Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

A Study of Sustainable Development Initiatives within Canadian Industry

Prepared for the Strategic Policy Branch of Industry Canada

Michael Barton

August 1998

Table of Contents

3.8 Association and Company Web Sites

3.9 Glossary of Terms

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

1.0 INTRODUCTION

The World Commission on Environment and Development in 1987 defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their needs." What this means is that the natural environment and its resources should be used in such a way to meet our ever-growing demands for energy and goods without damaging the supply of these resources for future applications. Industry Canada has embraced the concept of sustainable development and in 1997 tabled a sustainable development strategy. Accompanying the strategy were the following four objectives:

- foster a marketplace climate in Canada that promotes sustainable development;
- enhance the ability of Canadian firms to develop and use innovative technologies and tools which contribute to sustainable development;
- encourage trade and investment flows which contribute to sustainable development in Canada and abroad;
- continue to improve the capacity of Industry Canada to manage and deliver departmental policies, programs, and operations which contribute to sustainable development.

Objective

Industry sectors, and the companies within these sectors, vary in their sustainable development activities. The objective of this study is to achieve a general perspective of the sustainable development initiatives being pursued by Canadian industry

Methodology

This research study was conducted from May to August of 1998. The companies and associations reviewed in this study were selected from a list of more than 70 organizations. The companies and associations were chosen based on information from a variety of sources. These sources included an article from the March 1997 edition of *CMA Magazine*, which listed 26 companies that produce substantial annual environmental or sustainable development reports. Other companies were added to the list on the basis of other sources such as Industry Canada staff involved in sustainable development-related work. The next step was to gather data on these companies and associations in order to develop an information base for conducting research. The information used in this study comes from three main sources: dialogue with environment officials for the companies and associations; examination of Web sites published by the companies and associations; and the Voluntary Challenge and Registry office and Web site.

Once the information was collected, the next step was to select the companies and associations that would actually be included in the study. In most cases, one association and two companies were chosen for each of the industry sectors based on the information available on their sustainable development activities. However, because the manufacturing and processing technologies sector branches off into many different divisions, three associations were selected rather than one. The selection process narrowed the study down to nine associations and sixteen companies. The companies and associations' sustainable development activities were reviewed in the context of three criteria and this document was created to report the findings.

Criteria for Reviewing Sustainable Development Practices of Companies and Associations

The review of the companies and associations is based on three main criteria. A company or association with substantial sustainable development practices is likely to meet these criteria. They are the following:

- The association or company operates in an industry sector for which Industry Canada has responsibility;
- The association or company publishes regular information about its sustainable development and environmental management activities;
- The association or company displays evidence of a tangible sustainable development contribution.

This study focuses on associations and companies whose operations and products are classified within an industry sector for which Industry Canada has responsibility. The sectors included in this study are the following: metals and minerals processing; manufacturing and processing technologies; forest and building products; advanced materials, chemicals, and plastics; aerospace and defence; information technologies

and telecommunications; and automotive and transportation.

It is important that an association or company makes public information on its sustainable development and environmental management practices so that members of communities affected by an association or company's operations are aware of these practices. Such documentation also allows other associations and companies to learn from those organizations that have been reasonably successful in achieving sustainable development. This information is published in many different sources. For example, companies and associations may choose to publish such information in their annual reports, along with shareholder information. Companies and associations often publish separate sustainable development or environmental management reports. These reports give specific information on company or association objectives, practices, achievements, and future activities. The information may also be available on the corporate Web site. Publishing this information on the Web site makes it quickly available to a large public audience.

Deciding whether an association or company's sustainable development contributions can be considered tangible is not as straightforward as the first two criteria. The following indicators are suggestive of tangible sustainable development contributions:

- The company or organization participates in the federal government's Voluntary Challenge and Registry Program and meets the requirements set out by the Challenge guidelines;
- The company or association directly or indirectly considers the World Business Council on Sustainable Development's seven elements of eco-efficiency;
- The company or association has a recognizable form of environmental management system in place to guide operations that may adversely impact upon the natural environment.

The Voluntary Challenge and Registry (VCR) program is a national initiative that challenges Canadian organizations to voluntarily take actions to limit or reduce greenhouse gas emissions. The primary goal of the VCR program has been to limit greenhouse gas emissions to 1990 levels by the year 2000. However, the program has recently been encouraging its participants to adhere to the goals of the Kyoto Agreement, which for Canada represent a 6% reduction below 1990 levels within the 2008 to 2012 period. The Registry records the actions taken by significant emitters of greenhouse gases, primarily in the industrial and commercial sectors. A participant is required to submit a *Letter of Intent* to confirm with the VCR program that it accepts the challenge of reducing its greenhouse gas emissions. An *Action Plan* should then be submitted to provide information on how the participant plans to reduce greenhouse gas emissions. The action plan should also include forecasts or future emission levels, goals and targets for emission reductions, and a display of continued commitment to the challenge. Once the action plan has been submitted, participants are encouraged to submit annual *Progress Reports* to report the results achieved from the action plan. The progress report should include a brief description of ongoing objectives and projects and, to the extent possible, calculated or measured results in greenhouse gas emission reductions since the last report was submitted.

The concept of *eco-efficiency* means producing more valuable products or services using fewer material and energy inputs, and creating less pollution. This concept was developed by the World Business Council for Sustainable Development (WBCSD), which is a coalition of 120 multinational corporations from 33 countries, representing more than 20 major industrial sectors. The seven elements of eco-efficiency are the following:

- reduction in the material intensity of goods and services;
- reduction in the energy intensity of goods and services;
- reduction in toxic dispersion;
- enhancement of material recyclability;
- maximization of the sustainable use of renewable resources;
- extension of product durability;
- increase in the service intensity of goods and services.

An environmental management system is a way for a company, or association, to responsibly manage its environmental performance and minimize its adverse environmental impact. For example, the International Organization for Standardization (ISO) has developed the ISO 14 000 series, which specifies requirements for an environmental management system. In this study, the examination of companies and associations' environmental management systems (EMS) will be loosely based on the ISO 14 001 standard. An ISO 14 001-registered EMS is required to have the following elements:

- an environmental policy statement that shows commitment to environmental improvement; compliance with regulations and legislation; a framework for review of environmental objectives; communication with employees; and communication with the public;
- identification of the company or association's environmental impacts;
- identification of the regulatory requirements that affect company or association operations;
- creation of environmental objectives and targets;
- proper training and education of employees, contractors, and interested public;
- development of an emergency preparedness and response plan;
- monitoring and measurement of operations and activities.

The appendices provide descriptive profiles on the sustainable development activities of a select number of companies and associations. The descriptive information is guided by the above criteria. One part of the

appendices also provides information on the company and association Web sites.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

2.0 OVERVIEW OF ASSOCIATIONS AND COMPANIES' SUSTAINABLE DEVELOPMENT ACTIVITIES

Companies

Seventeen companies have been reviewed in this study. These include:

- Air Canada
- Alcan Aluminum Ltd.
- B. C. Hydro
- Chrysler Canada
- Consumers Gas Company Ltd.
- Dofasco Inc.
- Dow Chemical Canada
- Du Pont Canada
- E. B. Eddy Forest Products Ltd.
- General Motors of Canada
- International Business Machines (IBM) Canada
- Inco Ltd.
- Northern Telecom
- Orenda Aerospace Corporation
- Shell Canada
- Suncor Energy Inc.
- Weyerhaeuser Canada

Each of the seventeen companies included in this study has some form of documentation about its sustainable development and environmental management activities, as is shown in Table 2.1.1. Each of these companies has a Web site; however, Air Canada, E. B. Eddy, Orenda Aerospace, and Northern Telecom's sites contain no sustainable development information. These sites are simply vehicles for business information and communication. The other sites have, at a minimum, the companies' environmental policy statements and goals for sustainable development. Most of the sites have documentation about the companies' specific sustainable development activities and what the companies hope to achieve through these activities. All of these companies participate in the VCR program and submit annual reports updating their greenhouse gas management activities. Furthermore, each of the companies, except Consumers Gas, Orenda Aerospace, and Du Pont Canada, produce documentation to supplement their Web sites and VCR reports. This documentation discusses issues such as waste management, control of toxic releases to air, land, and water, energy efficiency, and other sustainable development initiatives. Very few companies publish sustainable development and environmental information in their annual reports. These reports are primarily reserved for financial and stockholder information.

Each of the companies in this study consider at least two of the eco-efficiency elements. Each of the seventeen companies has plans to reduce the energy intensity of goods and services and reduce toxic dispersion. However, none of the companies have plans for all seven eco-efficiency elements. The most comprehensive is B. C. Hydro, which considers five of the elements. B. C. Hydro has yet to explore initiatives to reduce the material intensity of goods and services or to maximize the sustainable use of renewable resources. Notwithstanding, each of the eco-efficiency elements is covered by at least one of the companies' sustainable development plans.

All of the companies in this study, except Orenda Aerospace, have environmental management activities that cover at least four of the seven EMS components. Weyerhaeuser, Du Pont, IBM, and Suncor's management plans satisfy all seven components. Du Pont's EMS is aligned with the Canadian Chemical Producers Association's Responsible Care program. While many companies are still in the preliminary stages of their sustainable development activities, environmental management systems are being developed in every sector of industry.

Associations

Nine industry associations have been reviewed in this study. These include:

- Air Transport Association of Canada

- Automotive Industries Association of Canada
- Canadian Association of Petroleum Producers
- Canadian Chemical Producers Association
- Canadian Electricity Association
- Canadian Gas Association
- Canadian Pulp and Paper Association
- Canadian Steel Producers Association
- Information Technologies Association of Canada

Seven of the nine industry associations in this study regularly publish environmental documentation, as is shown in Table 2.1.2. Each of these associations has a Web site with sections devoted to discussion of sustainable development and environmental management. The Web site information includes the associations' goals and objectives for sustainable development and the specific activities and programs that the associations have undertaken to achieve these goals. Six of these associations, excluding the Automotive Industries Association of Canada, participate in the Voluntary Challenge and Registry program. All except the Canadian Steel Producers Association regularly submit reports to the VCR program updating their progress in greenhouse gas management. Each of the seven associations publishes separate sustainable development reports, covering topics such as waste management, greenhouse gas emissions reduction, energy efficiency and employee education. The two associations that do not regularly publish environmental documentation are the Air Transport Association of Canada and the Information Technologies Association of Canada. ITAC does not publish any information on its Web site, or in hard copy form, concerning sustainable development. ATAC briefly discusses noise and glycol emissions on its Web site, but does not provide any plans to deal with these problems.

Seven of the associations, excluding the Air Transport Association of Canada and the Information Technologies Association of Canada, directly or indirectly consider at least two of the seven elements of eco-efficiency. All seven associations reduce toxic dispersion and five of the seven also consider the reducing energy intensity eco-efficiency element in their sustainable development plans. None of the associations consider all seven eco-efficiency elements. The Canadian Pulp and Paper Association is responsible for six of the elements, the excluded element being extension of product durability.

Seven basic components were used to study the environmental management systems of the associations and companies. The seven associations that participate in the VCR program also have in place at least three of the components of an environmental management system. While most of the associations do not have a formally recognized EMS, their sustainable development activities are consistent with preliminary forms of a management system. The Canadian Chemical Producers Association's environmental management activities cover all seven EMS components. CCPA's Responsible Care program is a well-developed environment, health, and safety management system that guides the association and member company activities. The Automotive Industries Association of Canada's activities also cover all of the EMS components. However, the AIA deals mainly with waste management rather than GHG emissions reduction and energy efficiency. The Canadian Steel Producers Association has a strong system in place, covering five components, and continues to work toward improving employee education and emergency response. The Canadian Association of Petroleum Producers also covers five of the components. However, it is still lacking in its identification of regulatory requirements and emergency response.

Companies and Associations' Voluntary Sustainable Development Initiatives

The use of voluntary initiatives to advance sustainable development and environmental management is widespread among the companies and associations included in this study. Each of the seventeen companies in this study participates in the Voluntary Challenge and Registry while six of the nine associations participate. There is also widespread participation in the Canadian Industry Program for Energy Conservation (CIPEC), which is a program to promote effective voluntary action to reduce industrial energy use per unit of production. Fourteen of the seventeen companies and four of the nine associations participate in this program, as is shown in Table 2.1.3. The use of voluntary sustainable development initiatives is most extensively developed in the chemical industry. The Responsible Care program is a creation of the Canadian Chemical Producers' Association (CCPA) and consists of a set of policies and guidelines to deal with the production and handling of chemicals, in order to prevent negative impacts on the environment and human health. Members of the CCPA voluntarily adopt the Responsible Care ethic as a condition of membership. Within the forest industry, the Sustainable Forest Management Standard has been created by the Canadian Standards Association (CSA) and company or association can receive certification by the CSA if it meets certain criteria. The Canadian Pulp and Paper Association and Weyerhaeuser Canada have adopted the Sustainable Forest Management Standard and are revising their policies and practices to meet the requirements of the CSA.

Many companies and associations are also beginning to develop environmental management systems that are consistent with the International Organization for Standardization's ISO 14 001 series. This standard for environmental management systems has certain criteria that must be met before an organization can receive recognition from the ISO. Other companies and associations have signed Memoranda of Understanding (MOU) with Natural Resources Canada. These are agreements between the federal government and Canadian industry over what will be done to pursue sustainable development and environmental management. For example, the Canadian Association of Petroleum Producers and the

Canadian Gas Association have signed MOUs outlining their responsibilities and commitments for limiting or reducing greenhouse gas emissions.

2.1.1 Companies and Sustainable Development Activities

Company	Environmental Documentation	VCR Program	Environmental Management System	Eco-Efficiency Elements
Air Canada	Mainly VCR reports; little in annual report or Web site.	Submitted letter of intent, action plan, and 1997 progress report.	Five of the seven elements are considered.	Reduction of energy intensity and reduction of toxic dispersion.
Alcan Aluminium Ltd.	Extensive Web site info; annual environmental reports, VCR reports.	Letter of intent and action plan.	Six of the seven EMS elements are considered.	Four of the seven elements are considered.
B. C. Hydro	Corporate annual report, annual Reports on Environment, Web site, VCR reports.	Letter of intent, action plan, progress report to 1998.	Five of the seven EMS elements are considered.	Five of the seven eco-efficiency elements are considered.
Chrysler Canada	Corporate annual report, Web site, reports to the VCR.	Letter of intent, action plan.	Three of the seven EMS elements are considered.	Four of seven eco-efficiency elements.
Consumers Gas	Web site and VCR reports.	Letter of intent, action plan, Progress Report.	Six of seven EMS elements are considered.	Two of seven elements are considered.
Dofasco Ltd.	Annual environment & energy reports, Web site, VCR reports.	Letter of intent, action plan.	Five of seven EMS elements are considered.	Four of seven eco-efficiency elements are considered.
Dow Chemical Canada	EHS reports, Web site, VCR reports.	Letter of intent, action plan, progress report.	Six of seven EMS elements are considered.	Four of seven elements are considered.
Du Pont Canada	Web site, VCR reports.	Letter of intent, action plan, progress report.	Each of the seven EMS elements is considered.	Three of the seven eco-efficiency elements are considered.
Company	**Environmental Documentation**	**VCR Program**	**Environmental Management System**	**Eco-Efficiency Elements**
E. B. Eddy Forest Products	Sustainable development reports, VCR reports.	Letter of intent, action plan, progress report.	Five of seven EMS elements are considered.	Four of seven elements are considered.
General Motors of Canada	Web site, VCR reports.	Letter of intent, action plan, progress report.	Four of seven EMS elements are considered.	Three of seven eco-efficiency elements are considered.
IBM Canada	Environment progress reports, Web site, VCR reports.	Letter of intent, action plan, progress report.	Each of the seven EMS elements is considered.	Three of seven elements are considered.
Inco Ltd.	Corporate annual reports, Web site, VCR reports.	Letter of intent and action plan.	Five of seven EMS elements are considered.	Four of seven elements are considered.
Northern Telecom	Corporate annual reports, environmental reports.	Letter of intent.	Six of seven EMS elements are considered.	Four of seven elements are considered.
Orenda Aerospace	VCR reports.	Letter of intent, action plan, progress report.	None of the elements of an EMS are considered.	Reduction in energy intensity & toxic dispersion.
Shell Canada	SD reports, VCR reports, Web site.	Letter of intent, action plan, progress report.	Four of seven EMS elements are considered.	Four of seven elements are considered.
Suncor Energy	EHS reports, Web site, VCR reports.	Letter of intent, action plan, progress report.	Each of the seven EMS elements is considered.	Three of seven elements are considered.
Weyerhaeuser Canada	Web site, environment performance reports.	Letter of intent, action plan, progress report.	Each of the seven EMS elements is considered.	Four of the seven elements are considered.

2.1.2 Associations and Sustainable Development Activities

Association	Environmental Documentation	VCR Program	Environmental Management System	Eco-Efficiency Elements
Air Transport Association of Canada	None.	Does not participate.	None.	None.
Automotive Industries Association of Canada	Waste management guidelines.	Does not participate.	Each of the seven EMS elements is considered.	Reduction of toxic dispersion and enhancement of recyclability.
Canadian Association of Petroleum Producers	Web site, VCR reports.	Letter of intent, action plan, progress report.	Five of seven EMS elements are considered.	Three of seven elements are considered.
Canadian Chemical Producers Association	Web site, Responsible Care reports, reducing emissions reports.	Letter of intent, action plan, progress report.	Each of the seven EMS elements is considered.	Reduction of toxic dispersion and enhancement of

				recyclability.
Canadian Electricity Association	Web site, VCR reports.	Letter of intent, action plan, progress report.	Three of seven EMS elements are considered.	Reduction in energy intensity & toxic dispersion.
Canadian Gas Association	VCR reports, annual report, Web site, climate change newsletter, supplemental brochures.	Letter of intent, action plan, progress report.	Five of seven EMS elements are considered.	Reduction in energy intensity & toxic dispersion.
Canadian Pulp and Paper Association	Web site, VCR reports.	Letter of intent and action plan.	Three of seven EMS elements are considered.	Six of seven elements are considered.
Canadian Steel Producers Association	Web site, 1-2 page publications.	Does not participate.	Five of seven EMS elements are considered.	Three of seven elements are considered.
Information Technologies Association	None.	Does not participate.	None.	None.

2.1.3 Companies and Associations' Voluntary Sustainable Development Activities

Company	Voluntary Initiatives
Air Canada Ltd.	Voluntary Challenge and Registry (VCR) program.
Alcan Aluminum Ltd.	VCR Program; Canadian Industry Program for Energy Conservation (CIPEC).
B. C. Hydro	VCR Program; pursuit of ISO 14 001 environmental management system certification.
Chrysler Canada	VCR program; CIPEC; Joint National Environment Committee with the Canadian Auto Workers' (CAW) Union.
Consumers Gas Ltd.	VCR program and CIPEC.
Dofasco Inc.	VCR program; ARET; CIPEC; Environmental Management agreement with the province of Ontario.
Dow Chemical Canada	VCR Program; ARET; Canadian Chemical Producers Association's Responsible Care program.
Du Pont Canada	VCR program; CCPA's Responsible Care program; CIPEC.
E. B. Eddy Forest Products	VCR program; CIPEC.
General Motors of Canada	VCR program; CIPEC.
IBM Canada	VCR program; CIPEC; ARET; pursuit of ISO 14 001 certification.
Inco Ltd.	VCR program; CIPEC; ARET; pursuit of ISO 14 001 certification.
Northern Telecom	VCR program; CIPEC.
Orenda Aerospace Corporation	VCR program; CIPEC.
Shell Canada	VCR program; CIPEC; ARET; pursuit of ISO 14 001 certification.
Suncor Energy Inc.	VCR program; CIPEC; ARET.
Weyerhaeuser Canada	VCR; CIPEC; Canadian Standards Association's (CSA) Forest Management Standard certification.
Association	**Voluntary Initiatives**
Air Transport Association of Canada	None documented by the association.
Automotive Industries Association of Canada	None documented by the association.
Canadian Association of Petroleum Producers	VCR program; Memorandum of Understanding (MOU) with NRCan for reducing greenhouse gas emissions.
Canadian Chemical Producers Association	VCR program; Responsible Care; CIPEC.
Canadian Electricity Association	VCR program; Power Smart; MOU on the environment signed by NRCan in 1995.
Canadian Gas Association	VCR program; CIPEC; MOU with NRCan outlining responsibilities for reducing greenhouse gas emissions.
Canadian Pulp and Paper Association	VCR program; CIPEC; ARET; CSA Sustainable Forest Management Standard.
Canadian Steel Producers Association	VCR program; CIPEC; ARET.
Information Technology Association	None documented by the association.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.0 Appendices

3.1 METALS AND MINERALS PROCESSING

The Canadian Steel Producers Association

Jean Van Loon
1425 - 50 O'Connor St. Ottawa, ON K1P 6L2
(613) 238-6049 Fax: (613) 238-1832
www.canadiansteel.ca

Background

The Canadian Steel Producers Association (CSPA) is the national voice of Canada's primary steel producers. The steel-making industry in Canada has annual sales of more than $11 billion, generates $3 billion in exports, and supports more than 150 000 jobs across the country. The CSPA has a full-time president located in Ottawa and a Board of Directors composed of chief executive officers from member companies. Association members have 15 plants which account for 90% of Canadian steel production and employment. There are twelve members in the association. The CSPA and its member companies commit themselves to ongoing voluntary action, with a goal of continuous improvement in matters concerning air quality, water quality, waste management, and climate change.

Environmental Documentation

The Canadian Steel Producers Association makes available a great deal of information on its environmental objectives and practices, and makes this information available to members companies, employees, and the public. The CSPA has a Web site that addresses sustainable development and environmental management. It contains information on accomplishments in emission reduction, energy consumption, and recycling within Canada's steel producing sector. The CSPA also publishes a number of 1-2 page documents which are available by contacting the association. These documents contain information about the following:

- the voluntary initiatives of CSPA and its member companies;
- results achieved through these voluntary initiatives;
- the commitment of CSPA and its members to sustainable development and environmental protection; and
- the environmental management systems which are used in the steel industry.

Voluntary Challenge and Registry

The Canadian Steel Producers Association has registered with the Voluntary Challenge and Registry program; however, it has yet to submit a letter of intent or an action plan.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Since 1990, despite a 10% increase in the amount of steel produced and shipped, Canadian Steel Producers have accomplished the following energy reduction achievements:

- reduction in total greenhouse gas emissions of 16%;
- reduction in energy consumption per tonne of steel shipped of 20%;
- reduction in total energy consumed of 11%.

