Catalogue no. 16F0006X

Environmental Protection Expenditures in the Business Sector

2008

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website at *www.statcan.gc.ca*, e-mail us at *infostats@statcan.gc.ca,* or telephone us, Monday to Friday from 8:30 a.m. to 4:30 p.m., at the following numbers:

Statistics Canada's National Contact Centre

Toll-free telephone (Canada and the United States):

Inquiries line	1-800-263-1136
National telecommunications device for the hearing impaired	1-800-363-7629
Fax line	1-877-287-4369

Local or international calls:

Inquiries line	1-613-951-8116
Fax line	1-613-951-0581

Depository Services Program

Inquiries line	1-800-635-7943
Fax line	1-800-565-7757

To access this product

This product, Catalogue no. 16F0006X, is available free in electronic format. To obtain a single issue, visit our website at *www.statcan.gc.ca* and browse by "Key resource" > "Publications."

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed *standards of service* that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on *www.statcan.gc.ca* under "About us" > "The agency" > "Providing services to Canadians."

Statistics Canada
Environment Accounts and Statistics Division

Environmental Protection Expenditures in the Business Sector

2008

Published by authority of the Minister responsible for Statistics Canada

November 2010

Catalogue no. 16F0006X

ISSN 1701-6282

Frequency: Biennial

Ottawa

Cette publication est également disponible en français.

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

User information

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
0s	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 **John Marshall**, 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.

Sheri Vermette, Analyst, Environment Protection Accounts and Surveys, managed the project.

Major contributions to the project were made at various times by:

Peter Van Wesenbeeck

Marc Lavergne

Don Grant

Jeff Fritzsche

Gordon Dewis

Laurie Jong

Monique Deschambault

Preface

This publication presents estimates from the Survey of Environmental Protection Expenditures (SEPE), 2008. The survey provides a measure of the expenditures made by 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.

The SEPE has been conducted since 1994. It was started in order to fill gaps in the data regarding the expenditures made by industry on 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.

Table of contents

Table of contents – continued

Data quality, concepts and methodology

Charts

Highlights

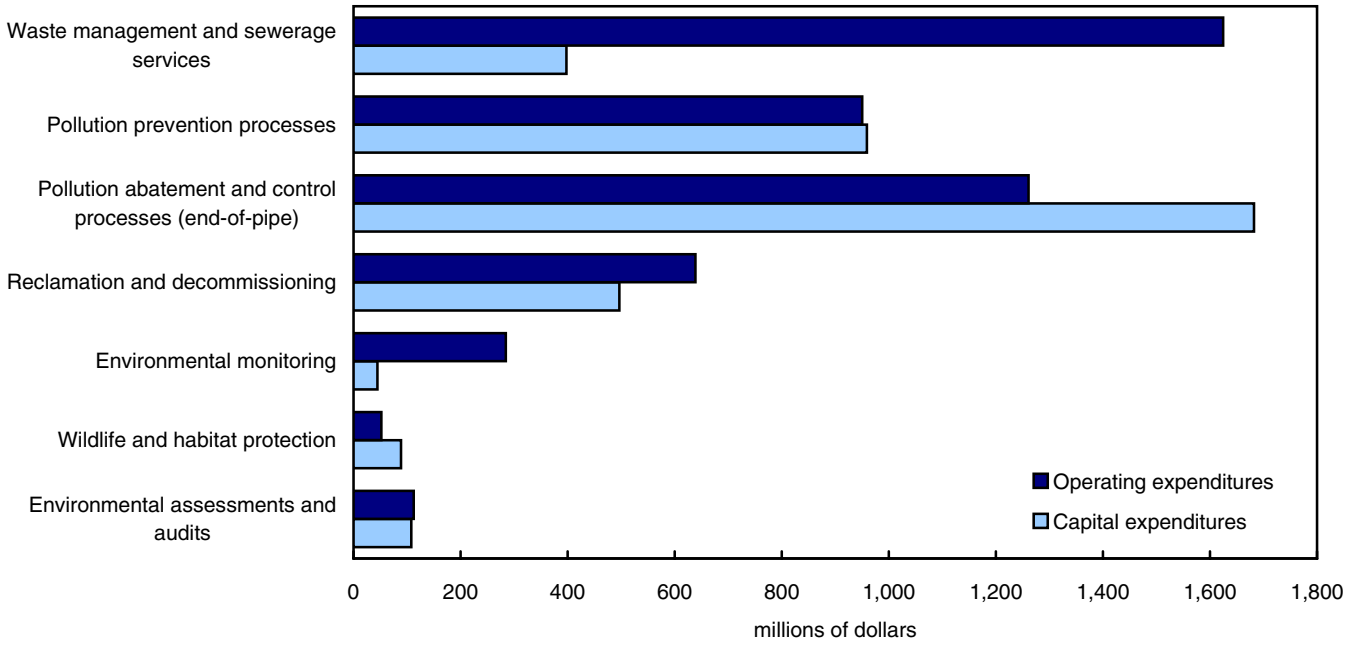
- Businesses operating in Canada spent $9.1 billion in 2008 to protect the environment, up 5.3% from 2006. Following a long-standing trend, the largest share of these expenditures was spent to deal with pollutants after they were created.
- The oil and gas extraction industry spent more on environmental protection than any other industry surveyed, followed by the electric power generation, transmission and distribution industry, accounting for 32% and 14% of the total spent respectively.
- Of the $3.8 billion in capital expenditures made for environmental protection, the majority was for pollution abatement and control (44%), followed by pollution prevention (25%).
- In 2008, investments in pollution prevention totalled $959 million, down 37% from 2006.
- Provincially, businesses in Alberta spent the most in capital to protect the environment ($1.7 billion), followed by Ontario ($580 million) and Quebec ($439 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 totalled $5.2 billion in 2008, up almost 10% from 2006. These expenditures were mostly directed towards waste management and sewerage services ($1.6 billion) followed by pollution abatement and control ($1.3 billion).
- Similar to the 2006 results, the oil and gas extraction industry had the highest operating expenditures for 2008, mainly for site reclamation and decommissioning. Provincially, Ontario led the way followed closely by Alberta ($1.6 billion and $1.4 billion respectively).
- Businesses spent $1.7 billion in 2008 on energy-related processes and technologies, down 15% from 2006. Unlike environmental protection expenditures, these expenditures are not restricted to those made in response to environmental regulations, conventions or voluntary agreements.

Analysis

Total environmental protection expenditures

Businesses operating in Canada increased their spending on environmental protection in 2008, with total expenditures reaching $9.1 billion, up 5.3% from 2006.[1] Similar to past years, the largest share of environmental protection expenditures went to treating pollutants after they were created as opposed to eliminating pollutants before they are created. Over half (55%) of the total environmental protection expenditures in 2008 was targeted at pollution abatement and control and waste management and sewerage services (Chart 1).

Chart 1
Business capital and operating expenditures on environmental protection, 2008



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

The oil and gas extraction industry spent more on environmental protection than any other industry surveyed, followed by the electric power generation, transmission and distribution industry, accounting for 32% and 14% of the total, respectively. Over a third of all environmental protection expenditures made by the oil and gas extraction industry were for pollution abatement and control. The electric power generation, transmission and distribution industry directed most of their environmental expenditures to pollution prevention (30%). Pollution prevention is the minimization or elimination of pollutants before they are created rather than after they are created.

