



Environment Accounts and Statistics Division  
**Survey of Environmental Protection  
Expenditures, 2002**  
**Guide to Definitions and  
Classification Details**



## Definitions

### **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 and expenditures for 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 Montreal Protocol (elimination of CFCs by 1998); the Canada-U.S. Air Quality Agreement; the "Responsible Care" program from the Canadian Chemical Producers Association; the Accelerated Reduction/Elimination of Toxics (ARET) Program; the Voluntary Challenge and Registry (VCR) Program on climate change; etc.

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

**How to report**

Please report expenditures in **thousands of Canadian dollars for your 2002 fiscal year**. If, for certain categories, no expenditures have been incurred, **please write “0” in the corresponding box**.

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

**To report capital expenditures**

**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 construction 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).

**For logging activities**

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

**For mining activities**

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

**For petroleum operations**

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

## **Question 6) Pollution abatement and control and waste management expenditures**

### **6a)**

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.

### **6b)**

**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 7) Pollution prevention**

Pollution prevention is technologies, equipment or processes that reduce or eliminate pollution at the source instead of at the end-of-pipe or stack. 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, re-use, recirculation or recycling of materials on-site (does not include materials sent off-site for recycling).

### **7c) Pollution prevention methods**

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

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

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

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

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

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

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

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

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

## **Question 12) Environmental processes and technologies**

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

**Greenhouse gases:** The group of chemical compounds that are responsible for the so-called 'greenhouse effect.' The most important greenhouse gases produced by economic activity are *carbon dioxide* (CO<sub>2</sub>), *methane* (CH<sub>4</sub>), *nitrous oxide* (N<sub>2</sub>O), *chlorofluorocarbons* (CFCs), *hydrofluorocarbons* (HFCs), *perfluorocarbons* (PFCs) and *sulphur hexafluoride* (SF<sub>6</sub>).

**Fugitive or vented greenhouse gas emissions from fossil fuels:** Intentional or unintentional releases of greenhouse gases from the production, processing, transmission, storage and delivery of fossil fuels. Released gas that is combusted before disposal (e.g., flaring of natural gases at oil and gas production facilities).

**12a)** *Transportation* refers to the transport of fossil fuels from the field or processing plant to the local distribution centre.

*Distribution* refers to the distribution of natural gas or oil to the individual consumer.

**12b) Examples of systems or equipment to reduce fugitive or vented greenhouse gas emissions from the extraction, refining, transportation or distribution of fossil fuels** – high efficiency flares; lower emission pneumatic valves; flash tank separators; floating roof tanks; leak detection and repair programs.

**Examples of systems or equipment to reduce greenhouse gas emissions other than fugitive or vented emissions** – enhanced recovery technologies; high efficiency motors or engines; energy management systems; maintenance planning; drag reducing agents; electric micro turbines; energy recovery systems such as waste heat recovery; cogeneration; renewable energy sources; switching to lower or zero-carbon energy sources; CO<sub>2</sub> capture or disposal.

**12c) Examples of systems or equipment to reduce greenhouse gas emissions from the generation of electricity** – high efficiency motors or engines; energy management systems; maintenance planning; drag reducing agents; electric micro turbines; energy recovery systems such as waste heat recovery; cogeneration; renewable energy sources; switching to lower or zero-carbon energy sources; CO<sub>2</sub> capture or disposal.

**12d) Description of the systems and equipment listed in Question 12d:**

- 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. Small, mini- or micro-hydroelectric facility** – Micro-hydro = less than 100 kW; Mini-hydro = 100 kW to 1000 kW (1MW); Small hydro = 1 MW to 25 MW (50 MW in British Columbia).
- 3. Solar energy systems or equipment** – active and passive solar systems; photovoltaics; solar thermal generators; solar water and space heating systems.
- 4. Wind energy systems or equipment** – horizontal and vertical axis turbines; towers and other types of equipment used to generate energy and electricity.
- 5. Waste-to-energy systems or equipment** – systems and equipment (turbines, boilers, process equipment) that use organic matter such as forest and agricultural residues, to produce electricity, steam, or heat.

**6. Other renewable energy systems or equipment** – please specify your renewable energy systems and equipment if they are not listed in the preceding categories, such as systems and equipment for energy production from wave, tidal, ocean thermal energy conversion systems, and geothermal energy.

**7. 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.

**8. Fuel Substitution** – switching from a carbon fuel such as coal or petroleum to a lower carbon (such as natural gas) or carbon-free fuel.

**9. Other systems, equipment or employee training that improved energy efficiency** – please specify any other equipment or systems not listed in Question 12d that improved energy efficiency or energy conservation. Examples include energy management equipment or systems; installation of more efficient process equipment such as boilers, turbines and furnaces; process control equipment; energy efficient engines and motors; low NO<sub>x</sub> burners.

**12f)** Your best estimate is acceptable. Please exclude fuel costs.

**12h) New or significantly improved systems or equipment to reduce greenhouse gas emissions:** *A new system or piece of equipment* is one that is new to the establishment, whose characteristics or intended uses differ significantly from those systems or equipment previously used by the establishment. *A significantly improved system or piece of equipment* is an existing system or piece of equipment whose performance has been significantly enhanced or upgraded. Excludes maintenance, repair and replacement in kind.

**12i)** Please indicate what were the obstacles or drivers to the adoption of new or significantly improved systems or equipment to reduce greenhouse gas emissions.

Indicate the obstacles regardless of whether or not the system or equipment was adopted.

**12j) Environmental biological treatment**

**Microbiologically enhanced recovery of materials** – the use of living organisms to recover petroleum-based substances from soil.

**Phytoremediation** – the use of plants to clean up soil, sediment and contaminated water.

**Bioremediation** – the use of living organisms to reduce or eliminate environmental hazards in soil and waste water resulting from the accumulation of toxic chemicals.

**Biofiltration** – a control technology used in the treatment of gas streams contaminated with biologically degradable compounds. Biofilters are 100-130 cm deep and contain packing material such as compost, soil, peat moss, granular activated carbon (GAC), or other porous media capable of adsorbing gaseous compounds and supporting biological growth. Waste gases are purified by passage through the biologically active material.

**Natural or constructed wetland** – provide a natural filtering process for wastewater.

**Biobleaching** –the extraction of specific metals from ores though the use of bacteria.

**Bio-pulping** – the treatment of wood chips with lignin-degrading fungi prior to pulping.

**Bio-bleaching** – the treatment of wood pulp using enzymes in place of chloride.

**Biodesulphurization** – a process that involves a microbial system that removes organically bound sulphur from fuels.

### Question 13) Environmental management practices

- a) An **environmental management system** is a management structure that allows an organization to assess and control the environmental impact of its activities.
- b) **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.
- c) **ISO 14000** is an internationally recognized set of standards and guidelines primarily concerned with environmental management systems developed by the International Organization for Standardization.
- d) **Voluntary actions** include codes of environmental practice, guidelines, emission and waste reduction targets, as well as agreements with governments.
- e) **Green procurement** describes the procurement of goods and services that minimize environmental impacts compared with goods and services with similar performance requirements. The costs and environmental impacts of a product at various stages of its life cycle are taken into consideration, such as the process used to manufacture the product (including raw materials), transportation, storing, handling and operating and disposal of the product.
- f) **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.

- g)** Your establishment can either publish its own **environmental report** or be a contributor to the parent company's environmental report, or annual report that includes a section dealing with its environmental performance or sustainable development.