2. Reduction of Toxic Dispersion

From 1990 to 1996, members of the CSPA reduced greenhouse gas emissions by 16% and emissions of materials covered by the ARET program by 36%. Efforts are also underway by CSPA and its member companies to eliminate PCBs from all operations and to destroy all supplies in a safe manner.

3. Enhancement of Material Recyclability

Steel is the most recycled material on the planet. More steel is recycled each year than paper, glass, and

aluminum combined. For every tonne of steel that is produced annually, more than one-half of one tonne is recycled. Today, all new steel that is manufactured in Canada contains recycled material and some mills actually use 100% recycled material in manufacturing new steel. Because of increases in the percentage of steel that can be recycled, the same steel is used and recycled repeatedly, lengthening its service life.

Environmental Management System

1. Environmental Policy Statement

The CSPA has a policy statement in the form of the Statement of Commitment and Action Regarding Environmental Protection. CSPA provides a framework of principles, priorities, and objectives for member companies to follow in pursuing environmental performance improvement. CSPA will pursue this improvement by encouraging member companies to reduce their impact on the environment and providing appropriate information to respective communities. Independent third party audits are rendered to gather and report data publicly about the member companies' environmental performance and to verify that quantitative reduction targets are being met. This policy statement is available to employees and the public through documentation on the Internet or in hard copy form.

2. Identification of Environmental Impacts

CSPA recognizes that the steel-making industry is an emitter of greenhouse gases, primarily through combustion in the manufacturing process, which contribute to global warming. The industry, including CSPA members, are also responsible for releases of other toxic substances, including PCBs, dust particulate matter, and ARET substances, to air, land, and water. The CSPA has identified energy consumption and resulting emissions as a major source of these pollutants and recognizes energy conservation as a way to reduce emissions that impact upon the environment.

3. Identification of Regulatory Requirements

CSPA encourages its members to identify and follow regulations which apply to their operations, such as provincial restrictions on releases of toxins to air and water. The association also encourages its members to participate in voluntary initiatives, such as the VCR program, CIPEC, and ARET, and meet the requirements of these programs.

4. Environmental Objectives and Targets

The CSPA and its member companies have identified the following objectives and targets for sustainable development and environmental management:

- reducing emissions to air, land, and water below the regulations of the province of operation;
- reducing the number of accidental emission releases;
- eliminating PCBs from the steel industry and destroying them safely;
- reducing the amount of waste sent to landfill below 1994 levels by 1999;
- reducing the amount of energy used per tonne of steel produced by 1% annually up to the year 2000.

5. Monitoring and management of operations and activities.

As stated before, the CSPA Environment Committee monitors progress toward environmental targets and goals and helps member companies meet these goals. Third party independent audits are conducted by member companies to review their operations for progress toward environmental goals and conformity with its own regulations and those of any programs in which the company is a participant.

Case Study: Dofasco

P. O. Box 2460 Hamilton, ON L8N 3J5
Tom McGuire, Manager of Environment and Energy
(905) 544-3761 ext. 6766
www.dofasco.ca

Background

Dofasco is one of Canada's largest steel producers, servicing customers throughout Canada and the United States. Dofasco was incorporated on May 15, 1917 and in 1997 had total sales of $3.1 billion, with a net income of $193.2 million. Dofasco's current assets are valued at approximately $1.4 billion.

Environmental Documentation

Dofasco publishes annual Environment and Energy Reports, which discuss the following:

- the company's releases of ARET substances;
- reductions in emissions of gases and particulate matter to the air;
- reduction in releases to water;

- waste management;
- energy consumption and efficiency;
- success stories in sustainable development and environmental management

Dofasco's Web site contains information on the company's environmental practices It contains Dofasco's position papers on climate change and other environmental issues There are also copies of Dofasco's submissions to the Voluntary Challenge and Registry program

Voluntary Challenge and Registry

Action Plan

Dofasco submitted its Action Plan on August 2, 1996

The following activities are expected to limit or reduce emissions

- tighter sealing on reheat furnaces to reduce heat loss, improving energy efficiency,
- replacing fluorescent lighting across the company with higher efficiency models,
- improving heating practices at Hot Rolling operations to reduce nitrogen oxide emissions

Dofasco has selected 1990 as the base year for calculating greenhouse gas and energy consumption reductions The company's goal is to reduce specific energy consumption at an average rate of 1% per year for the period 1990 to 2000 However, since 1990 the average rate of improvement has exceeded 2% per year In reducing energy consumption, Dofasco hopes to reduce greenhouse gas emissions that are released during combustion In order to achieve these energy reduction goals, programs such as water pump upgrades and changes in lighting and insulation will be implemented

Progress Reports

Dofasco has yet to submit a progress report to the Voluntary Challenge and Registry program

Elements of Eco-Efficiency

1 Reduction in the Material Intensity of Goods and Services

Through modifications to the slitting process for certain grades of steel, less material is removed from the edge of an original coil of steel In addition, yield factors at each operation have been modified better calculate ordered slab weights, thereby reducing scrap losses from large coils The result is t' . less material has to be put into the manufacturing process to get the required amount of finished steel

2 Reduction in the Energy Intensity of Goods and Services

- Dofasco has set the goal of reducing energy consumption by 1% per year from 1990 to 2000, however, since 1990, the average rate of energy consumption per unit of production has decreased by 2 6% per year,
- fluorescent tube lighting in facilities s being replaced with higher efficiency models,
- improvements at the oxygen producing plant resulted in lower electricity requirements per unit of production,
- from 1995 to 1996, the energy used per tonne of steel shipped improved by 7 9%

3 Reduction of Toxic Dispersion

- Dofasco participates in the ARET program, since 1990, Dofasco's releases of substances covered by this program have been reduced by 45%,
- Dofasco is committed to reducing benzene emissions by 80% by 2000 This will be done through installation of emission control technology on coke oven gas and light oil distribution systems
- Dofasco is implementing a recirculation system that will reduce particulate loadings to the Hamilton Harbour by more than 60%,
- since 1990, releases of pollutants to the Hamilton Harbour such as phenol and ammonia have been reduced by more than 28% through enhanced sewage treatment,
- Dofasco has set a target of reducing 1990 levels of commercial waste sent to landfill by 50%

4 Enhancement of Material Recyclability

Dofasco has created a method of using slag from furnaces as a lime substitute in the steel making process This technology saves $250 000 per year and recycles more than 10 000 tonnes of slag. In addition, Dofasco has created operating practices to use slag for road paving The company provided 6 000 tonnes of the material to Hamilton-Wentworth for trial applications If it were not for these initiatives, the slag would be land filled or incinerated, resulting in emissions of toxic substances to the environment

Environmental Management System

1 Environmental Policy Statement

Dofasco has created an environmental policy statement based on the principle of sustainable development

discussed earlier. Dofasco intends to integrate this principle into product and process design, manufacturing, and business planning. Dofasco commits to improving environmental management by optimizing the effectiveness and integrity of the environmental management system through open communications, comprehensive education programs, environmental audits, and risk assessments. Dofasco also commits to preventing any potentially adverse impacts of operations and products on the natural environment, employees, customers, and the community.

This policy is communicated to employees in order to develop an understanding of their responsibilities and to assign the necessary authority. The policy statement is available to employees and the public in the Annual Reports, Annual Environmental Reports, and on the company Web site. Dofasco also makes it policy to meet the standards set by relevant legislation and international agreements through participation with governments and "application of economically feasible and scientifically sound methods and technologies".

2 Identification of Environmental Impacts

Dofasco recognizes that it is an emitter of ARET substances, which can be toxic to air, land, and water. Dofasco also releases effluent to water courses, such as Hamilton Harbour, which pollute the water if not properly treated. Finally, Dofasco releases greenhouse gases which contribute to global warming.

3 Identification of Regulatory Requirements

- Dofasco has identified ARET substances that it emits and is taking steps to reduce or eliminate these substances;
- through the VCR program, Dofasco has accepted the requirement of reducing greenhouse gas emissions to 1990 levels by 2000;
- Dofasco recently signed an Environmental Management Agreement with the Ministry of Environment and Energy for Ontario; the agreement allows Dofasco to voluntarily meet the requirements of both federal and provincial laws governing all aspects of the environment.

4 Environmental Objectives and Targets

- reduction of benzene emissions by 80% by 2000;
- reduction in specific energy consumption by 1% per year from 1990 to 2000;
- reduction in commercial waste sent to land fill to 50% of 1990 levels by 2000

5 Monitoring and Measurement of Operations and Activities

Dofasco performs environmental audits and risk assessments to monitor the effectiveness of its environmental management system. This allows the company to search for inefficiencies in the system and identify possible areas of improvement. The objective is continuous improvement in sustainable development and environmental management.

Case Study: Inco Ltd.

145 King Street West, Suite 1500 Toronto, Ontario M5H 4B7
(416) 361-7511 Fax (416) 361-7781
www.incoltd.com

Background

Inco, the International Nickel Company, was formed in 1902 and was incorporated under the laws of Canada in 1916. The company began operations in the Sudbury basin and gradually expanded to the United Kingdom, the United States, Indonesia, and other locations worldwide. Inco is the world's top producer of nickel metal, supplying 27% of the global demand. The company has a team of 14 000 highly skilled people in 22 countries. In 1997, Inco had net sales of $2.4 billion and total assets of $7.8 billion.

Environmental Documentation

Inco publishes an extensive amount of information on its sustainable development and environmental management activities in its corporate annual reports. These reports contain information on environment, health, and safety audits; greenhouse gas and other toxic emissions; decommissioning and reclamation of operating sites; revegetation of old operating sites; and metals recycling. Inco's Web site is also an excellent source of information on the company's sustainable development practices. The Web site contains information on metals recycling through Inco's subsidiary Inmetco, the International Metals Reclamation Company; land reclamation projects; and an underground greenhouse project to prepare seedlings for revegetation. Finally, Inco submits annual reports to the Voluntary Challenge and Registry program to update the public on the company's efforts to limit or reduce greenhouse gas emissions through energy conservation and efficiency. These reports discuss emission reduction programs and the reductions achieved through these programs.

Voluntary Challenge and Registry

Action Plan

Inco submitted its action plan to the VCR program on July 9, 1996. This plan deals with both the Thompson, Manitoba and Sudbury, Ontario divisions.

The Sudbury division is the largest in the company. Division management has chosen improvements in energy efficiency as its approach to limiting or reducing greenhouse gas emissions. The activities planned include the following:

- monitoring major plant loads in a central station for peak control and shaving;
- replacing light industrial oil with natural gas;
- replacing most lighting fixtures with more efficient models;
- developing energy efficiency criteria for engineering standards;
- providing employees with installation training to minimize leaks;
- installing insulation, sealing, and weather stripping;
- working with consultants to evaluate energy saving opportunities in heating and cooling processes.

The Thompson division has a multi-faceted approach that is expected to improve energy efficiency by 1-2% per year from 1996 to 2006. The operation is essentially all electric, including electric smelting furnaces and electric boilers for heating and process steam. The only fossil fuels used are for diesel equipment on the surface and underground, and propane for mine air heating. The division's typical energy efficiency improvement projects include the following: insulation and lighting upgrades, use of energy efficient motors, and seasonal operating practices.

Progress Reports

Inco has yet to submit a progress report to the Voluntary Challenge and Registry program

Elements of Eco-Efficiency

1 Reduction in the Energy Intensity of Goods and Services

Inco's Manitoba and Ontario divisions are implementing projects to reduce their energy consumption and improve energy efficiency. These projects include activities such as insulation and lighting upgrades, switching to alternative fuels, and working with consultants to evaluate energy saving opportunities. These activities are expected to yield improvements in energy efficiency of 1-2% per year.

2 Reduction of Toxic Dispersion

In 1993, Inco rebuilt its Sudbury smelting complex, at a cost of $530 million U. S., to reduce emissions of sulphur dioxide (SO2), making it the most modern and efficient smelting complex in the world. Since 1990, Inco has reduced SO2 emissions at the smelting complex by 67%. In addition, through the ARET program, Inco has reduced its emissions of nickel, copper, arsenic, and lead by 65% from 1990 to 1997, surpassing the company goal of reducing these emissions by 50% from 1990 to 2000.

3 Enhancement of Material Recyclability

Inco owns the International Metals Reclamation Company (Inmetco), which is a world leader in metals recycling. It is the only major facility in North America that recovers saleable materials from steel-making wastes and from nickel cadmium batteries. Since 1978, it has recycled 1.5 billion pounds of material that otherwise would have been sent to land fill

4 Maximization of the Sustainable Use of Renewable Resources

Inco has revegetation programs in place at all of its sites. In 1997, approximately 150 hectares were seeded by air, bringing the total to 1 200 hectares since 1990. The goal is to return impacted and mined-out lands to a natural state

For decades, Inco has been doing reclamation work on its sites in attempts to keep the environment flourishing. One of the most inevitable problems of mining operations is disposal of processing wastes, or "tailings". Disposal sites become sandy, desert-like areas as a result of the tailings' inability to retain water or support flora. These areas are cleared and agricultural lime and fertilizer are spread. To date, Inco has reclaimed almost 2 000 hectares of land.

Environmental Management System

1 Environmental Policy Statement

While Inco does not have a formal policy statement that is recognized as such, the following environment, health, and safety statement from its 1997 Annual Report sums up the company's guiding principles:

"By being proactive in our environment, health, and safety programs, we strive to minimize any potentially adverse impact of our operations and products on employees, customers, the general public, and the natural environment. Our long-term goal is continuous environmental, health, and safety improvement."

2. Identification of Environmental Impacts

- combustion and consumption of fossil fuels and other energy sources releases of greenhouse gases, which contribute to global warming;
- smelting operations release sulphur dioxide to the environment;
- Inco operations release toxic emissions of nickel, copper, arsenic, and lead to the environment.

3. Identification of Regulatory Requirements

Inco works to meet all government and company environmental regulations. At the Sudbury facility, for example, SO2 emissions are 24.5% below the Ontario government's legal annual limit. The Thompson facility's SO2 emissions are 4.5% below Manitoba's legal annual limit.

4. Environmental Objectives and Targets

- reduce emissions of greenhouse gases through energy efficiency;
- reduce emissions of SO2 at all facilities;
- return impacted and mined-out lands to a natural state that is as good or better than before Inco operations arrived.

5. Monitoring and Measurement of Operations and Activities

Inco conducts six environment, health, and safety audits of its operating facilities on an annual basis. These audits are performed to identify potential problems in the environmental management system and improve operating procedures. The audits are conducted by trained company specialists and supported by outside experts. Audit results are reported to the facility manager, who then creates an action plan to deal with any deficiencies in the system. The plan is then sent to the Board of Directors for approval.

Case Study: Alcan Aluminum Ltd.

50 O'Connor Street, Suite 1418 Ottawa, ON K1P 6L2
Fraser Thomson, Research Officer
(613) 233-8475 Fax: (613) 233-6779
www.alcan.com

Background

Alcan Aluminum is a multinational Canadian company involved in all aspects of the aluminum business, including bauxite mining, alumina refining, aluminum smelting, and aluminum recycling. The company is headquartered in Montreal and employs over 33 000 people, with thousands more employed in related companies. In Canada, Alcan operates seven aluminum smelters. There is one in British Columbia which employs 1 800 people, and six in Quebec, which employ over 6 900 people. In 1997, Alcan had total revenues of $7 865 billion and total assets of $9.466 billion.

Environmental Documentation

Alcan publishes extensive environmental information on its Web site. The site contains the company's environmental policy statement, a description of the company's environmental management system, a discussion of its recycling and waste reduction efforts, and the company's environmental achievements at each stage of the aluminum production process. Alcan also publishes annual environmental reports. These reports outline the company's environmental protection policy and discuss the company's plans for air quality, effluent quality, and waste management. These reports also announce major projects that are planned for the future and explain what Alcan hopes to achieve through them. Finally, Alcan submits reports to the Voluntary Challenge and Registry program to update the company's greenhouse gas emission reduction and energy conservation efforts. The reports explain how Alcan contributes to global warming and how the company plans to mitigate its contributions.

Voluntary Challenge and Registry

Action Plan

Alcan submitted its action plan to the VCR program on July 31, 1996. The company has been focusing on energy efficiency as a means of reducing its greenhouse gas emissions. All of Alcan's Canadian smelters run on hydroelectric power. As a result, they emit 85% less carbon dioxide than smelters that use electricity generated by fossil fuels. When fossil fuels are used for electricity generation, 15 kWh of electricity is required and 20 kg of carbon dioxide is produced to generated 1 kg of aluminum. To improve the efficiency of its hydroelectric generation, the company initiated a major program in 1985 to replace its water wheels and improve the energy efficiency of its turbine generator units. This program is scheduled for completion in 2010 and will carry a price tag of $65 million. Furthermore, in most smelting processes, oil has been replaced by natural gas, which has allowed the facilities to cut their CO_2 emissions by 30% for the same level of energy production.

Alcan plans to continue reducing its energy consumption and its emissions of greenhouse gases. The

company is planning to implement many new projects to reduce greenhouse gas emissions in the smelting process and to make the production of electricity more efficient.

Progress Report

Alcan has yet to submit a progress report to update its July 1996 action plan.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Alcan has reduced its annual energy consumption by approximately 50% since the 1970s. This has been done mainly through recycling and energy efficiency improvement projects. The use of recycled material to produce new aluminum requires 95% less energy than the production of primary aluminum. As recycling efficiency improves, the amount of energy required to produce a certain amount of aluminum will continue to decrease. Alcan has also implemented projects to improve the energy efficiency of its turbine generator units.

2. Reduction of Toxic Dispersion

The energy savings at smelters and refineries have resulted in the reduction of airborne emissions associated with the combustion of fossil fuels, namely carbon dioxide and sulphur dioxide. In addition, the increased use of recycled materials in new aluminum has reduced toxic emissions because environmental releases from recycling operations are less than 10% of those generated by the primary production process.

Alcan attempts to keep generation of waste at the lowest level technically and economically feasible. For example, in 1994, a state-of-the-art waste disposal site was commissioned which, since 1990, has reduced the amount of waste sent for permanent storage by 65%.

3. Enhancement of Material Recyclability

In 1996, Alcan's capacity to recycle both post-consumer and pre-consumer aluminum products exceeded 800 000 tonnes, or about 32% of the company's combined primary and secondary production capacities. All of Alcan's aluminum is recyclable and the company's recycling technology is highly efficient. Approximately 98% of the aluminum sent for recycling is covered, with only 2% lost to melting. Alcan is also enhancing the recyclability of automobiles as upwards of 85% of the aluminum in a vehicle can now be recycled, which reduces the material sent to landfill.

4. Increase in the Service Intensity of Goods and Services

Because aluminum is 100% recyclable, the same material can be used over and over with little depreciation in value and integrity. Therefore, the service life of primary aluminum is lengthened, as is the period of time before new material will be needed to replace the original.

Environmental Management System

1. Environmental policy statement

Alcan has two policy statements, the environmental policy and the environmental protection policy. The elements of these policies are as follows:

i. Environmental Policy Statement

- work with suppliers and customers to design and manufacture products that take full advantage of aluminum's properties throughout their life cycle;
- use world class practices in existing operations and incorporate, in new plants and processes, technologies that meet social, economic, and environmental demands;
- communicate with employees, consumers, communities, businesses, and governments to achieve greater environmental understanding;
- comply with legal requirements and, where appropriate, use more stringent internal standards;
- respond effectively to environmental emergencies with highly-trained response teams and through agreements with others.

ii. Environmental Protection Policy

- laws and regulations concerning the environment must be respected. Should any discrepancy be discovered, appropriate and economically feasible solutions must be identified and implemented;
- discharges into the atmosphere and waterways are kept at the lowest levels technically and economically feasible;
- Generation of waste is kept at the lowest level technically and economically feasible, and

waste management, which primarily focuses on recycling, follows recognized practices,
• the consumption of raw materials and energy is kept at the lowest level technically and economically feasible;
• Any new installation includes measures to adequately protect the environment;
• landscaping and interior aesthetics of the installations offer pleasant surroundings for employees and nearby residents;
• environmental protection and improvement are the subject of frequent communications to employees, local communities, and government representatives.

2. Identification of environmental impacts

It is the responsibility of each plant to identify the aspects of its operations that are likely to affect the environment. Alcan recognizes that it mines a natural resource and converts it through the use of energy, which is another natural resources. Alcan accepts the responsibility to use these resources sustainably. The company also recognizes that its production processes result in environmental contamination and it is taking mitigative measures to reduce its impact. This contamination involves the release of greenhouse gases to the atmosphere as well as the release of contaminated effluent to water courses.

3. Identification of regulatory requirements

Alcan conducts compliance reviews to evaluate a facility's compliance with guidelines and legals requirements established by regulatory bodies. These reviews are conducted at regular intervals, at least every three years, by independent experts from within or outside the company.

4 Proper Training and Education of Employees, Contractors, and the Interested Public

Each Alcan facility is required to identify its own training needs and provide appropriate training to all personnel whose work has the potential to result in significant environmental impacts. Each facility is also required to maintain a documented communication program aimed at employees, regulatory agencies, and surrounding communities to keep these people aware of what is going on at the facility and the possible risks involved.

5 Emergency preparedness and response

Each facility is required to have action plans to respond to accidental events, such as fires and spills. Each facility has a fully-trained and properly equipped emergency response team. In order to prevent accidents in the first place, Alcan facilities have in place procedures for the operation, maintenance, and efficiency testing of all pollution control equipment.

6 Monitoring and Measurement of Operations and Activities

Alcan regularly monitors its emissions, ambient air quality, and surface and ground water quality in order to assess the effectiveness of its environmental techniques and make the necessary changes. Alcan facilities also perform compliance reviews to evaluate their compliance with legal requirements.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada
http://strategis.ic.gc.ca

Author - Industry Canada - Strategic Policy Branch

Publication Date - 2000-03-31

3.2 MANUFACTURING AND PROCESSING TECHNOLOGIES

The Canadian Gas Association
243 Consumers Road, Suite 1200
North York, ON M2J 5E3
J. Keyes
(416) 498-1994 Fax: (416) 498-7465
www.cga.ca

Background

The Canadian Gas Association (CGA) was formed in 1907 and currently has 270 members drawn principally from the distribution, pipeline transmission, and manufacturing sectors of the natural gas industry. There is additional membership from producers, energy service producers, and marketers. Throughout six provinces, CGA members have over 343 255 km of gas pipeline. The gas industry brings in $13.5 billion in annual revenue, $6.4 billion of which is the result of sales of natural gas to the United States. In Canada, 29% of our primary energy comes from natural gas. While natural gas is considered the most benign fossil fuel, it is still responsible for emissions of greenhouse gases. The problem is that about 70% of all emissions attributable to natural gas occur at the burner tip.