Provincially, businesses in Alberta reported the highest environmental protection expenditures in 2008 at $3.1 billion, with the majority of these expenditures (40%) directed at pollution abatement and control. Ontario businesses

1. The estimates for 2006 have been revised. These estimates are included in tables 1-2 and 2-2. In addition, estimates for the pipeline transportation industry were removed from the 2006 totals to be comparable with 2008 totals. In 2008, this industry was not surveyed.

followed with $2.2 billion, reporting that the largest proportion (33%) of their expenditures was directed at waste management and sewerage services.

Total environmental protection expenditures by business size

Business expenditures on environmental protection varied depending on the number of employees. Similar to the 2006 results, medium-sized businesses, those with 100 to 499 employees, spent the most on environmental protection in 2008. These businesses made up 23% of the survey population and accounted for 38% of the total expenditures, while very large businesses, those with 1,000 or more employees, made up only 1% of the survey population but accounted for 29% of expenditures (Tables 4 and 6).

On a per employee basis, very large businesses had the highest expenditures for environmental protection, spending $6,688 per employee (Tables 5 and 7).

Business capital expenditures on environmental protection

In 2008, businesses reported $3.8 billion in capital expenditures for environmental protection (Table 1-1). The largest share of these investments was for pollution abatement and control (44%), followed by pollution prevention (25%). In 2006, investment in pollution prevention activities accounted for 40% of the total capital expenditures.

Capital expenditures by the petroleum and coal products manufacturing industry were partially responsible for this shift. Investments in pollution prevention by this industry decreased from $533.1 million in 2006 to $42.5 million in 2008. Higher investments in 2006 may have been in anticipation of federal regulations increasing restrictions on sulphur levels in off-road, rail and marine diesel fuels, which came into effect in 2007.[2] A number of businesses in the industry completed capital projects in 2006, mostly for ultra-low sulphur diesel projects. In 2008, the industry spent $122.9 million on capital expenditures for pollution abatement and control projects.

The oil and gas extraction and the primary metal manufacturing industries reported the largest increases in pollution abatement and control capital investment over this time period. The oil and gas extraction industry spent $790.0 million in 2008, up from $410.1 million in 2006, with the majority of expenditures going to reduce air emissions and manage tailings.

The primary metal manufacturing industry increased its investment in pollution abatement and control activities spending $290.5 million in capital compared to $68.9 million in 2006. The majority of the 2008 expenditures went towards the treatment of air emissions.

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

In 2008, like in 2006, the majority of capital investments for pollution prevention and abatement and control were targeted at the prevention or reduction of air pollutants. Almost $1.4 billion was invested in pollution abatement and control processes and technologies to reduce air emissions, while capital expenditures on pollution prevention processes and technologies totalled $422.2 million (Tables 8 and 9).

The largest investments for pollution abatement and control of emissions to air were made by the oil and gas extraction industry followed by the primary metals manufacturing industry. The oil and gas extraction industry spent $711.4 million in 2008, more than doubling 2006 investments ($271.4 million). This represents 90% of the total capital spent for pollution abatement and control by the industry in 2008, compared to 66% in 2006.

The primary metals manufacturing industry also directed almost all (94%) of its capital expenditures for pollution abatement and control to reducing air emissions, with investment in this area totalling $272.9 million in 2008.

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

Ten of the 16 industry groups surveyed increased pollution abatement and control spending on air emissions. In 2006, the Canadian government created a regulatory framework to address emissions of air pollutants and greenhouse gases (Text box "**Clean Air Regulatory Agenda**"). Anticipation of these regulations may have contributed to the increase in spending to treat air emissions.

Clean Air Regulatory Agenda

In October 2006, the federal government announced the Clean Air Regulatory Agenda to provide a regulatory framework for industrial emission reduction targets. The agenda set mandatory and enforceable reduction targets for emissions of greenhouse gases and air pollutants. The proposed regulations were to come into force in 2010 and require existing facilities to reduce their emission-intensity by 6% each year from 2007 to 2010.[3] In 2009, the government announced plans to realign Canada's policies with those of the United States. A new target was set to reduce total greenhouse gas emissions by 17% from 2005 levels by 2020.[4]

The majority (57%) of pollution abatement and control investments made by the mining industry was to treat on-site releases to land and underground injection ($67.5 million). This included spending on deep well injection and tailings management. This is a shift from 2006 when the largest share of these expenditures went to treat substances released to water.

Among industry groups, the electric power generation, transmission and distribution industry reported the highest capital expenditures targeted at pollution prevention ($276.3 million), with just over half of this directed towards the on-site containment of solid and liquid waste. However, 76% of their pollution abatement and control investments ($149.7 million) were to treat air emissions.

Operating expenditures on environmental protection

Environmental protection operating expenditures totalled $5.2 billion in 2008 (Table 3), up almost 10% from 2006. Businesses reported increased spending on pollution prevention, pollution abatement and control, reclamation and decommissioning and environmental monitoring activities.

Overall, waste management and sewerage services accounted for the largest share of operating expenditures for environmental protection expenditures in 2008 ($1.6 billion).

The oil and gas extraction industry reported the highest operating expenditures for environmental protection, accounting for 24% of the total ($1.2 billion).

Provincially, Ontario had the highest operating expenditures, spending $1.6 billion in 2008 followed by Alberta at $1.4 billion.

Pollution prevention methods

Overall, 64% of businesses in Canada used at least one pollution prevention method (Text box "**Pollution prevention methods**"). The top three most commonly used pollution prevention methods in 2008 were unchanged from 2006: good operating practices or pollution prevention training; recirculation, on-site recycling, reuse or recovery of materials; and the prevention of leaks and spills.

3. Regulatory Framework for Air Emissions, 2007, Canada, Catalogue no: En84-53/2007.
4. Canada's Action on Climate Change, 2010, *http://www.ecoaction.gc.ca/climatechange-changementsclimatiques/index-eng.cfm* (accessed September 17, 2010).

Pollution prevention methods

The federal government defines pollution prevention as: "the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to the environment or human health."[5] Using this definition, the *Survey of Environmental Protection Expenditures* asked businesses to indicate which of the following pollution prevention methods were used in 2008:

- 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.

Large and very-large businesses were most likely to use one of these methods, with more than 85% of these companies reporting the use of at least one method to prevent pollution (Table 10).

Expenditures on energy-related processes or technologies and their use

Energy-related processes or technologies either reduce the amount of energy used for a manufacturing process or reduce the amount of pollutants produced through the production and use of energy.

Unlike the measures of industrial spending on environmental protection discussed above, which are restricted to spending made in response to current or anticipated regulations, measures of spending on energy-related processes or technologies include all such expenditures regardless of whether they were made in response to regulations or for some other reason.

Businesses spent $1.7 billion on energy-related technologies in 2008 (Table 11), down $301.7 million from 2006. The decrease was due to a 39% reduction in capital spending on energy-related technologies. Operating expenditures for these technologies increased by 6%.

The electric power generation, transmission and distribution industry spent over half a billion dollars on energy-related technologies. This was more than any other industry in 2008 and up $27.4 million from 2006 expenditures. The increase was a result of higher operating costs associated with renewable energy technologies such as small hydroelectric facilities, solar energy systems and wind energy systems.

The oil and gas extraction industry spent $393.4 million in 2008 for energy-related processes and technologies. Capital expenditures for these technologies decreased from 2006 to 2008 by $385.6 million. The industry, particularly businesses involved in oil sands extraction, reported a high level of capital investment in 2006 for energy-related technologies. In 2008, the majority of expenditures for these technologies shifted from capital to operating. The technologies most reported were solar energy systems or equipment and waste energy recovery or reuse technologies.

