. **Other renewable energy systems or equipment** - please specify your renewable energy systems and equipment if they are not listed in the preceding categories (e.g., systems and equipment for energy production from wave, tidal, and ocean thermal energy conversion systems).

#### 12.5 New or significantly improved systems or equipment to improve energy efficiency:

*A new system or piece of equipment* is one that is new to the establishment and whose characteristics or intended uses differ significantly from those systems or equipment previously used by the establishment. *A significantly improved system or piece of equipment* is an existing system or piece of equipment whose performance has been significantly enhanced or upgraded. Excludes maintenance, repair and replacement in kind.

### Question 13) Environmental management practices

1. An **environmental management system** is a management structure that allows an organization to assess and control the environmental impact of its activities.
2. **Life Cycle Management, Life Cycle Assessment** refer to tools that identify and measure direct and indirect environmental, energy and resource impacts associated with a product, process or service through its design, production, usage and final disposal. **Design for Environment** is the integration of environmental considerations into the design, production, distribution, use and end-of-life of products.
3. **ISO 14000** is an internationally recognized set of standards and guidelines primarily concerned with environmental management systems developed by the International Organization for Standardization.
4. **ISO 14064** are new international standards and guidelines recognized by the Canadian Standards Association developed by the International Organization for Standardization. The standard is meant for private sector organizations and governments to measure, report and verify greenhouse gas emissions through internationally-approved best practices.
5. A **pollution prevention plan** establishes a plan to meet or exceed compliance and improve the efficiency and environmental performance of an establishment, a specific operation or a particular product.
6. **Voluntary actions** include codes of environmental practice, guidelines, emission and waste reduction targets, as well as agreements with governments.
7. **Green procurement** describes the procurement of goods and services that minimize environmental impacts compared with goods and services with similar performance requirements. The costs and environmental impacts of a product at various stages of its life cycle are taken into consideration, such as the process used to manufacture the product (including raw materials), transportation, storing, handling and operating and disposal of the product.
8. **Eco-labelling programs** such as Enviro Choice (operated by TerraChoice Environmental Services Inc. for Environment Canada) are designed to encourage manufacturers and suppliers to develop environmentally preferable products and services. These eco-labelling programs are meant to help consumers identify products and services that are less harmful to the environment.
9. Your establishment can either publish its own **environmental report** or be a contributor to the parent company's environmental report or annual report that includes a section dealing with its environmental performance or sustainable development.