Environmental Documentation

The Canadian Gas Association publishes a great deal of information on its sustainable development and environmental management practices. CGA published annual reports for the Voluntary Challenge and Registry from 1995 to 1998, in which there is information about its activities to reduce greenhouse gas emissions. Several supplemental brochures are also published, reporting on the following:

- air emissions from natural gas and their impacts o the environment;
- the benefits of natural gas over other fossil fuels;
- programs which the CGA has initiated to reduce emissions from natural gas;
- environmental awards: which companies received them and why.

The association's annual report contains a section reporting on climate change and other environment-related initiatives which the CGA has undertaken in the previous year. The Canadian Gas Association even publishes a Climate Change Newsletter to keep members and the public informed about new developments in global warming and greenhouse gas emissions.

On its Web site, CGA publishes position papers on such issues as climate change and energy efficiency. The site contains the most recent annual report, as well as reports on the natural gas industry's contributions to environmental management. There are even home energy conservation tips that home owners can use to increase energy efficiency and reduce toxic emissions to the environment.

Voluntary Challenge and Registry

Action Plan

CGA submitted its action plan on October 30, 1995.

The Canadian Gas Association has identified numerous activities to limit emissions, which include the following:

- a $73 million gas-related research and development project to develop end-use technology which is more energy efficient and releases fewer greenhouse gases;
- energy audits conducted within member companies to assist in planning energy efficiency and conservation improvements in company operations;
- an environmental award program to recognize leaders in the gas industry in environmental an ustainable development activities;

• providing information and training in energy management techniques to assist customers in selecting energy efficient equipment and appliances;
• making financing available to assist customer purchase of high-efficiency equipment;
• free on-site inspections of residential and commercial customers by member companies to provide minor adjustments and recommendations to ensure optimum efficiency of equipment.

CGA is working in association with different groups in order to pursue emission reductions. These partnerships include the following:

• working with customers and distributors to reduce end-use emissions through improved knowledge and technology;
• working with Gas Technology Canada and International Approval Services to promote technology development and improvements in standards, approvals, and certifications process.

Progress Reports

The Canadian Gas Association submitted its most recent progress report in January of 1998 to update the original 1995 submission to the Voluntary Challenge and Registry. These reports outline the progress member companies have made toward the objectives identified by the CGA:

• the internal emission targets set by member companies to the year 2000 and beyond;
• information and training in energy management techniques for customers and members;
• the challenges being faced by members in attempting to reduce emissions of greenhouse gases;
• activities which companies are planning for the future.

Elements of Eco-Efficiency

1. Reduction of the energy intensity of goods and services.

There are four ways in which the Canadian Gas Association and its member companies are attempting to reduce energy consumption by natural gas users:

• providing information and training in energy management to assist customers in selecting energy efficient equipment and appliances for their homes or commercial businesses;
• providing financing for residential and commercial customers to buy equipment that is energy efficient and minimizes release of greenhouse gases;
• performing internal audits of member company operations to identify areas where unnecessarily high amounts of energy are consumed or lost.

2. Reduction of Toxic Dispersion

CGA and the natural gas industry are funding a $73 million program to develop technology which is more energy efficient. Increased energy efficiency means that less gas is consumed and fewer greenhouse gas emissions are produced.

Environmental Management System

1. Environmental Policy Statement

CGA's Environmental Code of Practice acts as its environmental policy statement. The CGA anr its members are committed to producing, transporting, and distributing natural gas while using the principles of sustainable development. They are also committed to manufacturing products which assist partners and customers in using natural gas responsibly and efficient. To achieve these goals CGA encourages members to:

• promote environmental awareness by identifying training needs and providing appropriate training to member companies regarding the responsible and efficient use of natural gas;
• develop and implement initiatives which contribute to energy efficiency, improve environmental protection, and promote responsible environmental management throughout the natural gas industry;
• support research and development initiatives that contribute to energy efficiency improvements;
• work with governments and other stakeholders to increase their awareness of the natural gas industry and related environmental issues, and develop appropriate strategies regarding environmental issues facing the natural gas industry, today and in the future.

2. Identification of Environmental Impacts

There are two main impacts which the natural gas industry has on the environment:

- releases of greenhouse gases to the atmosphere resulting from combustion of natural gas;
- depletion of a non-renewable resource due to increase in the use of natural gas.

3. Environmental Objectives and Targets

- reduce emissions of greenhouse gases from internal operations;
- reduce emissions of greenhouse gases at the burner tip;
- increase energy efficiency and conservation in internal operations and customer use.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

- training of member company employees on the Voluntary Challenge and Registry and how to submit plans;
- publishing a semi-annual newsletter on Climate Change and distributing it to members and other interested parties to inform them of new developments in dealing with climate change;
- conducting training sessions for employees to encourage greenhouse gas emission reduction and energy efficiency so that they will be able to practice these in the workplace and at home;
- education and training programs directed at a large range of audiences, including schools and residential customers, in order to sensitize current and future customers to energy conservation and efficiency practices and techniques.

5. Monitoring and Measurement of Operations and Activities

Many member companies conduct energy audits of their operations to find inefficiencies and to identify where improvements in greenhouse gas emissions and energy efficiency can be made. Also, many companies offer free on-site appliance checks for residential and commercial customers, providing minor adjustments as needed and recommendations to ensure efficiency.

Case Study: Consumers Gas Company Ltd.
2225 Sheppard Ave. West North York, ON M2J 5C2
Rob Milne, Director of Environmental Services
(416) 498-2978

www.consumersgas.com

Background

Consumers Gas is a natural gas utility which serves over 1.25 million residential, commercial, industrial, and other customers in central and eastern Ontario. Its head offices are in Toronto, with regional offices in Ottawa, Whitby, Richmond Hill, Mississauga, and Thorold. The company was first incorporated in 1848 to provide manufactured coal gas for lighting customers in the City of Toronto. Consumers than expanded to serve other needs, such as heating, and extended its service to neighbouring communities.

The company expects that population growth and improved economic conditions will bring new customers in the next five years. In 1996, Consumers Gas had total revenues of $1.94 billion and total assets of $3.26 billion.

Environmental Documentation

Consumers Gas publishes its *Statement of Environmental Principles* on its Web site. These principles outline the basic company objectives and principles for sustainable development and environmental management. Unfortunately, the Web site contains no information on specific sustainable development activities which Consumers Gas has implemented or is planning to implement. The other sources of sustainable development documentation are the company's reports to the VCR program. These reports focus mainly on energy conservation and GHG reduction goals and initiatives.

Voluntary Challenge and Registry

Action Plan

Consumers Gas submitted its Action Plan on September 29, 1995.

The following activities are expected to limit or reduce GHG emissions:

- audits will be undertaken to identify emission reduction and energy consumption opportunities;
- in 1990, a policy was created to convert all fleet vehicles to natural gas, which releases fewer greenhouse gas emissions upon combustion;

• replacement of cast-iron piping with corrosion-free polyethylene pipes reduces fugitive emissions;
• encourage customers to use energy efficiency programs, fuel switching, co-generation, and natural gas vehicles (NGVs);
• education programs to teach consumers about energy conservation and the environment.

Consumers Gas has established 1990 as the base year for calculating emission and energy reductions. The company has established the target of reducing greenhouse gas emissions to 25% below 1990 levels by the year 2000. In addition, Consumers Gas will attempt to stabilize customer use of natural gas at 1990 levels by encouraging energy efficiency.

Progress Report

Consumers Gas submitted its most recent progress report to the VCR program on September 9, 1997.

In 1997, Consumers Gas was on target to meet its GHG emission reduction target of 25% below 1990 levels by 2000. The company has implemented many of the reduction measures outlined in the Action Plan, and will continue to do so. Through these emission reduction efforts, GHG emissions were reduced by 27.5% from 1990 to 1996.

The company has converted over 90% of its vehicle fleet from gasoline to natural gas. In addition, Consumers Gas is sponsoring research into energy efficient technology, such as residential water heaters that are 20% more energy efficient than other water heaters.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

• a computerized environmental management system has been implemented in building facilities that allows for heating, ventilation, and cooling to be supplied based on occupancy loading, rather than supplying constant temperature; these systems will automatically shut down during unoccupied hours and restart in time to maintain a safe and healthy environment;
• infrared scanning of buildings has been used to identify areas of heat escape so that improvements can be made;
• energy audits are being performed to identify ways in which energy use could be reduced;
• a residential water heating efficiency program has been implemented; upgrades are performed on heating units rented by Consumers to customers to improve energy efficiency;
• Consumers Gas has been participating in Building Codes and Standards committees to encourage the inclusion of energy efficiency standards in requirements;
• Consumers Gas offers financial incentives to customers to encourage adoption of practices and installation of products that are energy-efficient and contribute to energy and water conservation.

2. Reduction of Toxic Dispersion

• conversion of Consumers' vehicle fleet to natural gas to reduce greenhouse gas emissions: NGVs emit 19-24% less carbon dioxide and 79-84% less nitrous oxide than gasoline-power vehicles;
• Consumers is developing a computer monitoring system to detect fugitive emissions from pipes at joints and fittings;
• as a result of these and other initiatives, Consumers Gas has reduced GHG emissions by 27.5% from 1990 to 1996.

Environmental Management System

1. Environmental Policy Statement

Consumers Gas has developed Environmental Principles which guide the company's environmental management activities. These principles include the following:

- examine environmental consequences arising from proposed activities in business decision-making;
- introduce progressive environmental industry standards, codes, and practices;
- respect government policies and guidelines for environmental protection in assessing, planning, constructing, and operating facilities;
- promote energy conservation and energy efficient utilization;
- participate in the implementation of waste management measures for the reduction, reuse, and recycling of materials;
- promote employee participation in initiatives relevant to environmental protection;
- encourage understanding of environmental issues by employees, customers, and the public;

- work in partnership with governments and other stakeholders in the development of environmental and energy policies.

2. Identification of Environmental Impacts

Consumers Gas recognizes that energy use for heating of buildings and other facilities results in releases of greenhouse gases, such as carbon dioxide, to the atmosphere. In addition, leaks in pipelines result in fugitive emission of gases which contribute to global warming.

3. Identification of Regulatory Requirements

Consumers Gas has committed in its environmental principles to identifying and complying with regulatory requirements. It commits to respecting government policies and guidelines for environmental protection in assessing, planning, constructing, and operating facilities. In fact, Consumers Gas works with governments and other stakeholders to develop environment and energy policies.

4. Environmental Objectives and Targets

- reduce GHG emissions to 25% below 1990 levels by 2000;
- reducing energy use in company facilities;
- promote energy efficiency among residential, commercial, and industrial consumers;
- replacing the corporate vehicle fleet with NGVs to reduce energy consumption and GHG emissions.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

A key component of Consumers Gas' emissions reduction strategy is consumer education about energy conservation and the environment, the benefits of wise energy use, and the availability and affordability of energy-efficient products. In 1997, Consumers published and distributed 80 000 copies of its magazine *Energy Saver*. The service publication *Pipeline* is distributed to over 800 000 residential customers six times per year, with information regarding energy efficiency and conservation.

In 1995, Consumers published the Catalogue of Environmental Policies, Procedures, and Practices, which is a document designed to be a quick reference point for employees needing information on environmental issues. There is also an environmental training program that consists of training modules developed to provide information on a range of environmental issues faced by the company.

6. Monitoring and Measurement of Operations and Activities

Consumers Gas monitors its operations through internal audits. The purpose of these audits is to identify possible areas of improvement in greenhouse gas reductions and energy efficiency. These audits include infrared surveys of facilities to detect heat loss, as well as surveying for fugitive emissions from pipelines. The necessary improvements are then made based on the recommendations of auditors.

Canadian Association of Petroleum Producers
2100 350-7 Avenue S.W. Calgary, AB T2P 3N9
Gary Webster (403) 267-1146
www.capp.ca

Background

The Canadian Association of Petroleum Producers (CAPP) represents over 180 companies from the upstream crude oil and natural gas industry. Member companies produce about 95% of Canada's crude oil, heavy oil, crude bitumen, synthetic crude oil, natural gas, and natural gas liquids. The upstream petroleum industry directly employs 70 000 people and an additional 117 000 indirectly.

The association's mission is to enhance the economic well-being and sustainability of the Canadian upstream petroleum industry in a socially, environmentally, and technically responsible manner. CAPP has set the goal of facilitating continued improvement in environment, health, and safety performance and stewardship while maintaining a viable industry.

Environmental Documentation

CAPP regularly reports on its environmental management and sustainable development practices through its Web site and its reports to the Voluntary Challenge and Registry. The Web site has a section devoted to the discussion of climate change. CAPP outlines its position on climate change issues and discusses what the association believes needs to be done in order to stabilize the global climate. CAPP outlines its goals for reducing its influence on climate change and suggests what steps the federal government should consider.

The VCR reports submitted by CAPP outline the association's goals and objectives for greenhouse gas emission reductions and energy conservation. These reports also serve as a forum for CAPP to present its progress in achieving its goals. Reduction targets and achievements, and employee education programs,

are discussed.

Voluntary Challenge and Registry

Action Plan

CAPP submitted its Action Plan on September 29, 1995.

The following activities are expected to limit or reduce emissions:

- installing energy efficient motors in member company operations;
- modifying vehicle fleet size and fuel types;
- phasing out the CFC-based refrigeration systems remaining in the industry;
- methane capture and recovery;
- installation of high-efficiency burners in incinerators and modification of stacks to reduce combustion emissions and fuel requirements;
- training of employees in management of emissions and energy efficiency;
- replacing inefficient equipment with newer, more efficient equipment.

CAPP has selected 1990 as the base level for analyzing GHG emission and energy consumption reduction initiatives. This is consistent with many of the other organizations in the VCR program. CAPP has not made any forecasts or projections of emission levels in the future, but has accepted the VCR challenge of reducing GHG emissions to 1990 levels by 2000. CAPP has joined with Natural Resources Canada in signing a Memorandum of Understanding. This memorandum encourages company participation in voluntary initiatives for reducing greenhouse gas emissions and energy consumption.

Progress Reports

CAPP submitted its most recent progress report on September 26, 1996.

The methodology and objectives of environmental management have remained much the same: reducing energy consumption through energy efficiency improvements and changes in operational procedures; and an accompanying reduction in greenhouse gas and other toxic emissions. The amount of natural gas used by Canadians from 1990 to 1995 increased by 16.8% while the amount of crude oil used decreased by 1.5%. This shows a trend toward use of cleaner burning fuels. CAPP does not have data available on reductions in greenhouse gas emissions, but the switching to natural gas could result in fewer gases being emitted per volume of fuel consumed.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

- modification of engines used in operations to install lean-burn carburetion;
- modifying trucks and cars in vehicle fleets to operate on propane;
- installation of high efficiency burners in incinerators;
- reducing the need for fuels and power by changing depressurization methods;
- lowering incinerator stack temperatures;
- using waste heat from electricity production in turbine plants for process heat requirements, rather than consuming new energy.

2. Reduction of Toxic Dispersion

- implementing systems to capture gases and hydrocarbons that are currently vented into the atmosphere;
- modification of truck off-loading and loading procedures to prevent venting of gases;
- fuel-switching to cleaner burning natural gas for energy requirements;
- in 1996, energy efficiency, methane capture and recovery, and greenhouse gas emission reduction projects reduced GHG emission by 2.25 million tonnes of carbon equivalent.

3. Increase in the Service Intensity of Goods and Services

- recovery of gases and liquids that were previously vented allows them to be used again as fuel sources;
- recovery of waste heat from the production of electricity increases the service life of the fuel originally combusted to turn the electrical turbines.

Environmental Management System

1. Environmental Policy Statement

The following are CAPP's policy elements for the environment:

- examine and clarify issues associated with global warming and climate change and establish operating principles to help formulate responses to climate change issues;
- help industry determine historical and current emissions status, and search for and implement methods to reduce or offset energy use and emissions;
- represent industry's position and operating principles in industrial, provincial, national, and international opportunities for discussion and negotiation;
- encourage industry participation in the VCR program by developing technical guidelines, workshops, and presentations to ensure reporting consistency and accuracy.

2. Identification of Environmental Impacts

The petroleum industry is responsible for the emission of greenhouse gases. The upstream oil and gas sector produces 9% of Canada's carbon dioxide emissions from industry.

3. Environmental Objectives and Targets

The two general objectives of CAPP are to reduce greenhouse gas emissions and improve the energy efficiency of production and operation in the petroleum industry. The specific emission reduction target is to reduce greenhouse gas emissions to 1990 levels by the year 2000.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

- communicating sector success stories to the rest of the sector so that companies can learn and apply effective initiatives to their own operations;
- sponsoring a series of technical meetings to clarify and standardize technical response in preparing action plans for the VCR;
- providing technical assistance to companies in calculating emissions of greenhouse gases and their sources.

5. Monitoring and Measurement of Operations and Activities

CAPP encourages its member companies to perform regular energy use and GHG emission audits and to report the findings to the association. The association reviews what companies are doing and whether they are making progress toward the association's goals. The association can then make suggestions for improvement in the company's energy and GHG emission reduction activities.

Case Study: Suncor Energy
P. O. Box 38 112-4th Avenue S.W. Calgary, AB T2P 2V5
Gord Lambert (403) 269-8720
Earle McVicar (403) 269-8724 Fax: (403) 269-6217
www.suncor.com

Background

Suncor Energy is a Canadian integrated oil and gas company headquartered in Calgary, Alberta. The company was initiated for the purpose of selling lubricating oils, kerosene, and spirits to Canadian war plants in 1917. Today, the company has assets of over $5.5 billion, produces approximately 120 000 barrels of oil equivalent per day, and sells 85 000 barrels of refined products per day. The company directly employs over 2 400 people.

Suncor's Oil Sands business is based near Fort McMurray, Alberta and produces light sweet crude oil and custom blends. The Exploration and Production business is based in Calgary and explores for, acquires, produces, and markets natural gas and conventional crude oil. Sunoco is Suncor's Ontario subsidiary. It has headquarters in North York, Ontario, and manufactures, distributes, and markets transportation fuels, petrochemicals, and heating oils.

Environmental Documentation

Suncor produces annual Environment, Health, and Safety Reports, which discuss the company's efforts in environmental management, including its environmental policy, air quality preservation initiatives, water quality protection initiatives, and land and wilderness protection initiatives. This report has extensive information on the goals and objectives of the company and the activities that are undertaken to achieve these goals.

Suncor's Web site has a section on Global Climate Change which the discusses possible solutions to global warming and greenhouse gas emissions. Suncor also submits annual progress reports to the Voluntary Challenge and Registry program, updating its environmental action plans. These reports discuss activities such as emission inventories and forecasts, GHG reduction initiatives and achievements, and future reduction goals and initiatives.

Voluntary Challenge and Registry

Action Plan

Suncor submitted its Action Plan on October 26, 1995.

The following activities are expected to limit or reduce emissions:

- incorporation of newer, more efficient technologies into operations;
- capital projects to improve energy efficiency in existing facilities;
- monitoring systems for greenhouse gas emissions.
- working with the Regional Air Quality Coordinating Committee (RAQCC) to develop systems for monitoring regional air quality and environmental effects.

Suncor has established 1990 as the base year for calculation of its greenhouse gas emission reductions. Suncor's goal is to stabilize carbon dioxide emissions at 1990 levels by 2005. On a per unit of production basis, this is equivalent to a 55% reduction in emissions from 1990 levels. However, a major problem is that the Oil Sands' production will be at 180% of 1990 levels by 2000, which will increase CO2 emissions and make absolute reduction difficult. Suncor projects that by 2000 it will have reduced CO2 emissions to 119% of 1990 levels. This action plan will be an ongoing development and updated after consultation with employees, stakeholders, environmental groups, industry associations, and legislative bodies.

Progress Report

The most recent progress report was submitted on September 2, 1997. Suncor is still committed to its CO2 reduction goal of meeting 1990 levels by 2005. The company's initiatives for the years remaining in the 1990 to 2000 period include efficiency improvements inherent in new technologies installed to increase production. Improvements made by Sunoco will represent a 32% decrease in GHG emissions per unit of production from 1990 to 2000. In the future, Suncor is going to communicate with employees regarding the importance of minimizing GHG emissions. Employees will be encouraged to make suggestions for operating efficiency improvements.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

- Suncor is planni- and implementing newer, more efficient technologies into the dev lopment of new facilities;
- Sunoco has set a goal of achieving energy improvements on average of at least 1% per year from 1990 to 2000;
- the Oil Sands has implemented new technology that will reduce energy cost per barrel produced by 33% in its extraction plant.

2. Reduction of Toxic Dispersion

- Suncor has set a goal of reducing company-wide GHG emissions by 31% from 1990 to 2000 on a per unit of production basis;
- in 1996, Suncor commissioned a $190 million sulphur dioxide (SO2) emissions reduction plant at the Oil Sands, which is expected to reduce SO2 emissions to 25% of 1990 levels by 1998;
- from 1993 to 1998, SO2 emissions per day have decreased by 74.3%;
- Suncor is creating programs to reduce benzene emissions;
- through its participation in the ARET program, Sunoco has set a goal of reducing its benzene emissions to 50% of 1993 levels by 2000;
- Sunoco blends ethanol gasolines that have the lowest levels of benzene in the industry and carry Canada's Eco Logo stamp of approval;
- all of Suncor's units have been undertaking efforts to reduce releases to w- ter courses; for example, Sunoco's Sarnia refinery on the St. Clair River has reduced its discharges to the river by 90% from 1987 to 1996;
- in 1993, Sunoco set a goal of eliminating leaks from underground fuel systems and throughout all of 1996 and 1997, Sunoco did not experience a single underground leak;
- from 1990 to 1996, the amount of hazardous waste shipped to disposal sites was reduced by 72%.

3. Maximization of the Sustainable Use of Renewable Resources

Suncor has been implementing projects to reduce the amount of water that is consumed and that needs to be treated before discharge from operations. The Oil Sands has set a goal of reducing its water intake and consumption by 30% of 1996 levels by 1999. Over this same period, it will reduce its discharges of water by 50%.