Both the wood products and paper manufacturing industries spent less in 2008 (decreases of 72% and 29% respectively) than in 2006 for energy-related processes and technologies, with the majority of the decrease due to a reduction in operating expenditures.

5. Pollution Prevention Planning Provisions of Part 4 of the Canadian Environmental Protection Act, 1999.

Distribution of energy-related processes or technology use

Overall, 27% of businesses reported using at least one energy-related process or technology (Table 13). The most widely reported processes or technologies (between 10% and 13%) were energy management or monitoring systems, waste energy recovery technologies and energy audits.

The likelihood of a business using an energy-related environmental technology increased with the number of people employed. Eighty-one percent of businesses with 1,000 or more employees reported the use of an environmental technology compared to 21% of businesses with fewer than 100 employees (Table 14).

Environmental management practices

Environmental management practices are practices that businesses adopt to reduce their impact on the environment.

In 2008, 32% of businesses engaged in at least one environmental management practice (Table 15). The use of an environmental management system and the implementation of a pollution prevention plan were the two most commonly reported practices.

Related products

Selected publications from Statistics Canada

16-001-M	Environment Accounts and Statistics Analytical and Technical Paper Series
16-002-X	EnviroStats
16-201-X	Human Activity and the Environment
16-257-X	Environment Accounts and Statistics Product Catalogue
16-401-X	Industrial Water Use
16F0023X	Waste Management Industry Survey: Business and Government Sectors
16F0024X	Environmental Management and Technologies in the Business Sector

Selected technical and analytical products from Statistics Canada

16-001-M2007004	Environment Surveys of Establishments: The Canadian Experience
16-002-X200900411030	The Canadian manufacturing industry: Investments and use of energy-related processes or technologies

Selected CANSIM tables from Statistics Canada

153-0052	Capital and operating expenditures on environmental protection, by North American Industry Classification System (NAICS) and type of activity, Canada, biennial
153-0053	Capital and operating expenditures on environmental protection, by type of activity, Canada, provinces and territories, biennial
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, biennial
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, biennial
153-0056	Capital and operating expenditures on environmental protection, by type of activity and establishment size, Canada, biennial

Selected surveys from Statistics Canada

1903	Survey of Environmental Protection Expenditures

Selected summary tables from Statistics Canada

- *Capital expenditures on pollution abatement and control (end-of-pipe) by medium and industry*
- *Capital expenditures on pollution prevention by medium and industry*
- *Expenditures on environmental protection by industry and activity*

Statistical tables

Table 1-1

Capital expenditures on environmental protection — Type of activity and industry, province or territory, 2008

	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Waste management and sewerage services
	millions of dollars				
Industry					
Logging	0.0	0.0	0.0	0.0	x
Oil and gas extraction	26.2	38.1	419.6	43.7	170.8
Mining	7.5	20.2	20.7	1.5	48.2
Electric power generation, transmission and distribution	2.6	39.9	21.5	41.6	52.9
Natural gas distribution	x	x	1.9	x	x
Food	F	F	F	F	27.5
Beverage and tobacco products	0.1	x	x	0.0	x
Wood products	x	F	0.0	0.6	F
Paper manufacturing	1.0	x	5.4	0.1	9.7
Petroleum and coal products	0.7	F	x	x	14.2
Chemicals	2.0	x	3.2	0.0	34.5
Non-metallic mineral products	0.7	1.4	x	x	F
Primary metals	1.2	F	3.6	0.0	6.9
Fabricated metal products	0 [s]	0.3	x	0.0	3.9
Transportation equipment	x	F	0.1	0.0	1.9
Other manufacturing	0.7	F	F	0.0	5.4
Total	**44.5**	**108.0**	**496.6**	**88.8**	**397.7**
Province or territory					
Atlantic provinces [1]	2.4	F	0.7	1.7	x
Quebec	2.2	x	18.9	x	57.0
Ontario	6.5	x	12.0	1.1	58.6
Manitoba	F	x	7.0	x	F
Saskatchewan	x	21.8	46.1	x	45.9
Alberta	21.9	34.1	362.2	43.3	143.3
British Columbia and the territories [2]	x	x	49.5	9.2	76.3
Total	**44.5**	**108.0**	**496.6**	**88.8**	**397.7**

See notes at the end of the table.

Table 1-1 – continued

Capital expenditures on environmental protection — Type of activity and industry, province or territory, 2008

	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Other	Total	Share of total
	millions of dollars				percent
Industry					
Logging	F	F	0.0	F	F
Oil and gas extraction	790.0	118.1	34.0	1,640.4	42.8
Mining	119.1	134.2	0.2	351.7	9.2
Electric power generation, transmission and distribution	197.6	276.3	8.8	641.2	16.7
Natural gas distribution	x	x	x	52.6	1.4
Food	19.2	42.3	F	92.4	2.4
Beverage and tobacco products	x	x	0.0	13.7	0.4
Wood products	3.4	6.8	F	18.1	0.5
Paper manufacturing	13.0	30.5	x	60.0	1.6
Petroleum and coal products	122.9	42.5	x	206.2	5.4
Chemicals	27.8	47.4	x	115.7	3.0
Non-metallic mineral products	39.2	38.2	x	92.6	2.4
Primary metals	290.5	72.6	x	375.2	9.8
Fabricated metal products	F	14.3	0.0	29.7	0.8
Transportation equipment	26.3	14.6	0.0	43.0	1.1
Other manufacturing	19.5	F	F	85.2	2.2
Total	**1,682.2**	**959.1**	**51.7**	**3,828.6**	**100.0**
Province or territory					
Atlantic provinces [1]	65.7	66.5	1.4	155.2	4.1
Quebec	F	155.0	1.1	439.0	11.5
Ontario	226.3	262.7	x	579.5	15.1
Manitoba	x	x	x	364.3	9.5
Saskatchewan	116.3	93.2	2.5	347.5	9.1
Alberta	857.3	183.8	31.4	1,677.4	43.8
British Columbia and the territories [2]	62.3	x	x	265.6	6.9
Total	**1,682.2**	**959.1**	**51.7**	**3,828.6**	**100.0**

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 1-2
Capital expenditures on environmental protection — Type of activity and industry, 2006

	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Waste management and sewerage services	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total	Share of total
	millions of dollars								percent
Industry									
Logging	F	F	F	F	0.5	0.8	F	F	F
Oil and gas extraction	132.3r	43.1r	343.7r	124.8r	286.3r	410.1r	377.1r	1,717.4r	44.8r
Mining	5.3	x	9.3	x	26.0	174.5	49.2	269.9	7.0
Electric power generation, transmission and distribution	6.4r	85.1r	21.6r	18.5r	22.2r	73.3r	111.6r	338.7r	8.8r
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	15.6r
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
Total	**172.6r**	**136.7r**	**407.2r**	**152.0r**	**x**	**x**	**1,527.7r**	**3,834.2r**	**100.0**

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 2-1
Operating expenditures on environmental protection — Type of activity and industry, province or territory, 2008