Environmental Management System

1. Environmental Policy Statement

- Management is sensitive to the environmental impacts of Suncor's operations. Employees at all levels are made aware of the potential impacts associated with their activities and are provided with the tools, processes, and training necessary to mitigate these impacts;
- Senior management is accountable for setting goals and establishing standards and work procedures which contribute to fulfilling Suncor's commitment to the environment. All employees will understand their responsibilities and accept accountability for their actions;
- Suncor will adapt programs aimed at anticipating and reducing the emission of pollutants and the generation of waste from its operations. Focus will be placed on controlling pollutants and wastes at the source;
- In setting its environmental performance standards and goals, Suncor will strive to achieve levels of performance governed not only by legislated requirements but which address the social, economic, and environmental expectations of communities, customers, shareholders, government, and public;
- Suncor will integrate environmental considerations in business planning, facilities and product design, operating practices, and training programs;
- Suncor supports a partnership among government, industry, and the public for the development of equitable, cost-effective, and realistic solutions to environmental issues;
- Suncor will be prepared in the event of an accidental release of contaminants to respond promptly in a manner that is protective of the health and safety of its employees and public, and mitigates the impact on the environment.

2. Identification of Environmental Impacts

The Oil Sands project is responsible for 70% of Suncor's GHG emissions and Sunoco is responsible for 20% of these emissions. The Oil Sands and Sunoco are responsible for releases of SO2 to the environment. All operations result in emissions of ARET substances and GHGs to the air, as well as toxic releases to water courses. Hazardous wastes are stored at disposal sites and result in pollution of air, water, and land.

3. Identification of Regulatory Requirements

Suncor strives for full compliance with all environment, health, and safety regulations applicable to its operations. In 1996, the company had 181 contraventions out of more than one million regulations that apply to its operations throughout the year. This represents a 99.98% compliance rate.

4. Environmental Objectives and Targets

- improve energy efficiency per unit of output that can be tracked;
- stabilize absolute GHG emissions at 1990 levels by 2005;
- reduce GHG emissions on a per unit of production basis by 31% of 1990 levels by 2000;
- eliminate leaks from underground systems.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

Employees are made aware of the potential impacts associated with their activities and are provided with the tools, processes, and training necessary to mitigate these impacts. Suncor takes part in emergency simulations to prepare its facilities and employees for real occurrences. For example, in 1995, Sunoco hosted a simulated tank fire emergency at its refinery as part of its training program. Less than a year later, a real fire occurred at a large storage tank in Sarnia. However, emergency response was immediate and prevented a much larger disaster.

6. Emergency Preparedness and Response

It is part of Suncor's environmental policy to be prepared in the event of accidental releases of contaminants to minimize negative impacts on the environment. Suncor makes employees aware of possible emergency situations and hold training simulations to prepare its facilities for emergencies.

7. Monitoring and Measurement of Operations and Activities

Through participation in a multi-stakeholder group known as the Regional Air Quality Coordinating Committee, Suncor actively takes part in the development of systems to monitor regional air quality and environmental effects. This new network employs state-of-the-art ecological and environmental health monitoring technology and has a voice information air quality hotline. There are also leak detection systems in place on all major Suncor pipeline systems to monitor and minimize environmental impacts of possible contaminant leaks.

Suncor Production and GHG Emissions Profile
(production = 000 m^3; emissions = 000 tonnes of CO2 equivalent)

	1990	1996	2000 (without action)*	2000 (performance target)**
Production	9 141	11 826	14 924	14 947
Direct CO2 Emissions	4 153	4 696	7 441	4 691
Direct CH4 Emissions	65	123	213	176
Direct N2O Emissions	44	45	46	43

Total Direct Emissions	4 263	4 864	7 701	4 911
Total Indirect Emissions	544	566	768	459

* represents the absence of a Voluntary Action Plan.
** 2000 Performance Target represents expected results based on 1997 plans.

Case Study: Shell Canada
400 Fourth Avenue Southwest Calgary, AB T2P 0J4
Dr. Linton Kulak, Director of Corporate Health, Safety, and Environment
(905) 644-1996 Fax: (905) 644-3830
www.shell.ca

Background

Shell Canada is one of the largest integrated petroleum companies in Canada. It is a major producer of crude oil, natural gas, natural gas liquids, and is the country's largest producer of sulphur. The company is also a leading manufacturer, distributor, and marketer of refined petroleum products. Shell Canada employs over 3 700 people in the head office in Calgary, Alberta, and operating locations across the country. Shell is owned jointly by the Shell Transport and Trading Company in Great Britain and the Royal Dutch Petroleum Company in the Netherlands.

Environmental Documentation

Shell Canada publishes annual Sustainable Development Reports, the most recent of which was published in 1997. This report discusses the following elements of its sustainable development strategy:

- protection of air, water, and soil quality;
- restoration and remediation of company sites;
- waste and energy reduction;
- emergency preparedness and response;
- objectives and targets for sustainable development.

Shell Canada also submits annual plans to the VCR program in which the company updates its progress toward its greenhouse gas and energy reduction goals. Shell discusses reductions achieved and announces new reduction and conservation goals.

Shell Canada's Web site contains a copy of the Sustainable Development Report. There is also a discussion of the company's Environmental Fund. The Fund provides funding of up to $5 000 for innovative projects to improve or protect the environment.

Voluntary Challenge and Registry

Action Plan

Shell is going to reduce its energy consumption as a means of reducing GHG emissions. The idea is that if the company can reduce the amount of material that is actually being combusted, then the amount of GHGs being released will also be reduced. Shell is going to audit its facilities to monitor progress in reducing GHG emissions and to identify areas needing improvement. The company is also implementing projects to reduce fugitive emissions from distribution systems and in storage.

Shell Canada has identified 1990 as the base year for calculation of its GHG reductions. The goal is to reduce GHG emissions to 1990 levels by the year 2000. To help meet this reduction goal, Shell has set a downstream energy reduction goal of 5% below 1994 levels by 2000. The downstream is the business segment that manufactures, distributes, and markets refined products from crude oil. The upstream goal is to reduce energy consumption to 7% below 1995 levels by 2000. The upstream is the business segment that explores for, acquires, develops, produces, and markets crude oil and natural gas.

Progress Report

Shell Canada submitted its most recent progress report on August 29, 1997. The company remains committed to its goal of reducing GHG emissions to 1990 levels by 2000. Since 1990, operating facilities have decreased CO2 emissions by 8%, or an equivalent of 670 000 tonnes per year. In order to meet the year 2000 goal, Shell will attempt to reduce CO2 emissions by 340 000 tonnes per year from 1998 to 2000.

In downstream operations, energy efficiency has improved by 9.9% since 1990. In upstream operations, the amount of energy required per unit of production has decreased by 30% since 1990. A significant portion of these reductions has been the result of initiatives at the Montreal East refinery and the Scotford refinery. At the Montreal East refinery, modification were made to the Fluid Catalytic Cracking Unit to improve heating integration and utilization. This project cost $4.2 million and will save $1 million per year in fuel and electricity. Furthermore, CO2 emissions are expected to

be reduced by 12 000 tonnes per year. The Scotford refinery implemented an on-line monitoring system that provides operators and staff with current energy consumption numbers on each process unit and compares them with target numbers. A series of computer screens allow the user to trace the cause of changes in energy consumption or deviation from the target, and make appropriate adjustments.

Over the 1997 to 2000 period, Shell plans to improve its refinery energy efficiency by an average of 1% per year. A $20 million project has been proposed that, if completed, will reduce CO2 emissions by 230 000 tonnes per year and improve energy efficiency by 8.3% from 1995 levels by 2000.

Shell Greenhouse Gas Emissions by Source
1990-2000

	1990	1994	1995	1996	2000
Direct CO2 Emissions					
Combustion	5 810	5 365	5 225	5 180	4 725
Refinery H2 Production	380	380	400	410	420
Flaring	25	10	40	90	20
Formation CO2	570	710	695	695	715
Indirect CO2 Emissions					
Purchased Electricity	1 125	1 590	1 640	1 725	1 770
Total CO2 Emissions	8 000	8 055	8 000	8 100	7 650
Other GHG Emissions					
Nitrous Oxide (N2O)	90	75	75	70	70
Methane (CH4)	560	695	705	730	700
Total Other GHG Emissions	650	770	780	800	770
Total GHG Emissions	8 650	8 825	8 780	8 900	8 420

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

- downstream target is to reduce energy consumption to 5% below 1994 levels by 2000;
- upstream target is to reduce energy consumption to 7% below 1995 levels by 2000;
- since 1990, energy efficiency at Shell refineries has improved by 9.9%.

2. Reduction of Toxic Dispersion

Shell has set a target of reducing total waste disposal to 50% of 1988 levels by 2000. Shell has entered into an alliance with a national waste contractor for the handling and disposal of wastes from its facilities. The contractor has offered extensive knowledge in disposal and source reduction opportunities. This has improved Shell's approach to managing waste and controlling its disposal sites. Since 1988, the downstream has reduced its total waste disposal by 62%. Shell has set a goal of reducing its hazardous waste disposal to 20% below 1996 levels by 2005.

Shell has also achieved the following reductions in toxic dispersion:

- Shell participates in the ARET program and by the end of 1995, the company had achieved a 58% reduction in ARET substances since the 1988 base year;
- Sulphur dioxide emissions were reduced by 4000 tonnes from 1995 to 1996;
- In 1996, $12 million in capital expenditures was used to improve underground storage and handling. The upgrades were aimed at reducing both the environmental impacts of leaks and the costs of restoring contaminated sites;
- CFCs have been removed from all process refrigerant systems in Shell's operations.
- Shell has committed to reducing its benzene emissions to 50% of 1988 levels by 2000.

3. Enhancement of Material Recyclability

In 1995, Shell began switching from its yellow 20 litre lubricant pails to black pails which contain higher levels of recycled plastic resin.

4. Maximization of the Sustainable Use of Renewable Resources

Shell undertakes efforts to leave the ground water and soil at its sites in as good or better shape than before Shell operations arrived. The company has projects to reduce leaks to ground water and soil and conducts reviews to monitor the integrity of these projects. In addition, about $40 million is spent annually on remediation and restoration of sites. Upon removal of surface facilities, Shell treats contaminated soil and ground water and revegetates the site.

Environmental Management System

Shell has a Health, Safety, and Sustainable Development Management System that is consistent with the ISO 14 001 standard. By the end of 1996, shell had drafted 50 standards and guidelines and approved 37 for implementation into Shell operations.

1. Identification of Environmental Impacts

Shell's air emissions from oil and gas production facilities and refineries result primarily from the burning of fuel and vapour losses from tanks and equipment. Waste is generated from a number of sources, including drilling muds and fluids, formation waters, oil sludges from cleaning tanks, biosludge from water treatment facilities, and general debris from construction and operations.

In 1996, Shell discharged 239 tonnes of effluent into water courses. In separate incidents, the company was charged for exceeding the allowable ammonia level in an effluent stream and improperly discharging storm water. There were 430 spills of sensitive liquids by the downstream. While this was nine fewer than in 1995, the volume increased to 883 000 litres from 460 000 litres in 1995. The upstream had 54 spills, up from 14 spills in 1995. This resulted in 1 445 cubic metres of released material, up slightly from 1 040 cubic metres in 1995.

2. Environmental Objectives and Targets

- reduce releases of ARET substances by 65% from 1988 to 2000;
- reduce GHG emissions to 1990 levels by 2000;
- zero incidents resulting in non-compliance charges or orders;
- reduce benzene emissions to 50% of 1988 levels by 2000;
- reduce emissions of volatile organic compounds (VOCs) to 50% of 1988 levels by 2000;
- eliminate CFCs and halons from operations by 2000.

3. Emergency Preparedness and Response

All Shell facilities conduct annual exercises and drills to validate emergency response capabilities. All facilities are required to create and maintain the emergency response plan. In addition, the Canadian Shipping Act requires designated marine oil-handling facilities to develop a Marine Environmental Protection Plan. The plan must detail emergency response for specified oil spill scenarios. Shell has submitted plans for all of its refineries, distribution terminals, and marketing bulk plants that are designated marine facilities.

4. Monitoring and Measurement of Operations and Activities

Shell audits its major facilities at least once every four years. The audits are done by specially-trained Shell employees using both company and industry protocols. The results of the audits are reviewed with management and plans are developed to address concerns identified in the audit.

The Distribution Department conducts complete reviews of its management systems and the integrity of its operations related to the prevention of spills. These assessments are done by senior non-distribution personnel and involve inspection of most distribution facilities and interviews with all management teams.

The Canadian Electricity Association
66 Slater Street, Suite 1210 Ottawa, ON K1P 5H1
Roy G. Staveley, Vice President of Public Affairs and Environment
(613) 230-9263 Fax: (613) 230-9326
www.canelect.ca

Background

The Canadian Electricity Association was founded in 1891, and is the national forum and voice for the electricity industry in Canada. The association consists of a core of 65 corporate utility member companies, which account for approximately 95% of Canada's electricity generating capacity.

Environmental Documentation

The CEA publishes environmental information on its Web site, including a paper titled "Greenhouse Gas Management and the Canadian Electric Utility Industry". This paper presents information on the following: recent GHG reduction initiatives in the industry; current GHG emissions in the industry; future GHG emissions in the industry; a full range of options for dealing with GHG emissions; and ways in which the industry can use the marketplace to achieve environmental goals.

CEA also submits annual reports to the VCR program. These reports discuss the following:

- management's commitment to the action plan;
- targets for emission reductions in electricity industry;
- identification and quantification of broad categories of emission reduction activities;
- projected emissions for 2000, incorporating GHG reduction activities;
- practices supporting improved GHG reduction performance.

Voluntary Challenge and Registry

Action Plan

CEA submitted its action plan to the VCR program on November 1, 1995.

CEA identified four broad categories of action:

- improved efficiency of internal operations in generation, transmission, and distribution;
- customer energy efficiency;
- use of alternative technologies which use renewable and cleaner burning fuels.

CEA established 1990 as the baseline for calculating GHG reductions. The goal is to reduce emissions to 1990 levels by 2000. The ten member utility companies that have committed to the VCR program are attempting to reduce their aggregate emissions to 101.7 million tonnes per year by 2000, which is 3.5% below the 1990 baseline. The association's long term goal is to stabilize GHG emissions at 1990 levels over the next 30 years. In order to achieve these reductions, the following activities are being considered:

- switching from fossil fuels to natural gas in production of thermal energy;
- initiating projects to capture methane and other land fill gases;
- upgrading vehicles fleets to improve efficiency and making use of alternative technologies;
- using the Power Smart program to educate customers about energy efficiency in the home.

Progress Report

CEA submitted its most recent progress report on October 20, 1997.

So far, nine of the ten VCR companies from the CEA have upgraded their participation to Tier II status, which requires more extensive commitment. The CEO of the company must express formal commitment and responsibility for GHG reductions. In addition, the company must make emission projections for 2000 and invoke management practices, such as internal and external education programs. Also, seven of the VCR reporting member companies have become sponsors of the Greenhouse Emissions Management Consortium (GEMCo), whose objective is to identify and market offset opportunities and establish a market for the purchase and trading of certified GHG emissions reductions in Canada.

The ten reporting companies are on target to meet their 1990 emission level reduction efforts by 2000. In 1997, CO2 emissions were reduced by 29.75 million tonnes, which was 18.6% greater than the reductions in 1996. Twenty-four percent of these reductions came from internal efficiencies at member companies. Over 27% of the reductions came from customer improvements in energy consumption. Offsets, such as land fill methane capture and tree planting, accounted for 40% of these reductions. Furthermore, the use of renewable and alternative technologies, such as natural gas vehicles, accounted for 6% of the 1997 reductions.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

CEA is attempting to improve energy efficiency in the electricity industry in various ways. The Power Smart program educates consumers about energy efficiency in the home and using energy efficient appliances. CEA is encouraging its member companies to make improvements to internal operations in generation, transmission, and distribution of electricity. CEA is also encouraging companies to upgrade its vehicle fleet to more efficient models or to switch to natural gas, electricity, or other alternatively-fuelled vehicles, which are more energy efficient than fossil fuels.

2. Reduction of Toxic Dispersion

The most significant reductions have been in greenhouse gas emissions. CEA's long term goal is to stabilize GHG emissions at 1990 levels over the next 30 years. The VCR member companies in the CEA are currently attempting to achieve reductions that are 3.5% below 1990 levels by 2000.

Environmental Management System

CEA does not have a recognizable form of environmental management system in place. There is no policy statement which guides industry activity. However, the association has the following elements, which may form an EMS in the future:

1. Identification of Environmental Impacts

Energy generation from thermal sources, such as fossil fuels, is the principal cause of GHG emissions from electric utilities in Canada. Coal, oil, and natural gas-fired generators produce CO2 and nitrous oxide and release them into the atmosphere and also contribute to increased levels of surface ozone.

2. Environmental Objectives and Targets

   • reduce GHG emissions to 1990 levels by 2000 and stabilize them at this level for 30 years;
   • increase the use of renewable and alternative fuels;
   • improve energy efficiency through consumer-efficiency and GHG offset projects.

3. Proper Training and Education of Employees, Contractors, and the Interested Public

Up until 1996, CEA had a Power Smart program that educated its customers about energy conservation and encouraged them to adopt energy efficient practices. The CEA and most member companies also hold training sessions for employees on energy conservation and other environmental issues.

Case Study: B. C. Hydro
6900 Southpoint Drive Burnaby, B. C. V3N 4X8
David A. Balser, Manager of Corporate Environment
(604) 528-2731 Fax: (604) 528-7740
www.bchydro.com

Background

B. C. Hydro is a provincial Crown operation and the third largest electrical utility in Canada. It was founded in 1860 as the Victoria Gas Company. The company serves a population of 1.5 million people and provides 75% of B. C.'s electricity. Ninety-nine percent of this power is generated by 61 dams and 32 hydroelectric power stations. In 1997, the company had revenues of $2.4 billion and a net income of $339 million. B. C. Hydro has total capital assets of $9.2 billion.

Environmental Documentation

B. C. Hydro's annual reports briefly mention its environmental management activities. In the 1997 Annual Report, the Power Smart program is discussed. It reports that Power Smart is shifting its focus from financial incentives to user-pay products and services, while cooperating with customer sectors on conservation initiatives. The report also discusses the improvements being made to the Burrard Generating Station to address environmental concerns while meeting electricity needs.

B. C. Hydro publishes annual Reports on the Environment. These reports discuss issues such as the company's environmental management system; the environmental auditing and review process; environmental impact assessments; programs such as Power Smart and Resource Smart; fish, land, and wildlife management; and training of employees and customers.

B. C. Hydro also submits annual reports to the Voluntary Challenge and Registry program. These reports update the company's progress toward GHG reduction goals and updates to the action plan. Issues such as the company's commitment to the VCR, its reduction programs, and education programs are discussed.

Voluntary Challenge and Registry

Action Plan

B. C. Hydro submitted its Action Plan in September of 1995.

B. C. Hydro has had in place since 1989 the Resource Smart and Power Smart programs. The Resource Smart program involves using energy efficient equipment in operations and reducing power losses from the transmission and distribution system. Power Smart focuses on Demand Side Management, which is an attempt to reduce the amount of energy customers purchase and consume to meet their electrical service needs. Power Smart administers programs to promote energy efficiency through on-site energy audits, direct installations, financial incentives, or a combination of these programs. The Power Smart and Resource Smart programs reduce GHG emissions from B. C. Hydro by 1.3 million tonnes per year.

B. C. Hydro also has a fleet emissions reduction program, which over 5 years has reduced the emissions of conventional air pollutants from the fleet by 70%. This program involves reducing the use of the fleet; reducing the number of vehicles in the fleet; exploring alternative and improved fuels; and choosing vehicles with improved emission characteristics.

B. C. Hydro is planning upgrades to its Burrard Generating Station, which will reduce CO2 emissions per unit of energy produced by 0.5% and reduce total GHG emissions by 20 kilotonnes (kt) per year. The company predict that its GHG emissions will be reduced by 42% from 1990 to 2000.

Progress Reports

B. C. Hydro submitted its most recent progress report to the VCR program on January 13, 1998. The company is continuing its commitment to GHG emission reductions and improved energy efficiency. Actual emissions are expected to increase, with or without management measures, as a result of increases in provincial electricity demand driven by economic and population growth. However, without management measures, 2000 levels would be much higher than with management.

Emissions of GHGs in 1996 were 75% lower than in 1995, and 82% lower than they would have been without management. Even though GHG emissions will increase, B. C. Hydro's system will still produce fewer emissions per unit of energy produced than most other Canadian electrical utilities. From 1989 to 1993, B. C. Hydro's emissions were only 14% of the current Canadian industry average. The company will continue to manage GHG emissions by improving the efficiency of generation, transmission, and distribution systems, and corporate operations like vehicle fleet management.

State-of-the-art Selective Catalytic Reduction (SCR) equipment has been added to 3 of 6 boilers at the Burrard Generating Station to alleviate local air pollution. These improvements are expected to cut nitrogen oxide emissions from the boilers by almost 90%. In the future, B. C. Hydro is going to continue its work with governments, industry, and other stakeholders to promote an understanding of climate change and ensure the development of sound GHG management policies.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Power Smart is B. C. Hydro's initiative to help customers use electricity more efficiently. B. C. Hydro provides free energy audits for eligible homes and provides loans for implementation of audit recommendations. The program promotes energy efficiency in new homes by supporting technologies and products that provide savings above code requirements. There is also a refrigerator pick up program that saves 100 Gigawatt hours (GW.h) per year; since 1990, 145 000 refrigerators have been recovered, along with 14 500 kg of CFC refrigerant. The Power Smart program saves in excess of 2 300 GW.h of energy per year, which is enough to serve the annual energy needs of 230 000 homes.

2. Reduction of Toxic Dispersion

B. C. Hydro expects that it will be able to reduce GHG emissions by 42% from 1990 to 2000. GHG emissions in 1996 were 75% lower than in 1995. To reduce these emissions even further, the company has a vehicle fleet emissions program which has lowered emissions of air pollutants by almost 70%. The SCR equipment implemented at Burrard reduced nitrogen oxide emissions by 90% from 1995 to 1996.

B. C. Hydro is also committed to reducing its total volume of waste by 50% from 1993 to 1998. The company has implemented a Comprehensive Waste Management Program in all operations to divert material from land fills by encouraging waste reduction, reuse, and recycling. From 1996 to 1997, B. C. Hydro reduced its PCB inventory by 13% through high temperature destruction. In 1997, aging underground oil and fuel storage tanks were removed and replaced, in order to prevent leaks.

3. Enhancement of Material Recyclability

Retired wood hydro poles are recycled, which eliminates 50% of the wood pole waste that was previously sent to land fill. In addition, B. C. Hydro increased the amount of paper its recycles by 30% from 1990 to 1994.

4. Extension of Product Durability

B. C. Hydro treats its wood utility poles with wood preservatives in order to extend their service lives. These poles last longer, which means that less new material is needed to manufacture new poles and fewer poles need to be recycled.

5. Increase the service intensity of goods and services.

Utility poles are often used as lumber when not recycled. Therefore, this material is being used for a purpose rather than being sent to land fill. Furthermore, by treating the poles that are in service, their service lives are extended.

Environmental Management System

B. C. Hydro has been developing an environmental management system since 1995, in recognition of the benefits it would provide to the environment and its business. Work is underway to develop an EMS for the entire company, which meets ISO 14 001 standards, by 2003.

1. Environmental Policy Statement

The following is B. C. Hydro's environmental policy statement: "In carrying out business, B. C. Hydro will minimize adverse effects on the natural and social environment and actively pursue opportunities to manage these resources for the benefit of present and future generations."

The objectives of this policy are the following:

- to support and contribute to an efficient and environmentally-sound supply of electricity for the province of British Columbia;
- to minimize the adverse effects of its activities on the natural and social environment;
- to be recognized by its actions and attitudes as a corporation committed to a healthy environment.

2. Identification of Environmental Impacts

B. C. Hydro performs environmental impact assessments to consider the entire spectrum of biophysical and social issues associated with a project. The company is most largely responsible for emissions of greenhouse gases, damages to wildlife habitat, and the production of hazardous and non-hazardous waste. The goal of B. C. Hydro is to minimize, if not eliminate, the negative impact that its operations have on the environment.

3. Identification of Regulatory Requirements

B. C. Hydro recognizes that it is required, under the Canadian Electricity Association's Environment Commitment and Responsibility (ECR) program to develop an EMS that is consistent with the ISO 14 001 standard. In addition, B. C. Hydro's environmental performance is regulated by 16 provincial and 4 federal acts. In 1997, four environmental statutes and one regulation were introduced that could affect the company's operations in the future. B. C. Hydro makes every effort to comply with these regulations.

4. Environmental Objectives and Targets

- reduce total volume of waste produced by 50% from 1993 to 1998;
- eliminate the company inventory of PCBs;
- reduce the GHG emissions produced by the vehicle fleet;
- reduce total GHG emissions by 42% from 1990 to 2000.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

Employees are kept informed of changes in legislation affecting the facilities' and operations in B. C. Hydro. Training is extended to reviews of environmental legislation and regulations applicable to operators, stressing the standards and expectations for compliance with environmental laws. The employees also receive risk identification, assessment, prevention, and technical response training to ensure proper actions are taken to limit and mitigate incidents.

B. C. Hydro makes having a trained staff a formal requirement of its EMS. Training emphasizes effective operating procedures and clearly defined decision-making processes to prevent environmental impacts. Training components include: a spill management training package; a vegetation management training package; waste and PCB management training.

6. Monitoring and Measurement of Operations and Activities

B. C. Hydro regularly performs audits to examine environmental performance, report the results, and make improvements to existing practices. The audits are performed by external firms and auditors to measure adherence to established procedures, standards and regulations, and company objectives. After the audit is performed, there is a follow-up visit to ensure that commitments to improve are implemented. Audits are also performed to measure B. C. Hydro's impact on fish populations. Scientific work is done on fish stock and habitat assessments, inventories, life cycle studies, and projects to protect, restore, and enhance fish stock and habitat. Similar studies are done on wildlife habitat to identify wildlife needs and rehabilitate areas affected by B. C. Hydro's encroachment.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada
http://strategis.ic.gc.ca

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.3 FORESTRY AND BUILDING PRODUCTS

The Canadian Pulp and Paper Association

1155 Metcalfe St. Montreal, PQ H3B 4T6
Claude Roy, Director of Environment and Energy
(514) 866-6621 Fax: (514) 866-3035

Background

Founded in 1913, the Canadian Pulp and Paper Association (CPPA) has 54 members, which account for approximately 85-90% of pulp and paper and 70% solid wood products manufactured in Canada each year. The association is governed by a Board of Directors, whose members are senior executive officers from member companies. The association's mission is to advance the interests of its member companies. CPPA presents the industry's position on environmental issues, among others, to government and regulatory agencies. The association also conducts research, collects statistical information, and produces special studies in areas of interest.

Environmental Documentation

The CPPA makes vast amounts of information available on its Web site about the forest industry, the association's objectives, and the plans and activities that have been devised for dealing with environmental issues. This information resource includes information on forest and greenhouse gas management plans, the biodiversity program, effluent reductions, energy use reduction, recycling, public participation, and communication within the pulp and paper industry.

An extensive amount of information is also made available in the CPPA's annual progress report to the Voluntary Challenge and Registry Program. The CPPA and many of its members are participants in this program. The association's documentation reports on the objectives for greenhouse gas management and the plans that the association has made for reaching these objectives.

Voluntary Challenge and Registry

Action Plan

The CPPA submitted its action plan to the Voluntary Challenge and Registry program on November 28, 1996. CPPA identified the following activities to reduce or limit emissions:

- increase self-sufficiency in energy production by substituting purchased energy with energy from biomass;
- improve energy efficiency in facilities, vehicles, production processes, and other operations;
- reduce non-biomass emissions through decreased use of fossil fuels and increase in use of biomass for energy;
- maintain the carbon balance in the atmosphere by practising sustainable forest management and promoting long-term use of forest products through recovery, recycling, and reuse.

The CPPA sends letters to member companies, provides presentations on the Voluntary Challenge and Registry, and promotes participation by these companies. CPPA also prepares a guideline document to assist companies in preparation of greenhouse gas action plans and distributes it to all member companies.

The association has set an objective of all member companies in the pulp and paper industry reducing their greenhouse gas emissions to, or below, 1990 levels by the year 2000. Since 1990, emissions have been reduced by 20% on an absolute emission basis, and by 28% on a per tonne of production basis. A main reason for this decrease has been the increase in biomass energy use by 6%, from 50 to 56% of the total energy mix.

Progress Report

The CPPA has yet to submit a progress report to update the 1996 Action Plan submission.

Eco-Efficiency Elements

1. Reduction of material intensity of goods and services.

CPPA encourages recycling in the pulp and paper industry, and in 1997, the industry transformed 4.7 million tonnes of old newspapers, magazines, and other materials into new material. This recycling program creates material for new products and, therefore, fewer trees have to be harvested to meet material demand

2. Reduction of the energy intensity of goods and services.

The CPPA promotes energy efficiency and fuel switching from fossil fuels to renewable sources. Since 1990, the pulp and paper industry has reduced its use of non-renewable fossil fuels by 20% and dropped total energy consumption by 5% per tonne of production. The industry's fuel use has been cut by 50% since 1989 and 75% of the energy used by mills comes from renewable sources, such as biomass.

The Global Climate Change Task Force was set up in 1996 by the CPPA to work with member companies to stabilize greenhouse gas emissions through energy conservation, a shift to biomass and renewable energy, and emphasis on continual improvement in forest management. The goal of the task force is to increase total energy efficiency per tonne of production by 1% annually by the year 2000

3. Reduction of Toxic Dispersion

The pulp and paper industry has announced a 5-year, $18 million research program to develop pulp and paper mill technologies that shift the environmental focus from pollution treatment to prevention. Through the ARET program, participating companies have honoured a voluntary commitment to cut overall emissions by 44% from 1998 levels, by 1996, with plans to cut emission by a further 51% by the year 2000.

4. Enhancement of Material Recyclability

In 1995, The CPPA joined with the Paper and Paperboard Packaging Environmental Council to launch the Brown Bag Canada Challenge, which is a nationwide campaign to recycle paper grocery bags. As a result of initiatives like this and others, the Canadian pulp and paper industry manages to divert 4 million tonnes of recovered paper from landfills each year for use in making recycled paper and paper products.

5. Maximization of the Sustainable Use of Renewable Resources

The CPPA is involved in the Sustainable Forestry Program, which has been certified by the Canadian Standards Association. This program has guidelines which CPPA has adopted and promotes to its members. This program is important for a successful forest management strategy because it allows for the following:

- measurable objectives for continuous improvement;
- public input into the objectives and awareness of the objectives;
- independent third party audits to verify compliance with legislation and regulations;
- annual reporting to the public on activities and audit results.

6. Increase in the Service Intensity of Goods and Services

Many of the by-products of the pulp and paper production process used by CPPA member companies are reused, which increases the service life of the original materials. For example, sludge is used as an organic fertilizer and the bark from harvested trees is used as a form of biomass energy.

Environmental Management System

1. Identification of Regulatory Requirements

CPPA accepts its requirements under the ARET program and feels that the industry has been meeting this commitment in reducing toxic emission by 44% since 1988. CPPA also identifies and accepts the Voluntary Challenge and Registry requirement of reducing greenhouse gas emission to or below 1990 levels by the year 2000.

2. Environmental Objectives and Targets

The objectives and targets of the CPPA include the following:

- reusing by-products of the pulp and paper production process;
- working to maintain biodiversity within harvested forest area;
- reducing energy use on a per unit basis and, if possible, on an absolute basis through improved efficiency and switching from fossil fuels to cleaner burning energy sources;
- reduction of greenhouse gas emissions to 1990 levels by 2000.

3 Monitoring and Measurement of Operations and Activities

Through CPPA's sustainable forestry program, independent third party audits are conducted at member companies' sites to verify compliance with legislation and regulations and to determine whether the forest

manager has developed and applied sustainable forest management.

Also, through 20-25 year management plans, CPPA members are encouraged to do forest inventories, mapping, measurement of growth rates, calculation of allowable harvest volumes, and provisions for reforestation after harvest. There are also 1- and 5-year management plans which outline locations of harvesting, regeneration, and tending activities.

Case Study: E. B. Eddy Forest Products Ltd.
1 Station Road Espanola, ON P5E 1R6
C. Roger Cook, Vice President Environment
(705) 728-5821 Fax: (705) 869-4901

Background

E. B. Eddy was founded in 1851 and is in the business of producing spruce and pine lumber, bleached kraft pulp, as well as coated and uncoated fine, specialty, and packaging grade papers, including recycled content paper grades. The company currently has 3 405 permanent and seasonal employees in timber operations, saw mills, and pulp and paper operations. Most of the softwood supplied to company saw mills is harvested from Crown lands managed under Sustainable Forest Licenses issued by provincial governments. E. B. Eddy manages 1.6 million hectares of forest land. The company is owned by George Weston Limited of Toronto.

Environmental Documentation

E. B. Eddy publishes annual Status Reports on Sustainable Development. These reports update the progress of the company's environmental management system and the progress toward sustainable development goals. Environmental achievements in paper making, pulping and bleaching, and saw mills are reported, along with forest management practices that have been undertaken.

E. B. Eddy submits annual reports to the VCR program, which update its progress toward GHG emission and energy consumption reduction goals. These reports discuss GHG emission reduction activities, reductions that have already been achieved, and emission reduction projections to 2000.

Voluntary Challenge and Registry

Action Plan

E. B. Eddy submitted its action plan to the VCR program on October 1, 1995.

E. B. Eddy is committed to reducing the use of fossil fuels, reducing energy consumption, and changing processes which create GHG emissions. The company has three main approaches to these objectives. The first is to replace fossil fuels with biomass fuels. These fuel sources produce fewer GHG emissions than fossil fuel combustion. For example, bark and waste wood is used in power boilers to generate steam. The second approach is to implement energy conservation programs throughout all of E. B. Eddy's operations. By reducing energy use, the company hopes that GHG emissions will also be reduced. The third approach is to promote electrical self-sufficiency at facilities through the use of renewable fuels. Many mills have turbines to generate hydro-electric power from nearby rivers and this power eliminates the need to purchase power generated by fossil fuels.

E. B. Eddy believes that forest management is the best way to control releases of greenhouse gases. Sustainable forest management allows forests to act as CO2 sinks, absorbing much more CO2 than an unmanaged forest. In addition, forest management techniques, such as harvesting, tree planting, controlled burns, and fire suppression, reduce CO2 emissions from forest fires by 90%. E. B. Eddy believes that its forest management strategy, even with inclusion of fossil fuel combustion in processing, biomass combustion for energy, and biomass degradation over time, results in fewer CO2 emissions than would result from a fire in an unmanaged forest.

CO2 Emissions from Unmanaged Forest vs. Managed Forest (tonnes per year)

Source	Unmanaged Forest	Managed Forest
Fire	3 900 000	300 000
Fossil Fuel Combustion	0	300 000
Biomass Combustion	0	1 000 000
Lumber and Paper Biodegradation	0	400 000
Total	**3 900 000**	**2 000 000**

E. B. Eddy's goal is to stabilize its fossil fuel CO2, methane, and nitrogen oxide emissions at 1990 levels by 2000, through forest management and substitution of fossil fuels with biomass fuels. The company believes that its forest management practices will offset approximately 50% of its emissions of methane, nitrogen oxides, and CO2 from pulp and paper mills.

Progress Report

E. B. Eddy submitted its most recent progress report on October 9, 1997. The company remains committed to both the reduction in the use of fossil fuels and the conservation of energy. From 1990 to 1996, CO2 emissions from company mills and operations decreased by 0.5%. E. B. Eddy is predicting that its GHG emissions in 2000 will be 385 000 tonnes, which is 1% higher than the 1990 level of 381 000 tonnes. However, the company has developed several forestry projects to offset the 4 000 tonnes excess, thereby stabilizing the overall GHG emissions at 1990 levels.

Many of E. B. Eddy's facilities have implemented energy conservation and GHG emission reduction projects. The Ottawa-Hull mill has plans to substitute bunker C oil with natural gas by 2000, which will reduce CO2 emissions by 5 000 tonnes per year. The Espanola mill has created a bark-fired power boiler that generates process steam, rather than using fossil fuels. This will reduce CO2 emissions from oil and natural gas by 20 000 tonnes per year. The Espanola mill also plans to complete projects by 2000 that will reduce energy use by 1% per year, or 130 000 gigajoules. Many operations are practising Juvenile Spacing, which is ideal spacing of seedlings in newly regenerated forests to allow for optimal tree growth. The enhanced tree growth will increase carbon storage by 13 tonnes per hectare compared to non-spaced forest.

Carbon Dioxide Emissions 1990-1996 (tonnes per year)

	1990	1991	1992	1993	1994	1995	1996
Pulp Mills	144 887	120 255	125 637	66 760	120 281	126 929	144 926
Paper Mills	193 753	175 641	184 917	186 948	184 647	177 210	192 357
Saw Mills	11 631	11 331	14 109	14 661	14 797	13 533	16 222
Forestry Operations	21 802	12 881	8 841	22 061	22 000	19 559	16 676
Total	**372 073**	**320 108**	**333 504**	**290 430**	**341 724**	**337 231**	**370 181**

Projected Carbon Dioxide Emissions 1997-2000 (tonnes per year)

	1997	1998	1999	2000
Pulp Mill	145 000	145 000	145 000	131 000
Paper Mills	199 766	203 279	210 911	206 662
Saw Mills	19 345	19 405	19 405	19 405
Forestry Operations	17 000	17 000	17 000	17 000
Total	**381 111**	**384 684**	**392 316**	**374 067**

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

E. B. Eddy facilities have been implementing energy conservation initiatives, including the following:

- purchasing high-efficiency motors saves the company 220 gigajoules per year;
- installation of controls on combustion processes saves 16 000 gigajoules and 795 tonnes of CO2 emissions per year;
- installation of higher efficiency lighting.

2. Reduction of Toxic Dispersion

E. B. Eddy has set a goal of reducing the solid waste it sends to land fill by 50% from 1992 to 1998. To meet this goal, the company uses waste biomass, such as bark and sawdust, as fuel rather than land filling or incinerating the waste. In addition, the company is currently involved in research to find replacements for all CFCs in air conditioners and water chillers.

E. B. Eddy has set a goal of stabilizing its emissions of CO2, methane, and nitrous oxide at 1990 levels by 2000. While GHG emissions are expected to increase slightly from 1990 to 2000, offset projects are being implemented to stabilize the emissions at 1990 levels.

3. Enhancement of Material Recyclability

E. B. Eddy is implementing programs to increase the percentage of its paper products which are produced from recycled paper. The company is also recycling and reusing waste wood and wood products as a fuel source for the production of pulp and paper.

4. Maximization of the Sustainable Use of Renewable Resources

E. B. Eddy practices sustainable forestry to maintain its forest resources. The use of proper regeneration techniques, such as a juvenile spacing, maximizes tree growth and carbon storage to keep forest ecosystems healthy. The company has as a Sustainable Forestry Policy, which includes the following elements:

- integrate environmental management criteria into corporate decision making;
- ensure that customer expectations for service and product quality are met or exceeded while striving for excellence in environmental performance;
- reduce pollution at the source by incorporating process modifications that use the best technology that is economically achievable.

The objectives of this Sustainable Forestry Policy include the following:

- conservation of ecosystem, species, and genetic diversity;
- maintain and enhance the condition and productivity of the forest ecosystem;
- conserve soil and water resources.

Environmental Management System

E. B. Eddy has developed an Environmental Management System that is consistent with the ISO 14 001 International Standard for environmental management systems. It is consistent with this standard because it incorporates environmental policies and goals, planning for environmental programs, implementation of these programs, auditing and performance measurement, and management review.

1. Environmental Policy Statement

E. B. Eddy is committed to sound environmental management practices which are essential in maintaining a successful, sustainable, and fully integrated forest products enterprise. E. B. Eddy recognizes that:

- resources drawn from the environment must be used efficiently through the minimization of waste and the production of high quality products;
- forest resources must be managed responsibly to protect the interests of all users;
- it must continually improve its overall environmental performance;
- it must actively support research into environmental improvements;
- it must incorporate innovative, environmentally beneficial technology into manufacturing processes.

2. Identification of Environmental Impacts

E. B. Eddy identifies the consumption of energy and the resulting emissions of toxins and greenhouse gases as among its most significant impacts on the environment. These emissions cause air pollution and contribute to global warming. E. B. Eddy also recognizes that it is tampering with fragile forest ecosystems when it harvests trees. The company takes great strides to minimize the impact it has on these ecosystems and has regeneration programs to restore the forest to as good or better condition than it was before the harvest.

3. Environmental Objectives and Targets

- stabilize emissions of greenhouse gases at 1990 levels by 2000;
- reduce solid waste sent to land fill by 50% from 1992 to 1998;
- reduce energy consumption through fuel switching and energy conservation projects.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

Operators on new and existing production and environment systems are trained to maximize the opportunity for a trouble-free start up and continued operation. These operators will be able to recognize problems as they occur and decide how best to deal with them. Employees are also informed of the company's policies and goals for the environment so that they can be incorporated into their everyday activities.

5. Monitoring and Measurement of Operations and Activities

Elements of the EMS are carefully monitored after any modifications or operational changes are made to determine the environmental effects of the changes. Environmental data is reviewed by management to compare the performance of the EMS with the compliance requirements, E. B. Eddy stated objectives, and specific goals. In addition, every five years, independent audits are performed on the company's forest management plan. The auditors review the management plans, conduct field inspections, and interview forestry staff. The auditors make a final report, which becomes a public document, and the necessary improvements are made.

Case Study: Weyerhaeuser Canada

1075 West Georgia Street, 25th Floor Vancouver B. C. V6E 3C9
Ray Norgren, Planning Manager
(604) 691-2414 Fax: (604) 691-2445

Background

Weyerhaeuser Canada began operation in 1965 and has grown to be the second largest forest products company in Western Canada. The company is a wholly owned subsidiary of the Weyerhaeuser Company in Tacoma, Washington. It has operations in British Columbia, Alberta, and Saskatchewan which employ 4

700 people in the production of pulp, paper, lumber, and engineered panel products for Canadian and international markets. The company operates six saw mills in B. C., three in Alberta, and one in Saskatchewan. The head office is in Kamloops, with corporate offices in Vancouver.

Environmental Documentation

Weyerhaeuser Canada's Web site contains the company's environmental policies, goals and strategies. There are also electronic copies of the 1996 and 1997 Annual Environmental Performance Reports. These documents report on the company's environmental activities and successes in the preceding year. These reports discuss sustainable forestry, pollution reduction; natural resource conservation; environmental accountability; and future improvements.

The company also publishes information on its environmental practices in its action plans and progress reports to the Voluntary Challenge and Registry program. This information concerns mainly climate change and reducing emissions of greenhouse gases. These documents are available in hard copy format from Weyerhaeuser, or electronically from the Voluntary Challenge and Registry Web site. Weyerhaeuser Canada also addresses the environment in its 1997 Annual Report in a brief discussion of forest regeneration and sustainable forest management.

Voluntary Challenge and Registry

'ion Plan

Weyerhaeuser Canada submitted its Action Plan on August 2, 1996.

Weyerhaeuser Canada will attempt to limit or reduce emissions through the following activities:

- energy conservation;
- improving the energy efficiency of operations;
- fuel switching from fossil fuels to biomass;
- energy use awareness and training for employees;
- recycling and reusing forest products to reduce materials sent to landfill.

Weyerhaeuser Canada chose 1990 as the base year for calculation of greenhouse gas reductions. Weyerhaeuser Canada has accepted the challenge from the Voluntary Challenge and Registry to stabilize greenhouse gas emissions at 1990 levels by the year 2000. The company projects a 3.3% decrease in greenhouse gas emissions from 1990 to 2000.

Progress Reports

Weyerhaeuser Canada submitted its only progress report to date on September 30, 1997. The co ,y continued its commitment to the VCR through energy use awareness and conservation in manag ıd operating practices and development of a greenhouse gas employee awareness/education progr

From 1990 to 1996, greenhouse gas emissions decreas ,y 11%. The company projections for 2000 are 5% below 1990 levels. Equipment and operation changes ade in 1996 will have an impact on greenhouse gas emission reductions.

Eco-Efficiency Elements

1. Reduction in the Energy Intensity of Goods and Services

- monitoring and targeting centres of energy loss;
- investment in more energy-efficient equipment;
- employee training, recognition, and awareness programs for energy efficiency;
- fuel switching from fossil fuels to biomass;
- increasing sequestration of gases, such as CO2, through forest management.