	Environmental monitoring	Environmental assessments and audits	Reclamation and decom-missioning	Wildlife and habitat protection	Waste management and sewerage services	Pollution abatement and control processes (end-of-pipe)
	millions of dollars					
Industry						
Logging	0.8	0.6	0.3	16.1	3.8	F
Oil and gas extraction	90.2	32.3	403.0	10.2	134.9	245.2
Mining	34.5	13.6	61.6	0.9	60.1	127.0
Electric power generation, transmission and distribution	49.9	25.2	101.9	12.6	156.2	118.3
Natural gas distribution	0.4	0.5	F	x	3.0	x
Food	6.9	2.7	F	F	298.9	22.7
Beverage and tobacco products	0.3	0.2	x	0.1	15.7	1.0
Wood products	4.9	2.1	3.4	8.1	36.2	F
Paper manufacturing	26.0	4.0	5.0	0.5	156.6	155.3
Petroleum and coal products	8.5	1.0	10.6	0.1	92.2	138.7
Chemicals	15.5	7.4	29.9	x	102.7	72.9
Non-metallic mineral products	5.1	2.8	1.8	0.1	30.2	28.5
Primary metals	27.7	7.1	14.7	1.5	211.8	270.5
Fabricated metal products	3.2	1.9	F	x	100.6	9.4
Transportation equipment	4.4	3.7	0.7	F	70.7	15.9
Other manufacturing	6.3	7.0	3.7	F	151.0	26.9
Total	**284.6**	**112.3**	**638.7**	**52.0**	**1,624.6**	**1,261.1**
Province or territory						
Atlantic provinces [1]	15.8	x	10.4	x	115.7	103.3
Quebec	37.9	18.4	21.9	13.4	435.8	222.5
Ontario	64.7	34.3	80.4	3.8	661.9	372.5
Manitoba	4.3	x	1.6	x	31.3	20.4
Saskatchewan	29.9	6.5	41.6	1.0	50.4	49.9
Alberta	74.8	35.2	408.4	14.4	222.7	391.9
British Columbia and the territories [2]	57.1	9.7	74.5	7.7	106.7	100.6
Total	**284.6**	**112.3**	**638.7**	**52.0**	**1,624.6**	**1,261.1**

See notes at the end of the table.

Table 2-1 – continued

Operating expenditures on environmental protection — Type of activity and industry, province or territory, 2008

	Pollution prevention processes	Fees, fines and licences	Other	Total	Share of total
	millions of dollars				percent
Industry					
Logging	F	x	1.3	30.3	0.6
Oil and gas extraction	253.2	12.9	53.9	1,235.9	23.6
Mining	57.1	16.0	31.1	401.9	7.7
Electric power generation, transmission and distribution	112.8	28.4	41.2	646.7	12.3
Natural gas distribution	x	0.1	1.1	20.8	0.4
Food	11.9	9.7	4.3	357.3	6.8
Beverage and tobacco products	x	0.7	0.3	19.0	0.4
Wood products	7.8	2.8	2.1	93.0	1.8
Paper manufacturing	76.1	8.9	7.7	440.1	8.4
Petroleum and coal products	73.6	5.3	8.4	338.5	6.5
Chemicals	34.8	x	18.6	286.6	5.5
Non-metallic mineral products	7.9	2.1	4.5	83.0	1.6
Primary metals	F	3.0	19.1	796.7	15.2
Fabricated metal products	12.5	0.6	4.2	132.7	2.5
Transportation equipment	9.7	0.4	12.9	118.7	2.3
Other manufacturing	33.4	1.9	10.0	240.2	4.6
Total	**950.3**	**97.2**	**220.6**	**5,241.4**	**100.0**
Province or territory					
Atlantic provinces [1]	183.1	x	8.2	452.9	8.6
Quebec	F	8.2	34.9	1,002.9	19.1
Ontario	287.3	11.5	64.1	1,580.5	30.2
Manitoba	11.8	x	4.1	83.3	1.6
Saskatchewan	33.7	10.0	8.8	231.8	4.4
Alberta	172.5	45.8	64.4	1,430.1	27.3
British Columbia and the territories [2]	52.0	15.3	36.2	459.9	8.8
Total	**950.3**	**97.2**	**220.6**	**5,241.4**	**100.0**

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 2-2
Operating expenditures on environmental protection — Type of activity and industry, 2006

	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Waste management 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
Industry											
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	50.2r	43.2r	344.4r	16.5r	197.3r	183.7r	117.2r	25.2r	101.5r	1,079.2r	22.6r
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	39.6r	28.8r	68.6r	17.2r	90.0r	52.3r	85.8r	28.7r	55.8r	466.9r	9.8r
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	6.6r
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	10.6r
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
Total	**243.2r**	**128.6r**	**537.1r**	**107.4r**	**1,730.3r**	**1,047.3r**	**629.0r**	**120.9r**	**239.1r**	**4,782.9r**	**100.0**

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, 2008

	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	18.5	0.5	163.9	3.1
Prince Edward Island	1.8	0.0 s	5.4	0.1
Nova Scotia	58.0	1.5	70.2	1.3
New Brunswick	76.8	2.0	213.4	4.1
Quebec	439.0	11.5	1,002.9	19.1
Ontario	579.5	15.1	1,580.5	30.2
Manitoba	364.3	9.5	83.3	1.6
Saskatchewan	347.5	9.1	231.8	4.4
Alberta	1,677.4	43.8	1,430.1	27.3
British Columbia	x	x	428.5	8.2
Yukon, Northwest Territories and Nunavut	x	x	31.4	0.6
Total	**3,828.6**	**100.0**	**5,241.4**	**100.0**

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, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	millions of dollars			
Environmental monitoring	13.7	x	x	9.0
Environmental assessments and audits	16.5	34.2	20.6	36.7
Reclamation and decommissioning	161.2	239.7	46.0	49.7
Wildlife and habitat protection	16.2	x	x	28.9
Waste management and sewerage services	166.5	133.0	42.6	55.7
Pollution abatement and control processes (end-of-pipe)	122.2	636.2	255.1	668.6
Pollution prevention processes	136.9	369.6	128.4	324.2
Other	7.4	22.7	12.3	9.3
Total	**640.6**	**1,481.5**	**524.3**	**1,182.1**

Note(s): Figures may not add up to totals due to rounding.
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, 2008

	Number of employees per establishment				Total
	Fewer than 100	100 to 499	500 to 999	1,000 or more	
	dollars per employee				
Environmental monitoring	26.4	x	x	23.0	23.8
Environmental assessments and audits	31.8	46.4	93.3	93.9	57.9
Reclamation and decommissioning	311.2	325.5	208.2	127.0	266.0
Wildlife and habitat protection	31.4	x	x	73.8	47.6
Waste management and sewerage services	321.4	180.5	192.9	142.3	213.1
Pollution abatement and control processes (end-of-pipe)	236.0	863.8	1,155.7	1,708.8	901.2
Pollution prevention processes	264.4	501.8	581.7	828.6	513.9
Other	14.2	30.8	55.8	23.9	27.7
Total	**1,236.8**	**2,011.4**	**2,375.3**	**3,021.4**	**2,051.2**

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

Table 6
Operating expenditures on environmental protection by establishment size, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	millions of dollars			
Environmental monitoring	79.7	97.6	45.8	61.4
Environmental assessments and audits	24.3	36.4	19.9	31.7
Reclamation and decommissioning	130.8	216.8	95.5	195.6
Wildlife and habitat protection	8.3	29.3	5.4	9.0
Waste management and sewerage services	517.6	552.3	242.6	312.1
Pollution abatement and control processes (end-of-pipe)	111.9	559.0	187.9	402.3
Pollution prevention processes	224.1	312.0	69.9	344.5
Fees, fines and licences	10.8	51.4	26.8	8.2
Other	36.1	78.2	36.5	69.8
Total	**1,143.5**	**1,933.0**	**730.4**	**1,434.5**

Note(s): Figures may not add up to totals due to rounding.
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, 2008