2. Reduction of Toxic Dispersion

Process improvement and new equipment at facilities have helped reduce air pollutant emissions. For example, new precipitators were installed at the Grande Prairie, Alberta mill in order to reduce particulate matter released. As a result, particulate emissions from power boiler operations were reduced 88%, and total particulate emissions were reduced by 77%. During 1997, Weyerhaeuser continued implementing a company-wide management program begun in 1994 to deal with chemical and hazardous waste management. The company set a goal of eliminating all equipment containing PCBs by 2000; at year-end 1997, no Canadian facility in the company had regulated PCB equipment remaining.

3. Enhancement of Material Recyclability

Many of Weyerhaeuser Canada's facilities have begun projects to reduce, reuse, and recycle waste. The Princeton, B. C. facility, for example, has developed a 5-year waste minimization plan that includes sending much of its waste wood to a pellet plant where it is manufactured into fuel for woodstoves and wood-fired heaters. As a result, less material is being shipped to landfills.

4. Maximization of the Sustainable Use of Renewable Resources

Weyerhaeuser supports the Canadian Standards Association's new Sustainable Forest Management Standard. Through this standard and Weyerhaeuser's Forest Stewardship Principles, sustainable forestry is practised on 23.7 million acres (9.6 million hectares) of publicly-owned land which is managed by Weyerhaeuser through a long-term license. Weyerhaeuser forest managers from B. C., Alberta, and Saskatchewan worked together to develop common strategies, targets, and criteria for the Forest Stewardship Principles

A number of Weyerhaeuser facilities improved recovery of wood fibre during 1997. The Lumby, B.C. sawmill, for example, made conveyor improvements that increased wood fibre recovery, reduced downtime, and decreased particulate air emissions. New equipment at the Slave Lake, Alberta facility allows the mill to use all of the Aspen and Black Poplar logs brought to the site. These changes reduce wood waste and costs and increase resource efficiency

Environmental Management System

1. Environmental Policy Statement

The following is Weyerhaeuser's Environmental Core Policy Statement

"It is Weyerhaeuser's Core Policy that employees at all levels will work to ensure that we comply with applicable laws and regulations and continuously improve our environmental performance wherever we do business. Employees are accountable for ensuring compliance with applicable laws and for managing and operating our businesses to conform with the company's goals of practising sustainable forestry, reducing pollution, and conserving natural resources through recycling and waste reduction."

Further to this statement, Weyerhaeuser is committed to

- ensuring employees are trained and empowered to actively participate in the company's environmental management process,
- continuously improving processes for reducing waste and emissions to the environment,
- adopting internal standards for situations not adequately covered by law or regulation or where the company believes more stringent measures are necessary to protect the environment,
- complying with legal and regulatory mandates and performing better than minimum requirement to meet customer and community expectations

2. Identification of Environmental Impacts

Weyerhaeuser recognizes the impact that its operations and facilities have on the environment. These include the following.

- damaging wildlife habitat and biodiversity through harvesting of forested lands,
- reducing air quality through release of greenhouse gases and particulate matter,
- contaminating land and water with PCBs contained within equipment,
- polluting the land by land filling waste materials from production

3. Identification of Regulatory Requirements

Weyerhaeuser Canada recognizes the legal and regulatory requirements on the lands it harvests. In 1996, Weyerhaeuser Canada did not pay any non-compliance penalty fees; in 1997, the company only had to pay $500. Weyerhaeuser Canada operations have been more compliant than Weyerhaeuser operations in the United States, which have paid $34 000 and $199 000 in 1996 and 1997 respectively.

4. Environmental Objectives and Targets

- elimination of all regulated PCBs from equipment by 2000,
- conservation of natural resources through recycling and waste reduction;
- development of solid waste reduction management plans for every facility by 1999,
- stabilize greenhouse gas emissions at 1990 levels by 2000.

5. Appointment of management representatives

Both U. S. and Canadian operations of Weyerhaeuser have Environmental Councils which consist of business, staff, and facility leaders. These councils position the company to respond to emerging issues and oversee implementation of the Weyerhaeuser Environmental Policy. In addition, 98% of Weyerhaeuser Canada's facilities have designated parties to be responsible for chemicals and hazardous waste management.

6. Proper Training and Education of Employees, Contractors, and the Interested Public

Weyerhaeuser Canada has developed a greenhouse gas employees awareness program to educate employees about the impacts of global warming and what can be done to reduce the contributions the company is making to climate change. The company also works with community organizations and

educators to strengthen environmental education. For example, the Grande Prairie operations cooperated with two other forest product companies to fund a full-time forest educator who assists teachers by preparing learning materials and hands-on forestry activities.

7 Monitoring and Measurement of Operations and Activities

Weyerhaeuser Canada audits most major manufacturing sites annually to identify areas needing improvement. Smaller locations are audited on 3 to 4 year cycles. Where corporate audits are not performed in a particular year, mandatory self-audits are undertaken by the facilities themselves. These audits analyze the impact that operations have on watersheds, wildlife habitat, and air quality. For example, when auditing the watershed, foresters and scientists examine water flows, soil, fish habitat, and other characteristics of the basin surrounding a river or stream. From the findings, management makes recommendations to help protect and improve water quality and fish habitat in watersheds managed for wood production.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada
http://strategis.ic.gc.ca

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.4 ADVANCED MATERIALS, CHEMICALS, AND PLASTICS

The Canadian Chemical Producers' Association

350 Sparks Street, Suite 805 Ottawa, ON K1R 7S8
Bruce Caswell, Senior Project Manager
(613) 237-6215 Fax: (613) 237-4061

Background

The Canadian Chemical Producers' Association (CCPA) is a trade association that was formed in 1962 to deal with concerns over trade and tariff issues. The association represents manufacturers of a broad range of petrochemicals, inorganic chemical, polymers, and other specialty chemicals. It is a national organization which represents seventy-two companies within the Canadian chemical production industry. This membership accounts for over 90 per cent of the industrial chemicals manufactured in Canada, and total sales exceeding $15 billion annually. The member companies directly employ 27 000 people and an additional 89 000 indirectly. The association is lead by the vision of a dynamic, innovative, respected, and sustainable Canadian chemical industry. Responsible Care is the initiative which guides the association's activities and to which member companies are required to conform. According to CCPA, "The Canadian Chemical industry is committed to taking every practical precaution toward ensuring products do not present an unacceptable level of risk to its employees, customers, public, or the environment".

Environmental Documentation

The CCPA publishes and extensive amount of material on its sustainable development and environmental management activities on its Web site. On the Web site, the following information is available:

- the Responsible Care program Codes of Practice for the Community Awareness and Emergency Response Program; research and development; manufacturing; transportation; distribution; and hazardous waste management;
- sources, member company emissions, and reduction initiatives for emissions to water;
- levels of greenhouse gas emissions achieved by member companies;
- future emission projections and the initiatives that will be used to reach them.

The following documentation is available in hard copy format or on the CCPA's Web site:

- Responsible Care reports from 1994 through 1997, which update the progress of member companies at achieving the objectives under Responsible Care;
- Reducing Emissions reports for 1994 through 1997;
- the 1997 Chemical Manufacturing Industry Business Survey, which is an evaluation of the chemical industry market and projections for the future;
- the 1998 update for the Business Survey.

Voluntary Challenge and Registry

Action Plan

The Action Plan submitted by the Canadian Chemical Producers' Association is a two page document which basically outlines the association and its member companies' commitment to the Voluntary Challenge and Registry. It reports on the number of companies which have submitted plans to the VCR or are in the process of creating plans. The association vows to encourage all member companies to join the VCR program and submit plans. The plan itself does not give any information on the initiatives that will be taken to reduce greenhouse gas emissions or the targets that will be pursued. This information is outlined in the Reducing Emissions report that is included with the action plan. This report contains the information used in the following descriptive analysis.

Progress Report

CCPA has yet to submit a progress report to the Voluntary Challenge and Registry program.

Elements of Eco-Efficiency

1. Reduction of Toxic Dispersion

• emissions of effluent to water have decreased by 99% from 1992 to 1996, from 140 000 tonnes to 1 100 tonnes;
• emissions of heavy metals to water decreased by 59% from 1992 to 1996;
• emissions of volatile organic chemicals decreased by 25% from 1992 to 1996;
• since 1991, emissions of all substances except CO2 were reduced by 51%, despite a 20% increase in production; it is predicted that by 2001, total emissions of these substances will be reduced to 33% below 1992 levels;
• CO2 emissions have remained stable at 1992 levels;
• from 1996 to 2001, methane and nitrous oxide emissions are expected to decrease by 37% and 85% respectively;
• emissions of volatile chemicals which cause smog decreased by 43% from 1992 to 1996;
• emissions of ozone depleting substances, including CFCs, decreased by 62% from 1992 to 1996.

2. Enhancement of Material Recyclability

CCPA encourages it member companies' manufacturing and distribution operations to minimize their generation of waste materials through reduction, recycling, recovery, and reuse. Some companies have been implementing programs such as recycling to containers and packaging materials.

Environmental Management System

1. Environmental Policy Statement

The Responsible Care program acts as the environmental guidelines for the chemical production industry. The theme of the Responsible Care program is "A Total Commitment", which refers to a commitment to the responsible management of the total life cycle of products: from the beginning in the laboratory to the end, at ultimate disposal and destruction. Participating in the Responsible Care program is a condition of CCPA membership. The program is guided by the following principles:

• ensure that a member company's operations do not present an unacceptable level of risk to its employees, customers, the public, or the environment;
• provide relevant information on the hazards of chemicals to customers, urging them to dispose of products in a safe manner;
• comply with all legal requirements that affect the company's operations and products;
• be responsive and sensitive to legitimate community concerns.

The program consists of a set of initiatives undertaken by the CCPA in the mid-1980s to deal more directly with public concerns over chemicals and their impact on the environment. The requirements of the program are outlined in six codes of practice which have 152 individual elements:

a. Community Awareness and Emergency Response

Member companies are required to provide information about the hazards and associated risks of chemicals, chemical products, and operations to employees and interested members of the community. Member companies are expected to have an active Emergency Response program, to train their employees in dealing with emergencies, and to conduct regular performance assessments to ensure employee competence.

b. Research and Development

Member companies are responsible for the protection of people and the environment during research and development projects, and during the introduction of new chemicals, chemical products, processes and equipment. Each member company is expected to have a management system in place to ensure that R&D operations are functioning effectively and safely. New products must be studied for their impact on the environment before they are put into use.

c. Manufacturing

Member companies are required to identify and evaluate on a regular basis the environmental hazards associated with manufacturing operations and minimize these risks through controls, procedures, and education of employees in emergency response. Companies are to be aware of all their effluents and emissions and to monitor their effects on the environment. The companies are also encouraged to minimize the generation of waste materials through reduction, recycling, recovery, and reuse.

d. Transportation

Member companies are expected to have an emergency response system to deal with transportation accidents to minimize damage to the environment. The companies are expected to know the laws and regulations concerning transportation and to meet or exceed them. The

companies are also expected to establish standards for equipment used in loading and unloading containers, and to have trained personnel in case of accidental release.

e. Distribution

Member companies are to identify and evaluate on a regular basis the hazards and associated risks of storage and handling of chemicals and chemical products. The companies are expected to provide training to customers so that they can store and handle products properly and know how to deal with emergencies.

f. Hazardous Waste Management

The goal is to reduce the generation of hazardous wastes and reduce or eliminate their impact on people and the environment. Member companies are expected to have a hazardous waste management system to identify, classify, and maintain records of the hazardous wastes generated.

2. Identification of Environmental Impacts

Toxic emissions from the chemical production industry come from three main sources:

- processing and manufacturing operations;
- leaks in equipment, such as valves and pumps, or leaks from storage and handling of chemicals;
- discharges to land as a result of land filling waste.

The main gases emitted by the chemical industry are CO2, methane, and nitrous oxide, which are the three main greenhouse gases.

3. Identification of Regulatory Requirements

CCPA requires that its member companies identify all of the regulations and laws that apply to their operations. The association expects and demands full compliance with these regulations in manufacturing, transportation of goods, distribution of goods, and management of waste.

4. Environmental Objectives and Targets

- work with member companies to reduce net emissions and work toward zero discharge;
- reduce benzene emissions by 75% from 1997 to 2000;
- reduce methane emissions by 37% from 1996 to 2001;
- reduce nitrous oxide emissions by 85% from 1996 to 2001.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

Each member company is required to have an employee training program to prepare employees for dealing with emergency situations. Employees are informed of all effluents and emissions to the environment and are trained to control them. Employees, as well as the public, are informed about the materials handled by the company, and the related risks and procedures for their control.

6. Emergency Preparedness and Response

Each member company is required to have an up-to-date, operational emergency plan, which meets the following requirements:

- is based on site-specific risk assessment that identifies and evaluates situations where company processes, materials, or equipment could have an impact in an emergency;
- requires active participation, cooperation, and coordination by company personnel with local officials and media;
- in an emergency it makes available to first responders and the community company expertise and specialized equipment and materials;
- it is documented, field tested, audited, and updated at least annually.

7. Monitoring and Measurement of Operations and Activities

The emergency response plan is audited annually for its performance. Auditors look for possible problems in the system and make recommendations for improvement. Employee performance is also monitored to ensure they are displaying competence in manufacturing, transporting, and storing chemicals, as well as dealing with emergency situations.

Case Study: Du Pont Canada Ltd.

Box 2200 Streetsville Mississauga, ON L5M 2H3
Lynn Williams
(905) 821-5623 Fax: (905) 821-5651

Background

Du Pont Canada is a diversified industrial company serving customers across Canada and in 40 other countries. Du Pont Canada traces its roots back to 1862, when Hamilton Powder was formed. Hamilton Powder eventually became Du Pont Canada. Du Pont Canada operates a research and development centre and engineering centre in Kingston, five manufacturing facilities in Ontario, a manufacturing facility in Gibbons, Alberta, and offices in Quebec, Ontario, and Alberta. At the end of 1997, Du Pont Canada employed 3 327 people. In 1997, Du Pont had $1.5 billion in total assets and net earnings of $212 million.

Environmental Documentation

Du Pont Canada publishes extensive environmental data on its Web site, including:

- environmental, health, and safety policy and commitments;
- objectives for the current year in environmental management;
- emissions for 1996 and projections for 1997 and beyond;
- new energy conservation goals to 2005;
- CCPA's responsible care program and Du Pont Canada's commitment to the program.

The 1997 Progress Report to the VCR program is available in hard copy format or on the Du Pont Canada Web site. This report contains information on the following:

- GHG emission reductions achieved since 1990;
- GHG emission projections for the year 2005;
- new energy efficiency goals for the year 2005;
- education initiatives for employees.

Voluntary Challenge and Registry

Action Plan

Du Pont Canada submitted its Action Plan to the VCR on December 19, 1994. Du Pont Canada is planning the following activities which are expected to limit or reduce emissions:

- reducing energy consumption to reduce GHG emissions;
- using new technology to break down nitrous oxide into nitrogen and oxygen;
- phasing out the use of CFCs in all company facilities;
- conducting regular formal environmental audits to monitor environmental progress.

The company has established 1990 as the base year for calculating emission reductions. Du Pont's goal is to reduce emissions of CO2 by 75% of 1990 levels by 2000. In order to meet this goal, Du Pont Canada is going to attempt to reduce its energy consumption per unit of production by 25% from 1990 to 2000. At the time of the action plan submission, the company had already reduced its energy consumption by 12% since 1990. Plans in place to modernize the powerhouse in Maitland, Ontario are expected to reduce CO2 emissions from the plant by 10%. These reductions will contribute to the overall goal of reducing all air, land, and liquid releases to 50% of 1990 levels by 2000.

Progress Report

Du Pont Canada's most recent progress report was submitted on October 29, 1997.

From 1990 to 1996, the following emission reduction results were achieved:

- CO2 emissions increased by 79.2%, which is a increase of 19.4% per unit of production;
- N2O emissions increased by 6.9%, but this translates into a 22.9% reduction per unit of production.

Du Pont Canada has made the following projections for the year 2005:

- CO2 emissions per unit of production are expected to decrease by 12.7% from 1997 to 2005, which is an overall increase of 13.6% from 1990 to 2005;
- N2O emissions per unit of production are expected to decrease by 80% from 1997 to 2005, resulting in a total decrease of 91.2% from 1990 to 2005.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Du Pont Canada was originally committed to reducing unit energy consumption by 25% from 1990 to 2000. This target was met in 1994 and sustained in 1995 and 1996. A new target of 15% reduction in energy consumption per unit of production from 1995 to 2005 was established in 1996. In order to achieve this goal, all Du Pont Canada facilities are taking action. The Kingston facility is defining opportunities to reduce steam consumption and to reduce consumption of water so that new pumping capacity will not have to be added. At the Maitland powerhouse, incandescent lamps are being replaced with highly efficient metal halide lamps.

2. Reduction of Toxic Dispersion

- Du Pont shut down its CFC facility in 1993 and CFC emissions will be eliminated by 2000;
- Du Pont is in the midst of a 5-year program to eliminate nitrous oxide emissions from its facilities by implementing a process that breaks down N2O into nitrogen and oxygen gas;
- Du Pont is implementing GHG emission reduction programs which will reduce CO2 emissions by 12.7% and N2O emissions by 80% from 1997 to 2005;
- the company has set a goal of eliminating the land filling of packaging waste by 2005.

3. Enhancement of Material Recyclability

Du Pont Canada attempts to find ways to reduce, reuse, and recycle materials as an alternative to disposal. The Maitland powerhouse recycles water used for process cooling so that the same water can be used twice before it is discharged to the river. Du Pont has also introduced TUFF-PAK packaging, which uses 21-kilogram bags shipped in plywood boxes. These bags are 100% recyclable and reusable. This results in less waste in land fill as the packaging replaces metal drums.

Environmental Management System

1. Environmental Policy Statement

Du Pont has an Environment, Health, and Safety Policy Statement. The following are its policy elements:

- aim for the goal of zero injuries, illnesses, and environmental incidents;
- drive toward zero emissions and zero waste generation;
- excel in the efficient use of energy and natural resources, and manage lands to enhance wildlife habitat;
- continuously improve processes, practices, and products to reduce risks and impact throughout the product life cycle;
- promote open and public discussion of environmental issues and build alliances to develop sound public policies and regulations;
- educate, train, and motivate employees and executives to comply with the environmental commitment, and provide accountability by reporting regularly to the public.

2. Identification of Environmental Impacts

Du Pont is responsible for the release of greenhouse gases, including fluorochemicals, nitrous oxide, and carbon dioxide. The company also produces wastes which are hazardous to the environment and human health, if not dealt with properly. In addition, land filling of waste can result in contamination of the environment.

3. Identification of Regulatory Requirements

Du Pont recognizes its commitment to the Responsible Care program as a requirement for its membership in the CCPA. Du Pont recognizes the regulations for emergency response, research and development, manufacturing, transportation, distribution, and hazardous waste management, and incorporates them into its activities. Employees are expected to comply with all environmental legislation and regulations and are held accountable for failure to
do so.

4. Environmental Objectives and Targets

- reduce energy consumption by 15% from 1995 to 2005;
- reduce GHG emissions by 75% from 1990 to 2000;
- eliminate land filling of packaging waste by 2005;
- reduce all emissions to air, land, and water by 50% from 1990 to 2000.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

It is in Du Pont's environmental policy statement to educate and train employees about environmental management and the company's environmental commitment. Company and contracted employees are given information and training in handling of chemicals and other products in order to prevent accidental releases. Du Pont Canada attempts to increase all employees' knowledge and awareness of energy conservation and sustainability through the following:

- articles in corporate newsletters on energy conservation and sustainability;
- recognition of energy-related accomplishments in the company;
- courses and workshops on environmental management;
- distribution of information about energy efficiency to employees.

6. Emergency Preparedness and Response

The local site manager at each Du Pont facility is responsible for implementing a program to address emergency situations on-site and actively assist authorities in emergency response planning for neighbouring industry and the community. The company provides information about the hazards and risks of operations to employees, people on-site, and interested members of the community. This plan is to be modified on a regular basis until the company is certain that it will produce satisfactory results. There is also

an up-to-date, operational transportation emergency plan to deal with hazards, contain and clean up releases, provide technical advisors at accident scenes, and assist local emergency response forces.

7. Monitoring and Measurement of Operations and Activities

Each Du Pont facility conducts regular environmental audits to ensure that it is meeting minimum company standards and are making progress toward company goals and objectives. Audits are performed to assess risks to environment and safety, and strategies are developed to ensure that these risks are adequately managed.

Du Pont Canada Greenhouse Gas Emissions Per Unit of Product 1990-1996

	1990	1992	1994	1996	% change
Emissions per unit of product					
Unit CO_2 (kg/kg product)	1.03	1.43	1.42	1.23	+ 19.4
Unit N_2O (kg/kg product)	0.114	0.088	0.085	0.081	- 22.9
Absolute Emissions					
CO_2 (10^3 Mg)	312.9	519.4	607.8	560.6	+ 79.2
N_2O (10^3 Mg)	34.6	32.1	36.4	37.0	+ 6.9

Case Study: Dow Chemical Canada

1086 Modeland Road, P. O. Box 1012 Sarnia, ON N7T 7K7
David W. M. Short Environment, Health, and Safety Regulatory Affairs
(519) 339-5268

Background

Dow Chemical Canada was formed in 1942 when the Dow Chemical Company of Midland, Michigan invited the Canadian government to build a styrene plant in Sarnia, Ontario. Today, Dow Canada has annual sales of $2.3 billion and employs approximately 2 000 people in producing and selling chemicals and plastics. More than 40% of the chemicals and plastics manufactured by Dow Canada are exported to other countries. The company is a promoter of the Canadian Chemical Producers Association's Responsible Care ethic among associations, customers, suppliers, and policy makers.

Environmental Documentation

Dow Chemical Canada has been publishing annual Progress Reports on Environment, Health, and Safety Performance since 1988. These reports discuss Dow's environmental concerns and its plans for dealing with these concerns. The purpose of these reports is to make public information on the company's environmental performance so that it can be held publicly accountable for failing to meet expectations. These reports discuss such sustainable development and environmental management issues as air and water quality preservation, management of hazardous and non-hazardous wastes, and sustainable development goals for the future. These reports are available in hard copy format or on Dow Canada's Web site.

Dow Canada also submits annual reports to the VCR program to update its greenhouse gas emissions reduction efforts. These reports discuss baseline emissions, emission projections and goals for the future, actions to achieve improvements in GHG emissions and energy use, and results achieved at the date of the report.

Voluntary Challenge and Registry

Action Plan

Dow Canada submitted its action plan to the VCR program on September 18, 1995.

The company had planned the following activities to limit or reduce greenhouse gas emissions:

- providing information to employees on actions they can take in the workplace and at home to reduce greenhouse gas emissions;
- supporting research and development efforts to develop fuel cells, photovoltaics, and other renewable energy sources as alternative methods of electric power generation;
- reviewing energy consumption on a plant by plant basis and developing strategies to reduce energy use,
- cogeneration of electrical power and steam using natural gas; this process results in fewer GHG emissions than if electricity were purchased from a coal-based utility;
- reuse of energy; where possible, energy generated in one chemical process will be fed or recycled into another process.

Dow Canada's goal is to reduce its energy use per kilogram of product manufactured by 2% per year from 1994 to 2000. Dow believes that reducing its energy use will also reduce the amount of greenhouse gas emissions generated per kilogram of product manufactured.

Progress Report

Dow Canada submitted its most recent progress report on August 28, 1997. The company remains focused on its efforts to reduce GHG emissions through energy efficiency improvements. From 1990 to 1996, energy consumption per kilogram of product was reduced by 48.3% and CO2 emissions were reduced by 21.2%, from 2 040 kilotonnes (kt) to 1 608 kt. Dow projects that by 2000, CO2 emissions will be 1 726 kt per year, representing a 15.4% reduction from 1990. Emissions of all greenhouse gases were reduced by more than 50% from 1990 to 1996.

The planned expansion of the polyethylene plant in Fort Saskatchewan is expected to improve energy efficiency per unit of production by 6%. In addition, the promotion of home insulation products is expected to provide a cost-effective method of achieving energy efficiency and home greenhouse gas emission improvements. Finally, the elimination of CFCs as the blowing agent in Styrofoam has resulted in the elimination of 3 million tonnes of CO2 equivalent annually in CFC emissions.

Dow Chemical Canada Energy Efficiency (energy used per unit of production) and CO2 Emissions

Year	1990	1991	1992	1993	1994	1995	1996
Energy Use (million joules/kg)	8.49	8.25	8.10	6.57	5.40	4.27	4.39
% reduction since 1990	n/a	2.8	4.6	22.7	36.4	49.7	48.3
CO2 from operations (kilotonnes)	2 040	1 950	2 060	1 740	1 794	1 727	1 608
% reduction since 1990	n/a	4.4	-1.0	14.7	12.1	15.3	21.2

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Dow Canada has set an energy efficiency improvement goal of reducing energy use per kilogram of production by 20% from 1994 to 2005. From 1990 to 1997, Dow Canada improved its energy efficiency by more than 40%.

2. Reduction of Toxic Dispersion

Dow Canada's toxic emission reduction goal is to reduce chemical emissions to air and water by 50% from 1994 to 2000. From 1992 to 1997, emissions to air, land, and water were reduced by 37.6%, 81.0%, and 71.4% respectively. Over this same time period, the amount of waste sent off-site for treatment was reduced by 10.6%.

Through cogeneration, Dow Canada projects that 19 200 000 tonnes of greenhouse gas emissions will have been prevented from 1990 to 2000. The Varennes latex plant employees designed and installed a new system for unloading trucks containing liquid ammonia, thus reducing emissions by 45 kg per year. The Sarnia plant has created a River Separation Project to eliminate spills and harmful discharges to the St. Clair River by 2000. This initiative includes installing new sewers, separating sewer systems, and using reduce, reuse, and recycle techniques to better manage water usage. Since the project was announced in 1989, daily discharges of organic chemicals to the river have been reduced by 97%. The Sarnia plant has also made improvements to its production procedures that have reduced emissions of volatile organic compounds by 44% since 1994.

3. Enhancement of Material Recyclability

In 1997, Dow Canada recycled or reused 76% or non-hazardous wastes and 24% of hazardous wastes generated. Dow Canada is also a founding member of the Canadian Polystyrene Recycling Association (CPRA). During 1997, the CPRA collected, converted, and sold in excess of 2 500 tonnes of used polystyrene material. The Fort Saskatchewan site, in 1997, sent 60 tonnes of paper, 94 tonnes of cardboard, 2 960 tonnes of metal, 183 tonnes of lumber, and 44 tonnes of oil for recycling.

Recycled Materials at Fort Saskatchewan Site (tonnes per year)

Material	1992	1993	1994	1995	1996	1997	% change (1992-1997)
Paper	67	69	75	70	56	60	-10.4
Cardboard	95	76	102	55	68	94	-1.1
Metal	860	792	900	835	1 260	2 960	+244.2
Lumber	535	428	204	119	112	183	-65.8
Asphalt	2 852	3 206	2 138	2 674	2 630	3 660	+28.3
Oil	38	100	66	69	42	44	+15.8

4. Maximization of the Sustainable Use of Renewable Resources

The Power and Utilities Plant at the Fort Saskatchewan site has begun to use water resources more sustainably. In

1996, it began recycling storm and runoff water. This program is expected to reduce the amount of water taken from the river for use in plant process systems by 11%.

Environmental Management System

1. Environmental Policy Statement

The following is Dow Canada's policy on environment, health, and safety:

"At Dow, protecting people and the environment will be a part of everything we do and every decision we make. Each employee has a responsibility in ensuring that our products and operations meet applicable government or Dow standards, whichever is more stringent. Our goal is to eliminate all injuries, prevent adverse environmental health impacts, reduce wastes and emissions, and promote resource conservation at every stage of the life cycle of our products. We will report our progress and be responsive to the public."

2. Identification of Environmental Impacts

Dow Canada's chemical emissions are comprised of 95.2% to air, 4.7% to land, and 0.1% to water. The air emissions come from the following sources: 68.4% from process stack or vent emissions; 17.8% from fugitive emissions; 7.0% from storage, loading, and unloading operations; 4.3% from surface ponds and building ventilation; and 2.5% from accidental release. Land emissions are principally from land fill sources (98.0%) and an additional 1.5% are from accidental releases. Water releases are the result of controlled discharges 99.8% of the time, with only 0.2% being accidental. The greatest potential for contamination of water comes from the accidental release of process chemicals into storm water drainage systems. Each of Dow's manufacturing locations is committed to eliminating harmful discharges and spills by reusing, recycling, and treating process and drainage water.

3. Identification of Regulatory Requirements

Dow Canada promotes the Canadian Chemical Producers Association (CCPA) Responsible Care ethic and keeps all of its operations in compliance with the CCPA's codes of practice. In 1997, the Fort Saskatchewan site had 28 reportable air releases or license non-compliance. All of these incidents were investigated by the manufacturing units to determine causes, and corrective and preventative actions were taken. The Sarnia, Varennes, and Weston sites had no reportable air incidents. Fort Saskatchewan reported 3 releases to water to Alberta Environmental Protection. The Sarnia site reported two releases to water to the Ministry of Environment. The Varennes and Weston sites had no reportable water incidents.

4. Environmental Objectives and Targets

Dow Chemical Canada has 3 goals for the period from 1994 to 2005:

- reduce chemical emissions to air and water by 50%;
- reduce the amount of waste and waste water generated per unit of production by 50%;
- reduce energy use per unit of production by 20%.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

Dow Canada provides information to its employees on how they can improve energy efficiency in the workplace and at home. Employees can then use this knowledge in everyday activities. Dow Canada also participates in community events, works with schools, distributes newsletters, makes presentations, and hosts plants tours. These activities inform the public about Dow's operations and allow the public to raise any concerns it may have.

6. Emergency Preparedness and Response

In 1997, Dow Canada's transportation and primary containment incident rates were higher than in 1996. The company's performance on these fronts did not meet its own expectations, or those of the public. All Dow Canada facilities have undertaken projects to prevent environmental accidents and deal with them when they do occur. The Fort Saskatchewan site has an automated telephone calling system that informs neighbours of environmental incidents that have potential for off-site impact. Neighbours then receive follow-up letters explaining the incident and inviting them to call Dow for more information. Also, Dow Canada and the City of Varennes carry out joint field emergency simulations to test common industry-city emergency plans and identify areas needing improvement.

Dow Canada employees visit the sites of direct customers before first time delivery to assist and train them in handling Dow products, give information on disposal procedures, and provide them with complete and current safe handling and use information. Dow believes that this product stewardship will prevent accidents at customer sites.

7. Monitoring and Measurement of Operations and Activities

All Dow Canada sites have complete monitoring programs to identify and measure fugitive emissions that can leak from pumps, valves, and seals. As a result, these emissions have been reduced by over 150 tonnes since 1996. Dow conducts audits and assessments to determine overall conformance with company requirements, government regulations, and Responsible Care. Accidents and incidents are investigated and corrective action plans and follow-up visits are planned. Managers review the information from these studies and make decisions to ensure

continuous improvement in environment, health, and safety performance.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada
http://strategis.ic.gc.ca

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.5 AEROSPACE AND DEFENCE

Air Transport Association of Canada

255 Albert St., Suite 1100 Ottawa, ON K1P 6A9
(613) 233-7727 Fax: (613) 230-8648

The Air Transport Association of Canada (ATAC) has been the national service organization for Canada's commercial air transport industry since 1934. Today it represents 220 commercial carriers and suppliers located in all of the provinces and territories. ATAC members account for 95% of commercial air transport revenues in Canada. The ATAC fulfils its members needs in the following positions:

- an effective common voice in regulatory and legislative matters;
- a buffer for controversial issues;
- a focal point for industry leadership and coordination on operational issues;
- a cost-effective provider to common needs.

ATAC is active in many environmental issues, including noise, toxic emissions, glycol releases, and maintenance and disposal of hazardous materials and chemicals. The vice-president in charge of Flight Operations has been active in attending the proceedings of the Noise Management Committee at Toronto, Vancouver, Calgary, and Ottawa airports. The goal of the association has been to ensure that no new noise abatement procedures or restrictions are introduced. However, no plans have been implemented to assess and reduce the effect of noise on natural wildlife and human communities near airports. Glycol releases at airport facilities are another major environmental concern. ATAC and the air transportation industry have been meeting with Environment Canada to establish a reasonable science-based guidelines to control glycol disposal and clean-up. The present guidelines, which are issued by the Canadian Environmental Protection Act, are not legally binding but provide guidance for airlines and airport operators. Both the industry and Environment Canada have agreed that the present guidelines are outdated, but provincial and municipal laws make it difficult to amend the guidelines.

The Air Transportation Association of Canada does not directly implement guidelines and policies for environmental consideration by its members. ATAC respects the government regulations and expects its members to follow them. ATAC is working with government to develop policies and guidelines that are reasonable for the air transportation industry. ATAC is really a mediator between government bodies and the industry, rather than a regulatory body for the environment.

While many of the ATAC's members are participants in the Voluntary Challenge and Registry program, such as Air Canada, the association itself is not registered with the program. ATAC publishes very little documentation about environmental practices in the air transportation industry. In the association profile on its Web site, ATAC briefly discusses glycol emission efforts and meetings by the Noise Management Committees. However, there is no documentation on industry initiatives or achievements in environmental management. The Web site is the only source for information for environmental considerations by ATAC. The association does not have any form of environmental management system in place, but encourages its members to create such a system in order to be able to meet government guidelines.

Case Study: Air Canada

D. L. (Don) McLeay, Manager of Environmental Affairs
Centre Air Canada 24, Aeroport Int'l de Montreal
Dorval, Quebec H4Y 1C2
(514) 422-6824 fax: (514) 422-7606

Background

Air Canada is Canada's largest air carrier and, along with its regional airlines, serves over 118 destinations directly with a combined fleet of over 330 aircraft. The company is ranked as the 20th largest air carrier in the world by passenger revenue miles. In 1997, the company had operating revenues of $5.6 billion and $427 million in profit.

Environmental Documentation

The best source of information about Air Canada's environmental practices is the company's reports to the

Voluntary Challenge and Registry program. In these reports, Air Canada describes its activities to reduce greenhouse gas emissions and energy consumption. The company reports on the results it has achieved and announces new programs and emission reduction projections. Air Canada's Web site is mainly a vehicle for customers to book flights and get information about schedules and services offered to customers. No environmental management information is presented.

Voluntary Challenge and Registry

Action Plan

Air Canada submitted its Action Plan on August 19, 1996.

In Air Canada's ground facilities, the following activities are planned:

- installing up-to-date energy management control systems;
- replacing and upgrading old roofing insulation;
- installing more efficient lighting;
- ground vehicle and aircraft fleets will be upgraded and replaced with more energy efficient vehicles.

Air Canada has established 1990 as the base year for comparison of reductions in greenhouse gas emissions and energy consumption. The company has committed itself to reducing greenhouse gas emissions to 1990 levels by the year 2000. In order to meet this goal, Air Canada has committed to the following: reducing emissions from fuel combustion and non-combustion or "fugitive emissions"; and renewing the ground vehicle and aircraft fleets.

Progress Reports

Air Canada submitted its most recent progress report on October 9, 1997. The company remains committed to reducing energy consumption and GHG emissions through energy efficient practices, such as new technology, vehicle and aircraft fleet renewal, and improvement of ground facilities. From 1990 to 1995, total GHG emissions were reduced by 3%. For the air fleet, there was a 41% decrease in fuel consumption and GHG emissions, despite a 7% increase in the number of vehicles. Over the 1990 to 1996 period, fuel consumption per aircraft decreased from 18.36×10^6 L to 15.2×10^6 L.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Since 1995, despite a 7% increase in the number of gas-fuelled vehicles in the ground fleet, gas consumption decreased by 41%. However, this decrease is due a decrease in overall consumption per vehicle, rather than improved engine efficiency.

The aircraft fleet has also experienced a reduction in fuel consumption. While consumption increased by 5.8% from 1990 to 1996, the fleet size increased by 27.1%. This translates into an improvement in consumption per aircraft from 18.36×10^6 L in 1990 to 15.29×10^6 L in 1996, as described in the progress report.

2. Reduction of Toxic Dispersion

From 1990 to 1995, greenhouse gas emissions were reduced by 3% as a result of improved energy efficiency of upgraded fleet vehicles and operational procedures. In addition, more efficient criteria for operation of boilers and chillers has resulted in improved energy efficiency and reduced emissions of greenhouse gases and particulate matter.

Environmental Management System

1. Environmental Policy Statement

Air Canada has an environmental policy statement which sets guidelines for how the company will manage the environment and the possible impacts that its operations may have on the environment. The most significant aspects of the statement are the following:

- strive to develop and use technology that is environmentally sound;
- conduct ongoing audits and reviews of corporate policy and practices and take corrective action;
- communicate with customers, shareholders, and employees the importance of individual responsibility concerning environmental management;
- encourage employees, customers, and vendors to suggest improvements to current processes and procedures;
- ensure that environmental standards are achieved when purchasing new aircraft, equipment, and facilities.

2. Identification of Environmental Impacts

Air Canada's major impacts on the environment are emissions of greenhouse gases, such as carbon dioxide, methane, and nitrous oxide, which contribute to global warming. These emissions come mainly from two sources: fuel combustion and non-combustion or "fugitive emissions". These emissions come from aircraft, ground vehicles, and ground facilities.

3. Environmental Objectives and Targets

- develop new technology that is environmentally sound and has minimal impact on the environment;
- improve energy efficiency through modifications to aircraft and ground facilities and vehicles;
- upgrade aircraft fleet with engines that are 99.5% fuel efficient or greater.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

Air Canada not only makes it policy to communicate with employees, but also shareholders and customers to stress the importance of individual responsibility in environmental management. Equipped with this knowledge, these people are encouraged to consider the environment at home and in the workplace in order to minimize adverse impacts.

5. Monitoring and Measurement of Operations and Activities

Air Canada conducts audits and reviews of corporate policies and practices on an ongoing basis and takes corrective action to change these practices if they are not assisting in meeting environmental objectives.

Case Study: Orenda Aerospace Corporation
3160 Derry Road East Mississauga, ON L4T 1A9
Len Lewis
(905) 677-3250 x3297 fax: (905) 678-1538

Background

The Orenda Aerospace Corporation is a leading manufacturer of gas turbine and engine components. Over the past 11 years, Orenda has supplied more than 200 000 individual components to major original equipment manufacturers, as well as civil, military, and industrial end-users. Advanced repair and coating capabilities are applied in the repair and overhaul of a wide variety of commercial, military, and industrial engines, including engines that power F5 Freedom Fighters and F/A-18 Fighters. Since 1955, the Canadian Armed Forces have relied upon Orenda repair and overhaul capabilities to support the operation of six different types of aircraft. The company also has a contract with the United States Navy to repair and overhaul jet engine exhaust frames for F/A-18 Fighters. Orenda is currently developing reciprocating engines in the 500 to 700 horsepower range for eventual use in King Air, Beaver, Cessna, Piper, and Beech aircraft.

Environmental Documentation

Orenda Aerospace publishes only reports to the Voluntary Challenge and Registry program to update its greenhouse gas emission reduction efforts.

Voluntary Challenge and Registry

Action Plan

Orenda submitted its action plan to the VCR program on July 18, 1996. The company's focus in reducing greenhouse gas emissions is to improve the energy efficiency of its operations. Orenda experiences fluctuations in its energy consumption levels based on facility size, weather conditions, and production volume and mix.

Orenda has initiated many activities to reduce its energy consumption and improve overall energy efficiency, including the following:

- light oil and natural gas use has been reduced through reduction in heating of vacant space within company facilities;
- energy use during non-production periods has been minimized, which has reduced the overall non-production load;
- process improvement technologies have been implemented, including an annual capital investment of $1.5 million on new equipment that offers improved energy efficiency and less environmental impact;
- annual energy audits and monitoring on a company-wide basis.

Orenda has already achieved significant energy efficiency improvements. Since 1990, consumption of jet fuel, natural gas and light fuel oil, and electricity has been reduced by 60%, 17%, and 4% respectively. Although electricity use has been reduced by 4% since 1990, total consumption has actually been increasing since 1994 due to high energy demands for furnaces and heavy equipment, and an increase in

production in 1995. Energy efficiency has improved by 55% since 1990 as a result of increased productivity and reduced greenhouse gas emissions over a six year period.

Progress Report

Orenda submitted its most recent progress report to the VCR program on September 26, 1997. The company continues to pursue energy efficiency as a means of reducing greenhouse gas emissions. Orenda has started an employee suggestion program to encourage employees to help find improvements in work efficiency, quality, and safety. As a result of this program, timers were installed on lights so that they would be switched of at the end of shifts and only occupied areas would be lit. This energy conservation measure resulted in a 5.5% reduction in electricity use from 1995 to 1996. From 1990 to 1996, energy efficiency was improved by 46 5% and indirect CO2 emissions were kept below 1990 levels.

Orenda is projecting an increase production demands that will increase the amount of electricity consumed in the operation of heavy machinery. It is expected that, unless mitigate measures are taken, the amount of electricity purchased will likely exceed 1990 levels by 2000. Through boiler and electrical lighting retrofits, a 10% reduction in natural gas and oil consumption, and savings of 2-3 Gwh per year, are expected by the end of 1998. For the 1990 to 2000 period, the following targets have been set:

- reduce consumption of natural gas and light oil by 10%;
- reduce electricity consumption by 5%;
- maintain energy efficiency at 46 5% greater than 1990 levels to 2000.

Elements of Eco-Efficiency

1 Reduction in the Energy Intensity of Goods and Services

Since 1990, Orenda has reduced its consumption of jet fuel, natural gas and light oil, and electricity. This reduction in consumption has resulted in a 55% improvement in energy efficiency since 1990. Orenda spends $1.5 million annually to implement new energy efficient process technologies. Energy efficiency has also been improved by reducing energy use in vacant space and during non-production periods. In addition, timers have been installed on lights so that they are switched off at the end of shifts. Orenda has set an energy goal of improving energyefficiency by 46 5% from 1990 to 2000.

2 Reduction of Toxic Dispersion

Orenda has committed to reducing its emissions of greenhouse gases through the Voluntary Challenge and Registry program. The company is responsible for emissions of CO2, CH4, and N2O from the following sources: natural gas and oil combustion for space heating and process steam, consumption of aviation fuels for aircraft engine testing; and consumption of electricity for lighting and operation of heavy equipment. Orenda has set a goal of reducing its consumption of natural gas and light oil by 10% and electricity consumption by 5%. By reducing the amount of fuel consumed, Orenda projects that it will be able to reduce its emissions of greenhouse gases.

Environmental Management System

Orenda does not have an environmental management system in place. The company's participation in the VCR program is its only significant environmental management activity.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada

http //strategis ic gc ca

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.6 INFORMATION TECHNOLOGIES AND TELECOMMUNICATIONS

Information Technology Association of Canada
360 Albert St., Suite 1000 Ottawa, ON K1R 7X7
(613) 238-4822

The Information Technology Association of Canada (ITAC) is the voice of Canada=s rapidly growing information technology and telecommunications industry. Together with its partner organizations, ITAC represents more than 1 200 firms engaged in every sector of computing and telecommunications. The association=s mission is to identify and lead on issues that affect the industry and to advocate initiatives that will enable continued growth and development. Unfortunately, the environment is not among the issues considered by ITAC. The association does not publish any information on environmental practices in the information technology industry and has not created any guidelines or policies for its members concerning environmental management. ITAC does not participate in the VCR program, nor does its have any form of an environmental management system. From discussion with ITAC representatives, such consideration of the environment is not in the association=s plans for the near future. This is not to say that the entire information technology sector is lax on its protection of the environment. Many companies, such as Northern Telecom and IBM, have developed environmental management systems and are participants in the VCR program. These companies also publish extensive amounts of documentation about their environmental objectives, practices, and achievements and what they have planned for the future. At this point, ITAC seems more concerned with advancing the industry=s business interests and extending the reach of telecommunication and information networks than how such growth will affect the environment. Perhaps once the industry has more fully integrated itself into the business world the environment will become more of a concern to the association.

Case Study: International Business Machines (IBM) Canada
3600 Steeles Ave. East Markham, ON L3R 9Z7
Richard Mireault, Manager of Environment, Health, and Safety
(514) 534-6396

Background

IBM is in the business of developing, manufacturing, and selling advanced information processing products. These products include computers, microelectronic technology, software, and networking and related services. IBM was incorporated on June 15, 1911, in New York State, as the Computer Tabulating Recording Company. In 1997, IBM had revenues of $78.5 billion, net earnings of $6.1 billion, and assets of $81.5 billion.