	Number of employees per establishment				Total
	Fewer than 100	100 to 499	500 to 999	1,000 or more	
	dollars per employee				
Environmental monitoring	153.9	132.6	207.7	157.0	152.5
Environmental assessments and audits	46.9	49.5	89.9	81.0	60.1
Reclamation and decommissioning	252.5	294.4	432.7	499.9	342.2
Wildlife and habitat protection	16.0	39.8	24.4	23.0	27.9
Waste management and sewerage services	999.3	749.9	1,099.1	797.7	870.4
Pollution abatement and control processes (end-of-pipe)	216.0	758.9	851.4	1,028.2	675.6
Pollution prevention processes	432.6	423.6	316.5	880.4	509.2
Fees, fines and licences	20.9	69.7	121.5	20.9	52.1
Other	69.7	106.2	165.5	178.3	118.2
Total	**2,207.8**	**2,624.5**	**3,308.6**	**3,666.4**	**2,808.2**

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

Table 8
Distribution of capital expenditures on pollution prevention by medium and industry, province or territory, 2008

	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Other	Total
	millions of dollars					
Industry						
Logging	F	F	F	F	F	F
Oil and gas extraction	F	F	19.4	F	0.9	118.1
Mining	18.9	83.6	30.7	x	x	134.2
Electric power generation, transmission and distribution	81.3	21.3	142.3	F	F	276.3
Natural gas distribution	x	0.1	1.1	0.0	0.0	x
Food	10.8	8.3	F	F	16.2	42.3
Beverage and tobacco products	1.4	1.4	0.0	F	1.5	x
Wood products	3.1	0.6	1.6	0.0	1.6	6.8
Paper manufacturing	20.9	x	2.9	x	3.9	30.5
Petroleum and coal products	26.8	x	4.6	x	x	42.5
Chemicals	23.9	4.0	8.3	F	F	47.4
Non-metallic mineral products	30.9	2.7	x	F	4.2	38.2
Primary metals	60.5	5.7	5.4	x	x	72.6
Fabricated metal products	7.5	1.7	2.0	0.2	2.9	14.3
Transportation equipment	x	F	x	0.0	4.6	14.6
Other manufacturing	F	F	F	0.2	12.0	F
Total	**422.2**	**178.8**	**232.8**	**F**	**100.6**	**959.1**
Province or territory						
Atlantic provinces [1]	41.2	x	x	0.0	2.5	66.5
Quebec	98.1	16.1	19.6	1.1	20.0	155.0
Ontario	132.9	36.6	29.7	0.6	63.0	262.7
Manitoba	x	6.5	x	0.0	2.7	x
Saskatchewan	x	x	25.7	F	0.4	93.2
Alberta	100.5	F	x	F	x	183.8
British Columbia and the territories [2]	22.6	F	x	F	F	x
Total	**422.2**	**178.8**	**232.8**	**F**	**100.6**	**959.1**

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, province or territory, 2008

	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Total
	millions of dollars				
Industry					
Logging	F	F	0.0	F	F
Oil and gas extraction	711.4	18.3	58.5	1.7	790.0
Mining	F	x	67.5	F	119.1
Electric power generation, transmission and distribution	149.7	20.9	x	F	197.6
Natural gas distribution	x	0.0	0.0	0.0	x
Food	9.9	3.6	F	F	19.2
Beverage and tobacco products	0.7	x	x	x	x
Wood products	3.0	F	0.2	0.0	3.4
Paper manufacturing	8.0	4.4	x	x	13.0
Petroleum and coal products	96.9	x	x	F	122.9
Chemicals	11.7	4.6	10.1	1.4	27.8
Non-metallic mineral products	37.9	0.5	F	0.7	39.2
Primary metals	272.9	8.3	x	F	290.5
Fabricated metal products	F	0.1	0.1	F	F
Transportation equipment	15.3	x	x	x	26.3
Other manufacturing	16.8	F	F	x	19.5
Total	**1,361.0**	**114.7**	**190.2**	**16.2**	**1,682.2**
Province or territory					
Atlantic provinces [1]	49.9	x	x	0.0	65.7
Quebec	F	14.8	x	F	F
Ontario	162.5	35.0	22.0	6.9	226.3
Manitoba	F	7.5	F	F	x
Saskatchewan	55.5	x	41.7	x	116.3
Alberta	764.8	21.1	69.4	2.1	857.3
British Columbia and the territories [2]	47.4	x	x	0.3	62.3
Total	**1,361.0**	**114.7**	**190.2**	**16.2**	**1,682.2**

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
Distribution of pollution prevention methods by establishment size, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	percent			
Product design or reformulation	13	15	21	29
Equipment or process modifications	18	25	34	55
Recirculation, on-site recycling, reuse or recovery	37	49	66	70
Materials, feedstock or solvent substitution	17	23	25	47
Improved management or purchasing techniques	23	26	32	44
Prevention of leaks and spills	33	49	72	73
Good operating practices or training	36	54	77	75
Other	6	6	11	25
Total [1]	**60**	**75**	**88**	**87**

1. Percentage of establishments that used at least one pollution prevention method.
Source(s): Statistics Canada, Environment Accounts and Statistics Division.

Table 11
Expenditures on energy-related processes and technologies by industry, province or territory, 2008[1]

	Operating expenditures	Capital expenditures	Total
	millions of dollars		
Industry			
Logging	x	x	0.6
Oil and gas extraction	308.7	84.7	393.4
Mining	14.7	20.2	34.9
Electric power generation, transmission and distribution	402.0	121.0	523.0
Natural gas distribution	x	x	2.2
Food	11.0	24.9	35.9
Beverage and tobacco products	0.6	0.8	1.4
Wood products	45.1	14.8	59.9
Paper manufacturing	136.0	104.2	240.2
Petroleum and coal products	x	x	26.0
Chemicals	107.2	F	183.4
Non-metallic mineral products	x	x	6.9
Primary metals	F	x	112.5
Fabricated metal products	1.0	6.2	7.2
Transportation equipment	3.3	2.9	6.2
Other manufacturing	7.0	16.9	23.9
Total	**1,072.7**	**584.8**	**1,657.5**
Province or territory			
Atlantic provinces [2]	x	x	53.6
Quebec	54.8	44.8	99.7
Ontario	119.4	236.7	356.1
Manitoba	x	x	11.3
Saskatchewan	x	x	314.2
Alberta	591.1	73.6	664.7
British Columbia and the territories [3]	89.5	F	158.0
Total	**1,072.7**	**584.8**	**1,657.5**

1. Expenditures for energy-related 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 12
Expenditures on energy-related processes and technologies by establishment size, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	millions of dollars			
Operating expenditures	F	333.1	342.1	175.6
Capital expenditures	139.1	135.1	134.4	176.3
Total	**361.0**	**468.1**	**476.5**	**351.8**

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

Table 13
Distribution of energy-related technology use, 2008

	Proportion of establishments using each technology
	percent
Cogeneration	3
Alternative fuel systems or equipment	3
Fuel substitution systems or equipment	3
Waste energy recovery and reuse (for example, heat recovery)	10
Use of energy management or monitoring system(s)	12
Performed energy audit in the last three years (2006 to 2008)	13
Other systems, equipment or employee training that improved energy efficiency	8
Renewable energy source	
Small, mini- or micro-hydroelectric facility	1
Solar energy systems or equipment	2
Wind energy systems or equipment	0 s
Biomass energy [1]	3
Geothermal	0 s
Other renewable energy systems or equipment	1
Total [2]	**27**

1. Examples include energy crops and waste-to-energy.
2. Percentage of establishments that used at least one energy-related technology.

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

Table 14
Distribution of energy-related technology use by establishment size, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	percent [1]			
Cogeneration	2	4	20	11
Alternative fuel systems or equipment	2	4	8	8
Fuel substitution systems or equipment	2	4	12	20
Waste energy recovery and reuse (for example, heat recovery)	7	18	29	46
Use of energy management or monitoring system(s)	9	19	37	64
Performed energy audit in the last three years (2006 to 2008)	9	21	28	48
Other systems, equipment or employee training that improved energy efficiency	7	10	21	41
Renewable energy source				
Small, mini- or micro-hydroelectric facility	0 [s]	0 [s]	5	11
Solar energy systems or equipment	1	2	7	20
Wind energy systems or equipment	0 [s]	0 [s]	4	14
Biomass energy [2]	2	4	7	9
Geothermal	0 [s]	0 [s]	1	2
Other renewable energy systems or equipment	1	1	3	13
Total [3]	**21**	**40**	**66**	**81**

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.

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

Table 15
Use of environmental management practices by establishments, 2008

	Proportion of establishments using the practice	Employment share of establishments using the practice
	percent	
Environmental management system	18	43
Life cycle analysis	5	17
ISO 14000 certification	7	28
ISO 14064 certification	1	6
Implementation of a pollution prevention plan	14	32
Environmental voluntary agreements	7	20
Green procurement policy	8	18
Eco-labelling of products	5	7
Implementation of an environmental supply chain management policy	6	17
Impacted by a supplier's or client's environmental supply chain management policy	7	17
Environmental incentives	3	15
Other	1	2
Total	**32** [1]	**56**

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

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

Table 16
Distribution of environmental management practices by establishment size, 2008

	Number of employees per establishment			
	Fewer than 100	100 to 499	500 to 999	1,000 or more
	percent			
Environmental management system	12	28	70	78
Life cycle analysis	3	6	24	34
ISO 14000 certification	3	13	52	58
ISO 14064 certification	0 s	1	2	10
Implementation of a pollution prevention plan	11	20	44	59
Environmental voluntary agreements	5	9	32	37
Green procurement policy	7	9	20	24
Eco-labelling of products	4	6	7	13
Implementation of an environmental supply chain management policy	5	10	13	29
Impacted by a supplier's or client's environmental supply chain management policy	6	9	17	26
Environmental incentives	2	6	16	29
Other	1	2	4	3
Total [1]	**26**	**45**	**81**	**85**

1. Percentage of establishments that used at least one environmental management practice.
Source(s): Statistics Canada, Environment Accounts and Statistics Division.

Introduction

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. Because of the methodological changes and expanded coverage, comparisons with survey estimates prior to 2006 are not recommended. In addition, further changes were made to the survey coverage for the 2008 reference year. The pipeline transportation industry and establishments involved in contract logging were removed from the survey coverage. For more detailed information please see the section "Data quality, concepts and methodology — General methodology" that follows.

Data sources and methodology

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 3,507 units in selected primary industries (resource extraction industries), manufacturing industries, the electric power generation, transmission, and distribution industry, and the natural gas distribution industry.

For the 2008 reference year, 15 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. Note that for the 2008 reference year, the pipeline transportation industry and establishments involved in contract logging were removed from the sample.

Reference period

Respondents were asked to report for a 12-month period ending between April 1, 2008 to March 31, 2009. The results in this report, however, are simply presented as environmental protection expenditures made during 2008. No adjustment to the data is made for companies that do not report a fiscal year ending on December 31st.

General methodology

The methodology for the Survey of Environmental Protection Expenditures (SEPE) underwent a thorough redesign for the 2006 reference year. The changes focused on improving the methodology behind the sample selection, imputation and estimation processes for the survey. As a result of the methodological changes and expanded coverage, comparisons of the 2008 estimates with estimates prior to the 2006 reference year are not recommended.

In addition, a new sampling strategy was used in 2008 for establishments with fewer than 50 employees. The 2006 reference year was the first time data was collected for establishments with between 20 and 50 employees. These establishments made up a third of the sample and accounted for less than 10% of the total environmental protection expenditures. For 2008, the sample size for establishments with fewer than 50 employees was reduced.

Survey frame

The survey frame was constructed from the Generic Survey Universe File (GSUF). This establishment level file was produced from Statistics Canada's Business Register file in May 2009, and represents the most up-to-date listing of Canadian businesses available.

Sample selection

Industry classification

Business establishments selected for inclusion in the SEPE were chosen from industry groups in accordance with the North American Industry Classification System (NAICS). The NAICS has been 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.[1]

Coverage and sample selection

The survey covers businesses active in selected primary industries (resource extraction), manufacturing industries, the electric power generation, transmission and distribution industry, and the natural gas distribution industry.

Sample selection was done using a stratified sampling strategy at the establishment level. Two samples were selected based on employment size; one sample was selected for businesses with 50 or more employees and another for smaller businesses with fewer than 50 employees.

As a statistical unit, the enterprise is defined as the organizational 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.

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

Establishments with 50 or more employees were stratified by 3, 4 and 6-digit level NAICS industry groupings and by province. A size measure of total revenues was used as an auxiliary variable. The sample was allocated proportionally within each combination of industry group, province and size with a minimum sample size of 7 establishments. The sample size was inflated for some combinations where the non-response was high for the previous survey cycle.

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

1. The sampling unit was an establishment that belongs to an enterprise with multiple establishments in the oil and gas extraction industry;

2. The sampling unit was located in Prince Edward Island, the Yukon, Northwest Territories or Nunavut.

A total of 15 industry groups were targeted for increased survey coverage based on 3, 4 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.

For establishments with less than 50 employees, the sample size was set at 639 establishments. The sample was allocated proportionally according to the population distribution among the industry groups. A minimum of ten establishments were selected for each industry group.

List of selected targeted industries

- Logging (NAICS 113311);
- 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).

Concepts and variables measured

The survey questionnaire was designed in consultation with key public and private sector groups and by referencing the experiences from other countries who have conducted similar surveys. Environmental protection expenditures for the purposes of the survey are defined as those made to meet environmental regulations, conventions or voluntary agreements (see text box "**Environmental protection expenditures**" and the questionnaire (see IMDB 1903) for further explanation).

The questionnaire was sent to establishments 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
- energy-related processes and technologies

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

Questions related to energy-related processes and technologies for energy efficiency were also asked. The questions were designed to measure what proportion of overall investments were made to improve energy efficiency.

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 2008 questionnaire where necessary to improve wording, coverage and clarity.

Expenditures on energy-related 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[1] incurred by businesses in order to comply with, or to anticipate, Canadian and international environmental regulations, conventions[2] or voluntary agreements. The challenge in measuring expenditures made on environmental initiatives (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.[3] 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.[4]

1. Capital expenditures refer to all costs incurred during the 2008 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, 2008/2009, Research and Development in Canadian Industry Survey, (see survey number 4201).

Data accuracy

The mailout of the 2008 Survey of Environmental Protection Expenditures took place in August, 2009. Data collection was carried out from September 2009 to the end of March 2010. Survey questionnaires were mailed to specific establishments selected for the sample 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 or territory, 2008", 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 2008 reference year, there were 2,722 reports received for 3,507 surveyed establishments and enterprises. The response rate for the 2008 survey was 78%.

Response rates by industry ranged from a high of 93% in the electric power generation, transmission and distribution industry to a low of 72% in the transportation equipment industry. Response rates by province and territory ranged from a low of 59% in Newfoundland and Labrador and Prince Edward Island to a high of 82% in Alberta.

Text table 1
Response rates by industry and by province or territory, 2008

	According to number of reporting units		
	Responses	Total [1]	Response as a percentage of total [1]
	number		percent
Industry			
Logging	48	66	73
Oil and gas extraction	117	139	84
Mining	82	108	76
Electric power generation, transmission and distribution	76	82	93
Natural gas distribution	34	40	85
Food	372	508	73
Beverage and tobacco products	70	88	80
Wood products	251	316	79
Paper manufacturing	162	186	87
Petroleum and coal products	44	55	80
Chemicals	146	177	82
Non-metallic mineral products	151	199	76
Primary metals	101	130	78
Fabricated metal products	369	468	79
Transportation equipment	133	185	72
Other manufacturing	566	760	74
Total	**2,722**	**3,507**	**78**
Province or territory			
Newfoundland and Labrador	26	44	59
Prince Edward Island	42	71	59
Nova Scotia	73	105	70
New Brunswick	109	134	81
Quebec	652	816	80
Ontario	788	1008	78
Manitoba	138	197	70
Saskatchewan	103	151	68
Alberta	408	497	82
British Columbia	367	461	80
Yukon, Northwest Territories and Nunavut	16	23	70
Total	**2,722**	**3,507**	**78**

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

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, province or territory, 2008[1]

	Environmental monitoring	Environmental assessments and audits	Reclamation and decom-missioning	Wildlife and habitat protection	Waste management and sewerage services	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Other	Total
	percent								
Industry									
Logging	0	0	0	0	x	x	24	0	25
Oil and gas extraction	23	43	56	22	44	36	49	27	74
Mining	13	7	11	9	28	20	36	5	52
Electric power generation, transmission and distribution	25	31	26	26	36	32	45	5	60
Natural gas distribution	22	28	9	23	23	27	30	25	63
Food	4	3	x	1	15	7	15	x	32
Beverage and tobacco products	4	x	x	0	14	5	20	0	25
Wood products	0 s	1	0	1	7	4	10	x	16
Paper manufacturing	3	x	2	1	11	9	17	x	30
Petroleum and coal products	9	x	4	x	19	20	34	3	49
Chemicals	4	1	1	0	18	13	28	0 s	42
Non-metallic mineral products	2	1	1	1	7	16	19	1	34
Primary metals	6	7	2	0	8	15	19	x	29
Fabricated metal products	0 s	2	1	0	9	6	11	0	19
Transportation equipment	5	x	0 s	0	5	9	18	0	27
Other manufacturing	0 s	0 s	0 s	0	4	4	9	1	13
Total	**2**	**2**	**2**	**1**	**9**	**7**	**14**	**1**	**22**
Province or territory									
Atlantic provinces [2]	2	1	1	1	10	13	17	1	28
Quebec	1	2	1	1	11	7	14	1	23
Ontario	2	2	0 s	0 s	6	6	12	1	20
Manitoba	6	1	2	x	15	11	29	x	37
Saskatchewan	6	8	9	4	11	11	19	5	28
Alberta	4	7	8	3	11	9	16	4	24
British Columbia and the territories [3]	3	1	2	1	8	6	13	1	21
Total	**2**	**2**	**2**	**1**	**9**	**7**	**14**	**1**	**22**

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, province or territory, 2008[1]

	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Waste management and sewerage services	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Fees, fines and licences	Other	Total
	percent									
Industry										
Logging	24	34	17	22	98	13	41	13	33	100
Oil and gas extraction	66	51	48	20	100	34	52	50	51	100
Mining	69	43	30	13	98	56	44	40	43	100
Electric power generation, transmission and distribution	71	76	40	32	98	47	57	51	67	99
Natural gas distribution	64	63	38	23	98	26	46	10	36	100
Food	22	13	1	x	100	11	20	14	12	100
Beverage and tobacco products	15	13	x	7	100	11	16	22	11	100
Wood products	16	16	7	3	99	12	21	15	8	100
Paper manufacturing	32	29	3	1	100	19	34	21	22	100
Petroleum and coal products	35	20	17	3	100	25	50	19	28	100
Chemicals	33	28	13	4	100	35	36	25	23	100
Non-metallic mineral products	16	17	11	2	100	29	25	25	17	100
Primary metals	39	29	10	9	100	30	28	25	29	100
Fabricated metal products	14	15	4	x	100	13	26	13	10	100
Transportation equipment	22	32	4	6	98	12	39	13	27	100
Other manufacturing	11	10	1	1	100	9	21	9	8	100
Total	**19**	**17**	**5**	**3**	**100**	**14**	**25**	**14**	**14**	100
Province or territory										
Atlantic provinces[2]	19	17	4	3	100	20	28	27	16	100
Quebec	17	14	5	2	100	15	25	8	12	100
Ontario	20	19	3	2	100	13	26	17	14	100
Manitoba	13	10	3	1	100	19	24	6	10	100
Saskatchewan	21	18	10	4	99	15	37	11	20	100
Alberta	23	19	13	5	99	19	27	15	19	100
British Columbia and the territories[3]	15	13	6	4	100	11	19	19	11	100
Total	**19**	**17**	**5**	**3**	**100**	**14**	**25**	**14**	**14**	100

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.

Environment Accounts and Statistics Division

Survey of Environmental Protection Expenditures, 2008

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

0001 Company name

0002 Establishment name

0021 C / O

0004 Address

0005 City

0006 Province/Territory

0007 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, 2008,* Catalogue No. 16F0006XIE.

CONFIDENTIALITY

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

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**
E-mail: **enviro-oid-exp@statcan.gc.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

4-2300-2.1: 2009-05-20 STC/NAD-475-04244

Statistics Canada Statistique Canada

Canada

How to report environmental protection expenditures:

For Questions 2 to 11 of this questionnaire please only report expenditures made in response to or in anticipation of Canadian or international environmental regulations, conventions or voluntary agreements.

Please report your expenditures in Canadian dollars. Your best estimate is acceptable.

If the expenditure is zero ..... Report: $ 0

The data reported in this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregate form only.

1. Reporting year

Report must cover your most recent fiscal year that **ended** any time between **April 1, 2008 and March 31, 2009**.

From 0011 *Year Month Day* **to** 0012 *Year Month Day*

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

2. Waste management and sewerage services

Waste management and sewerage services include the collection, treatment, storage, disposal and recycling of all domestic, industrial, hazardous and non-hazardous waste and sewage. *Refer to page 14 of this questionnaire for more information.*

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)

Operating expenses		Capital expenditures		TOTAL
220 $, ,	+	230 $, ,	=	240 $, ,

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 the 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 $, ,	+	260 $, ,	=	270 $, ,

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 for more information.*

Substances released to air		Substances released to surface waters		On-site releases to land/ underground injection		Noise, vibration or radiation	
280 %	+	290 %	+	300 %	+	310 %	= 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 2008, please indicate how it was achieved by checking the appropriate box(es). *Refer to page 15 of this questionnaire for a description of each method.*

		Yes	No
Product design or reformulation Reformulating or redesigning end products to be non-toxic or less polluting upon use, release or disposal	810	1 ○	3 ○
Equipment or process modifications (integrated process) Upgrading or replacing production unit equipment or methods	830	1 ○	3 ○
Recirculation, on-site recycling or reuse or recovery of materials or substances	850	1 ○	3 ○
Materials or feedstock substitution, solvent reduction, elimination or substitution Changing the raw materials of product to use non-toxic or less polluting raw materials	870	1 ○	3 ○
Improved inventory management or purchasing techniques Integrating environmental considerations into existing and new purchasing practices, as well as into inventory management systems	875	1 ○	3 ○
Prevention of leaks and spills	880	1 ○	3 ○
Good operating practices or pollution prevention training Modifying existing equipment or methods by such steps as improved housekeeping, system adjustments, or process/product inspections	885	1 ○	3 ○
Other *(Please specify)*	890	1 ○	3 ○

0891

0892

0893

4.2 Expenditures on pollution prevention

If the expenditure is zero, please write "0" in the 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 $, ,

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?

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 the 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 $, ,	+	110 $, ,	=	120 $, ,

6. Environmental assessment and audits

If the expenditure is zero, please write "0" in the 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 $, ,	+	140 $, ,	=	150 $, ,

7. Site reclamation and decommissioning

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

Expenditures on site reclamation and decommissioning made during your fiscal year 2008 for any active or inactive site belonging to your establishment. Please include expenditures on site decommissioning even if site closed before 2008.

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 $, ,	+	170 $, ,	=	180 $, ,

8. Protection and restoration of wildlife and habitat

If the expenditure is zero, please write "0" in the 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 $, ,	+	200 $, ,	=	210 $, ,

9. Environmental charges

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

Include:

- Permits, fees, levies, special assessments 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 $, ,

What proportion of the operating expenses, above, was spent on each of the following?

1. Permits, fees, levies, special assessments and related fees ..... 0761 %
2. Any fines, penalties or damage awards paid to government agencies or individuals, or other charges paid to regulating bodies in order to allow operations to take place at this establishment ..... 0762 %

10. Other environmental protection expenditures

If the expenditure is zero, please write "0" in the 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 included elsewhere that are required to comply with environmental regulations, conventions or voluntary agreements

Exclude:

- Research and development expenditures

Operating expenses		Capital expenditures		TOTAL
770 $, ,	+	0771 $, ,	=	0772 $, ,

11. Total expenditures on environmental protection

If the expenditure is zero, please write "0" in the 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 and question 10.
They should also include all data for which breakdowns were not available.

Operating expenses		Capital expenditures		TOTAL
801		802		803
$, ,	+	$, ,	=	$, ,

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)
- The level of expenditures in the current reporting period if this is the first time your establishment has reported expenditures

For example, "We installed low-NO_x burners in 2008 – Question 4"

0804

0805

0806

0807

12. Environmental technologies

12.1 Did you use one or more of the following systems or equipment in your fiscal year 2008?

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 ○	3 ○
2. Alternative fuel systems or equipment	2006	1 ○	3 ○
3. Fuel substitution systems or equipment	1284	1 ○	3 ○
4. Waste energy recovery/reuse (e.g., heat recovery)	2031	1 ○	3 ○
5. Use of energy management or monitoring system(s) to improve efficiency	2032	1 ○	3 ○
6. Performed energy audit in the last three years (2006-2008)	2033	1 ○	3 ○
7. Other systems, equipment or employee training that improved energy efficiency. *Please specify most important* 1293	1292	1 ○	3 ○

Renewable energy source:

8. Small, mini- or micro-hydroelectric facility	2004	1 ○	3 ○
9. Solar energy systems or equipment	1288	1 ○	3 ○
10. Wind energy systems or equipment	1289	1 ○	3 ○
11. Biomass energy (e.g., energy crops and waste-to-energy)	1285	1 ○	3 ○
12. Geothermal	1290	1 ○	3 ○
13. Other renewable energy systems or equipment *Please specify most important* 2050	2005	1 ○	3 ○

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

2007 1 ○ Yes 3 ○ No ➔ *Go to Question 13.*

12.3 What were your operating expenses and capital expenditures in your fiscal year 2008 on the systems or equipment reported in Question 12.1?

If the expenditure is zero, please write "0" in the corresponding box. Please include in your estimate any expenditures made for these systems or equipment that were reported in response to Questions 2 to 10 of this questionnaire. Your best estimate is acceptable. **Please exclude fuel costs.**

Operating expenses		Capital expenditures		TOTAL
2008 $,,	+	2009 $,,	=	2010 $,,

13. Environmental management practices

Please indicate the environmental management practices adopted or utilized by this establishment in your fiscal year 2008 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 ○	3 ○
2. Did this establishment use Life Cycle Management, Life Cycle Assessment or Design for Environment for decision making?	965	1 ○	3 ○
3. Is this establishment certified under the ISO 14064 standards for greenhouse gas verification and accounting?	0975	1 ○	3 ○
4. Is this establishment certified under the ISO 14000 family of environmental management standards?	953	1 ○	3 ○
5. Did this establishment develop and implement a pollution prevention plan? . . .	970	1 ○	3 ○
6. Did this establishment implement any environmental voluntary agreement, or did it participate in any voluntary environmental program?	955	1 ○	3 ○

Examples include Environmental Performance Agreements (EPAs), Canadian GHG Reductions Registry© or Canadian Industry Program for Energy Conservation. *If yes, please list programs, accords or agreements.*

0976
0977
0978

7. Did this establishment have a "green" procurement policy?	957	1 ○	3 ○
8. Were any of the goods produced by this establishment certified by an environmental program, such as the "Enviro Choice Program" or Ecologo?	959	1 ○	3 ○
9. a) Did this establishment have an environmental supply chain management policy?	0972	1 ○	3 ○
b) Was this establishment impacted by the environmental supply chain management policy in place at a supplier or client business?	0973	1 ○	3 ○

		Yes	No
10. Did this establishment take advantage of any Canadian federal or provincial/territorial government environmental incentive programs, grants, loans, or tax credits during the 2008 fiscal year?	0974	1 ○	3 ○

Examples include ecoENERGY Retrofit program, or Accelerated Capital Cost Allowance for energy efficiency and renewable energy sources.
If yes, please specify the incentive programs, grants or loans.

0979
0980
0981

11. Other *(Please specify)*	967	1 ○	3 ○

0982
0983
0984

Certification

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

Name of person completing this questionnaire.
0026 1 ○ Mr. 2 ○ Mrs. 3 ○ Miss 4 ○ Ms

Signature

Last name
0054

First name
0013

Title
0014

Telephone number
0017

Ext. number
0027

E-mail address
0018

Fax number
0016

Website address
0020

Date *Year Month Day*
0015

Approximately how long did it take to collect the data and complete this survey?
9910 hour(s) 9909 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*

9920

9913

9914

If you have any questions, please contact us.
Telephone (toll free) 1-800-255-7726
Fax: 1-800-755-5514 (within Canada)
E-mail: enviro-oid-exp@statcan.gc.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 **Canadian dollars for your 2008 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 and chemical products.

Question 2) Waste management and sewerage services

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).

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

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.

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 - 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.

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 systems or equipment**- 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 system(s) to improve efficiency** - 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 (2006-2008)** - 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_x 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).

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 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.
4. **The ISO 14000 family** (ISO14001…ISO14063 inclusive) of environmental management standards are an internationally recognized set of standards and guidelines primarily concerned with environmental management systems developed by the International Organization for Standardization.
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), transport, store, handle, operate or dispose 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. **Environmental supply chain management** refers to the inclusion of environmental standards in the planning and management of activities involved in sourcing and procurement, conversion, and all logistics management activities. It also includes the coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. Environmental supply chain management integrates supply and demand environmental management within and across companies.