Environmental Documentation

IBM publishes annual Environmental Progress Reports. These reports are available in hard copy format from the company, or on the company=s Web site. These reports discuss the following environmental issues:

- using technology to find solutions to environmental problems;
- IBM=s environmental management system;
- environmental costs and savings;
- environmental audits and compliance with regulations;
- pollution prevention measures;
- hazardous and non-hazardous waste management;
- remediation of negative environmental impacts;
- water and energy conservation;
- environmental research programs.

In addition to these environmental reports, the company=s Web site also contains the Corporate Environmental Policy. This policy outlines IBM=s position on environmental management and the expectations of all of its business units. IBM also submits annual reports to the VCR program to update its energy conservation and GHG reduction initiatives. These reports discuss reductions in CO2, methane, and nitrous oxide; improvements in energy efficiency; and energy conservation projects that have been initiated since the last report.

Voluntary Challenge and Registry

Action Plan

IBM submitted its action plan on September 27, 1995. IBM attempts to reduce its emissions of GHGs by reducing its energy consumption. IBM=s energy reduction initiatives include the following:

- installation of energy efficient lighting in plants and labs;
- installation of energy monitoring equipment and control devices;
- improvements to manufacturing and waste treatment processes;
- reduction of steam pressure in manufacturing processes;
- education of employees in energy efficiency improvement measures;
- performing energy audits to find areas in need of improvement.

From 1990 to the 1994, IBM achieved reductions of 18.6% in CO2, 15.9% in methane, and 9.9% in nitrous oxide. Over this same period, IBM achieved a 10.6% reduction in net energy consumption. The following improvements in energy consumption were achieved:

- a 6.0% reduction in consumption of electricity;
- a 20.4% reduction in consumption of natural gas;
- a 24.2% increase in consumption of light oil.

Progress Report

IBM submitted its most recent progress report on July 8, 1996. IBM has continued its GHG emission reduction and energy conservation efforts, with measurable success. From 1994 to 1995, energy consumption was reduced by 3.8%. In addition, CO2, methane, and nitrous oxide were reduced by 6.9%, 9.3%, and 13.9% respectively. The following energy consumption improvements have been achieved:

- electricity consumption decreased by 8.4%;
- natural gas consumption decreased by 24.6%;
- light oil consumption decreased by 32.6%.

IBM has planned future energy conservation initiatives. Air conditioning and lighting in office areas is going to be reduced and monitored. Lighting will continue to be replaced with energy efficient models. Chiller equipments will be replaced with more efficient equipment.

IBM TOTAL ENERGY CONSUMPTION BY FUEL TYPE (megawatt hours--MW.h)

Fuel Type	1990	1991	1992	1993	1994	1995	% change (1990-95)
electricity	313 509	321 983	318 385	301 889	294 593	287 114	-8.4
natural gas	163 206	168 761	148 973	134 202	129 932	123 073	-24.6
light oil	4 571	1 605	2 264	800	5 675	3 082	-32.6
TOTAL	**481 286**	**492 349**	**469 622**	**436 891**	**430 200**	**413 989**	**-14.0**

IBM GREENHOUSE GAS EMISSIONS (1990-1995)

Emission	1990	1991	1992	1993	1994	1995	% change (1990-95)
CO2 (tons)	30392	30605	27240	24 211	24 732	23 012	-24.3
CH4(kg)	458	442	398	346	385	349	-23.8
N20 (kg)	476	416	388	320	429	369	-22 5
TOTAL	**31 326**	**31 463**	**28 026**	**24 877**	**25 546**	**23 730**	**-24.2**

IBM ENERGY CONSERVATION BY FUEL TYPE (MW.h)

Fuel Type	1990	1991	1992	1993	1994	1995
electricity	7 598	3 451	6 521	9 911	4 822	7 239
natural gas	3 738	4 421	4 711	6 766	6 083	2 760
light oil	0	0	0	0	0	0
Total	**11 336**	**7 872**	**11 232**	**16 667**	**10 905**	**9 999**

Elements of Eco-Efficiency

1. Reduction of the energy intensity of goods and services.

IBM has set a goal of achieving annual energy savings equivalent to 4% of the company=s yearly electricity and fuel use. Over the past 5 years, IBM=s energy conservation efforts have saved over 3.75 billion KW.h of electricity and $260 million in energy costs. From 1990 to 1995, energy consumption was reduced by 14% from 481 286 KW.h in 1990 to 413 989 KW.h in 1995.

IBM has developed an Adaptive Battery Life Extender (ABLE) which has made possible a 16-20% reduction in the energy used by a 2.5 inch hard disk drive in IBM Think Pads. IBM has also developed semi-conductor technology that has established the 2.5 volt operating power as an industry standard for circuits. The lower

operating power represents a 25% reduction in energy consumption from previous generation circuits.

2. Reduction of Toxic Dispersion

IBM is a participant in the ARET program and is making efforts to reduce or eliminate its emissions of toxins identified under the program. In 1996, the company=s hazardous waste generation declined by 9.7% from 1995. From 1995 to 1996, IBM reduced the amount of materials its sends to land fill by 15%. IBM has also been involved in reducing its greenhouse gas emissions. From 1990 to 1995, CO2 emissions decreased by 24.3% and methane emissions decreased by 23.8%.

3. Enhancement of Material Recyclability

- IBM requires that its paper stock be 50% recycled fibre, including 20% post-consumer fibre;
- from 1995 to 1996, the company increased its use of recycled plastics in its products by 72%;
- dismantling and recycling expertise have reduced the amount of material sent to land fill to only 6% of the total waste actually gathered;
- 78% of the hazardous waste generated in 1996 was recycled;
- 68% of the non-hazardous waste generated in 1996 was recycled, 3% more than in 1995.

Environmental Management System

IBM has had an environmental management system in place for more than 25 years as a means of achieving consistent environmental leadership. In 1996, IBM decided to pursue ISO 14 0001 registration covering all of its worldwide manufacturing and development operations.

1. Environmental Policy Statement

The following are the elements of the company=s environmental policy statement:

- provide a safe and healthful workplace and ensure that personnel are properly trained and have appropriate safety and emergency equipment;
- be an environmentally responsible neighbour in the communities where it operates, and act promptly and responsibly to correct incidents or conditions that endanger the environment;
- conserve natural resources by reusing and recycling materials, purchasing recycled materials, and using recyclable packaging and other materials;
- use development and manufacturing processes that do not adversely affect the environment;
- ensure the responsible use of energy throughout the business, including conserving resources, improving energy efficiency, and giving preference to renewable rather than non-renewable energy sources where feasible;
- meet or exceed all applicable government requirements and voluntary requirements to which IBM subscribes. Set and adhere to stringent requirements of its own no matter where in the world the company does business;
- conduct rigorous audits and self-assessments of IBM=s compliance with this policy, measure progress of IBM environmental affairs performance, and report to Board of Directors.

Every employee is expected to follow this policy and report environment, health, or safety concerns to IBM management.

2. Identification of Environmental Impacts

Chemicals are used in the company=s research and development and manufacturing processes and their use, treatment, and disposal must be properly managed. IBM=s consumption of energy also results in releases of greenhouse gases, such as CO2, methane, and nitrous oxide. The company performs environmental impact assessments to assess material, chemical, and energy use, waste generation, emissions to air, and discharges to water for manufacturing processes. This process helps to identify and evaluate potentially adverse environmental effects and devise plans to deal with them.

3. Identification of Regulatory Requirements

IBM requires that every employee and contractor of the company abides by the environmental policy statement. It is also an element of the policy statement that IBM=s operations meet or exceed all government regulations and any of its own internal regulations. This requirement seems to have been met as the company paid only $135 in fines in 1996, for exceeding the total suspended solids limit for sanitary waste discharge.

4. Environmental Objectives and Targets

- reduce the amount of material sent to land fill through reuse, recycling, and reduction;
- reduce energy use by 4% of the company=s yearly electricity and fuel use;
- continually improve operations and processes to reduce energy consumption and GHG emissions.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

IBM promotes energy conservation to its employees through: energy efficiency bulletins and brochures;

hosting of energy efficiency information days at facilities; and involving employees in the energy efficiency audits.

6. Emergency Preparedness and Response

It is a company requirement that each IBM location have a documented incident prevention program with provisions for preventing environmental incidents or their recurrence, as well as reporting procedures. It is also stipulated in the policy statement that IBM units be prompt and responsible in correcting incidents or conditions that endanger health, safety, or the environment.

7. Monitoring and Measurement of Operations and Activities

IBM measures its environmental performance against internal and external requirements through a comprehensive set of audit programs. Many facilities undergo corporate internal audits, which take 2 to 3 weeks. They address both regulatory and internal IBM requirements in environmental, chemical management, and health and safety programs. The results of the audit are communicated to top management, and follow-up action plans are established. IBM also has an Environment Incident Reporting System (EIRS), which is a computer system used to report management fines, releases, or incidents of non-compliance.

Case Study: Northern Telecom

8200 Dixie Road, Suite 100 Brampton, ON L6T 5P6
Ray Patterson, Manager of Environment
(905) 863-2827 Fax: (905) 863-8412

Background

Northern Telecom was founded in 1895 and has its corporate headquarters in Brampton, Ontario. Worldwide, the company employs approximately 73 000 people and had revenues of $15.5 billion in 1997, with net earnings of $812 million. Nortel designs, manufactures, and supplies complete networks for local exchange carriers, long distance carriers, cable and utility companies, wireless operators, enterprise networks, and governments.

Environmental Documentation

Nortel reports on its environmental practices within its corporate annual reports, and has been reporting on its environmental progress since 1993. These reports contain the following information:

- environmental targets for pollution, waste disposal, and energy efficiency to be achieved;
- reductions in emissions and releases to air, land, and water;
- reductions in waste sent to land fill;
- audits and compliance with regulations.

Nortel also publishes separate Environment, Health, and Safety reports to discuss what the company is doing to protect the environment, its employees, and the public. Specific site programs are discussed and evaluated for their success in meeting environmental objectives. In addition, future plans and initiatives are announced and projections for improvements made.

Nortel=s Web site does not have a separate environmental section for reporting on its sustainable development and environmental management activities. However, the annual report is on the site and, therefore, the environmental documentation within. News releases are also posted on the site and any releases on the environment are available to anyone on the Internet.

Voluntary Challenge and Registry

Action Plan

While Nortel has registered with the VCR program, it has yet to submit an action plan.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

Nortel has been working to reduce its energy consumption. While production increases have made it difficult to achieve absolute reductions in energy use, reductions have been achieved:

- in 1997, Nortel reduced its energy use by 0.2% from 1996 levels; when this reduction is considered on a per unit of production basis, the reduction is actually 15%;
- from 1993 to 1997, absolute energy use has been reduced by 18%, which translates into a 51% reduction on a per unit of production basis.

2. Reduction of Toxic Dispersion

- total pollution releases to land, air, and water decreased by 13% from 1993 to 1997;

• air emissions from 1996 to 1997 were reduced by 5% and toxic water discharges by 6% per unit of production;
• hazardous wastes sent off-site to land fills decreased by 19% from 1996 to 1997;
• non-hazardous wastes sent off-site to land fills decreased by 12% from 1996 to 1997.
• absolute emissions of greenhouse gases have decreased by 26% since 1993; on a per unit of production basis, this is a 56% decrease.

3. Enhancement of Material Recyclability

• in 1997, 58% of all waste generated by Nortel was recycled;
• in 1997, 52% of all hazardous waste generated by Nortel was either recycled, reclaimed, or treated.

4. Maximization of the Sustainable Use of Renewable Resources Nortel has been using forest and water resources sustainably:

• from 1996 to 1997, paper purchases decreased by 1%, or 16% on per unit of production basis;
• from 1996 to 1997, water consumption decreased absolutely by 30%, which translates into a 34% decrease since 1993.

Environmental Management System

While Nortel does have an environmental management system in place, there is no binding policy statement which gives broad guidelines and objectives for environmental management. The requirements of the EMS are what guide Nortel facilities and their activities.

1. Identification of Environmental Impacts

• releases of pollutants to air, water, and land negatively impact upon our natural resources and animal and plant habitat;
• land filling of hazardous and non-hazardous wastes;
• consumption of water and energy for business operations puts stress on natural resources.

2. Identification of Regulatory Requirements

Nortel makes compliance with all relevant legislation the minimum expectation by the company. However, Nortel is continually striving to exceed mere compliance by setting its own internal standards. All business units within the company are responsible for taking action to meet these standards.

3. Environmental Objectives and Targets In 1994, Nortel announced four environmental targets to be achieved by 2000, from a 1993 base year:

• reduce pollutant releases (air, water, hazardous wastes) by 50%;
• reduce solid waste sent for disposal by 50%;
• reduce paper purchases by 30%;
• improve overall energy efficiency by 10%.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

Nortel employees participate in Earth Day activities and hold community-oriented activities. Programs include tree planting and alternative transportation lessons and challenges. The focus of these activities is on environmental action and awareness-building.

5. Emergency Preparedness and Response

While Nortel has no strict requirements nor guidelines for emergency preparedness and response, most facilities have put in place plans, equipment, and personnel to address issues such as spills, fires, and other potential emergencies. The goal is to minimize the adverse impact of these occurrences on the environment and the health of employees and the public.

6. Monitoring and Measurement of Operations and Activities

Nortel conducts audits of its manufacturing and research plants every two years. The auditors are seeking to ensure that all facilities are meeting the requirements of Nortel=s environmental management guidelines. The auditors also look for areas of possible improvement in energy efficiency and pollutant emissions. The objective of these audits is to ensure that consistent programs based on risk assessments are incorporated into everyday business management activities.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Canada
http://strategis.ic.gc.ca

Author - Industry Canada - Strategic Policy Branch

Publication Date - 2000-03-31

3.7 AUTOMOTIVE AND TRANSPORTATION

The Automotive Industries Association of Canada
1272 Wellington Street Ottawa, ON K1Y 3A7
Dean Wilson
(613) 728-5821 Fax: (613) 728-6021

Background

The Automotive Industries Association of Canada (AIA) is a national organization which represents approximately 1400 companies from the automotive industry. The AIA is a voice in the federal and provincial governments: it monitors pending legislation and proposed regulations which will affect the automotive industry; it informs its members of regulatory amendments and/or initiatives; and it works pro-actively with elected and non-elected officials to resolve issues under provincial or federal jurisdiction. The AIA is also a public relations voice. It deals with the media and consumers to raise public awareness of the automotive industry.

The AIA offers education and training services to employees of member companies so that they can upgrade their skills and stay current with changes in the marketplace. In addition, the association also performs market research, industry surveys, and data gathering, and provides analysis of this data. This keeps companies informed of what is going on in the industry and helps them prepare for the future.

Environmental Documentation

The AIA has *Automotive Waste Management Guidelines*, which instruct its members on how to deal with their waste and toxic materials. This document provides the automotive industry with practical advice on classifying, handling, storing, and disposing of automotive waste, and responding to spills. This is the only documentation published by the AIA on environmental management. It is only republished when it becomes outdated or new legislation is passed in government concerning waste management.

Voluntary Challenge and Registry

The Automotive Industries Association of Canada does not participate in the Voluntary Challenge and Registry program.

Elements of Eco-Efficiency

1. Reduction of Toxic Dispersion

The AIA encourages its members to make every effort to collect and segregate all wastes that they generate. Where possible, wastes are to be prevented from entering interceptors, sewer systems, or the natural environment. The AIA also stresses that wastes should be stored in impermeable containers and stored on an impermeable surface away from sewers, drains, or watercourses, and not accessible by the general public.

2. Enhancement of Material Recyclability

The AIA gives preference to waste reduction, reuse, and recycling over waste disposal and destruction. Off-site disposal or destruction of waste is only to be considered when no other alternatives exist. In addition, to minimize the amount of refuse generated, all recyclable materials should be sorted and sent to a recycling facility or recycling collection depot.

Environmental Management System

1. Environmental Policy Statement

The Automotive Industries Association=s policies for environmental management are in the form of the Automotive Waste Management Guidelines. This document represents an attempt by the AIA to improve the industry=s waste management techniques so that the negative impact that automotive waste has on the environment can be reduced. This document also stresses compliance with federal and provincial legislation and regulations. This document is available to members of AIA for $49 and to the public for $99.

2. Identification of Environmental Impacts

The AIA recognizes that poor storage and disposal of automotive waste can result in contamination of the natural environment. Chemicals and other wastes can end up in water courses and landfills and cause damage to human health, as well as the environment. If waste is incinerated, the emissions cause air pollution and can damage the atmosphere.

3. Identification of Regulatory Requirements

The AIA includes the federal and provincial regulations for waste management in its Automotive Waste Management Guidelines and encourages the automotive industry to follow them. These include regulations for general handling, storage, transportation, disposal, spills, and record keeping of wastes. The AIA insists that member companies comply with municipal by-laws, and federal and provincial regulations, for waste water discharge, garbage disposal, and waste storage.

4. Environmental Objectives and Targets

- to have member companies comply with municipal, provincial, and federal regulations for waste management, storage, and disposal;
- to have each member company develop a waste management program which meets the following criteria: preparing of standard operating procedures for handling wastes; ensuring that all wastes have been registered when required by regulations; ensuring that facility equipment complies with regulations and improves waste management practices; and

ensuring that all storage areas comply with regulations.

5. Proper Training and Education of Employees, Contractors, and the Interested Public

The AIA encourages member companies to provide proper education and training for employees which are responsible for the storage, disposal, and spills of waste. The hope is that proper training will result in minimal damage to the environment by automotive wastes and that the amount of waste produced will be reduced.

6. Emergency Preparedness and Response

The AIA encourages its member companies to create spill response plans that are specific to their operations. In addition, the AIA suggests the following practices after a spill:

- eliminate all sources of ignition when necessary;
- prevent any additional discharge of the spilled material;
- prevent spills from entering an interceptor, sewer, or the natural environment;
- complete an incident report which includes: time, date, and location of the spill; any injuries and/or damages to the environment; the response activities of the company; and the corrective action taken to prevent reoccurrence.

7. Monitoring and Measurement of Operations and Activities

According to the AIA=s Automotive Waste Management Guidelines, waste containers are to be checked at regular intervals for stress cracks, corrosion, coating deterioration, and other damage, in order to prevent release of materials to the environment. Damaged containers should be repaired or replaced before leaks do occur. Reports should also be kept for company record and so that the company can prove its compliance with regulations.

Case Study: General Motors of Canada Limited
1908 Colonel Sam Drive Oshawa, ON L1H 8P7
Bryan Swift, Manager of Government Relations
(905) 644-1996 Fax: (905) 644-3830

Background

General Motors of Canada is Canada=s largest industrial manufacturer and exporter, with a workforce of over 35 000 employees across Canada. The company was founded in 1918 and by 1926 annual production had topped 100 000 vehicles. GM operates nine manufacturing plants, as well as parts distribution, sales, and service offices. In 1990, GM Canada produced its 15 millionth vehicle.

Environmental Documentation

GM Canada publishes a substantial amount of environmental information on its Web site, including the following:

- the company=s environmental policies, organization, and management;
- the company=s National Pollutant Release Inventory;

- tips to vehicle owners for improving energy efficiency and reducing GHG emissions.

GM Canada submits annual reports to the VCR program, which discuss the company=s action plans to reduce energy consumption and GHG emissions. The following topics are specifically addressed:

- the company=s commitment to the environment;
- GM=s environment principles and policy statement;
- energy use in GM Canada facilities;
- employee awareness and education;
- energy conservation projects that have been completed and are forecasted for the future.

Voluntary Challenge and Registry

Action Plan

GM Canada submitted its action plan to the VCR program on December 5, 1996.

The company has set a target of reducing energy consumption by 1% per year from 1990 to 2000. From 1990 to 1995, overall energy consumption reduced by 19.6%. The average energy consumption by a GM vehicle decreased by 11% from 1990 to 1995. GM Canada is also striving to reduce its GHG emissions to, or below, 1990 levels by 2000. On-site generation of CO2 decreased by 28% from 1990 to 1995.

Energy audits are performed in facilities to identify inefficiencies and make improvements. Technologies, such as solar walls and thermal ice storage units, are being implemented to shift peak electrical loads and help save energy throughout the company. One of the most effective projects has been the Slab Heating Project. Receiving docks and slabs require heating to keep them free of ice and snow to facilitate safe truck unloading. The heating is often manually-controlled, resulting in excessive energy use and costs. Revisions are being made to centrally monitor the pad heaters, which will result in significant power reductions. GM Canada is also planning to implement its OBD II monitoring system into its new vehicles. The system searches for deterioration in a vehicle=s power train operation and provides detailed diagnostic information for technicians. Improvements can then be made to improve fuel efficiency and reduce emissions of GHGs.

Progress Report

GM Canada submitted its most recent progress report on October 9, 1997. The company=s focus remains on demonstrating its commitment to the environment and sustainable development. GM Canada cannot accurately predict how its energy consumption and emissions of greenhouse gases will change in the future because they are directly related to production. Production depends on consumer demand, consumer preference, and competition for product allocation.

Nevertheless, GM Canada has achieved notable improvements. From 1990 to 1996, total energy consumption decreased by 34% and the on-road vehicle stock=s fuel efficiency improved by 8%. Over this same period, on-site generation of CO2 decreased by 23.9%. GM Canada is going to continue to work to keep GHG emissions below 1990 levels and improvements in fuel efficiency will be a major factor in limiting emissions. A wide range of initiatives are going to be implemented to meet these goals, including the following:

- vehicle weight reductions;
- improvements to tire technology;
- fuel injection and combustion improvements;
- friction reduction in lubricants, engine internals, and brakes;
- vehicle aerodynamic improvements;
- development of alternative fuels, such as electricity and natural gas.

Elements of Eco-Efficiency

1. Reduction in the Energy Intensity of Goods and Services

GM Canada has a goal of reducing energy consumption by 1% per year from 1990 to 2000. Since 1990, total energy consumption has been reduced by 17%. Energy consumption per vehicle produced has been reduced by 16.5%. The energy efficiency of the GM Canada vehicle stock has improved by 8% since 1990.

2. Reduction of Toxic Dispersion

- on-site generation of CO2 has been reduced by 25% since 1990;
- since 1994, emissions of hydrocarbons, carbon monoxide, and nitrogen oxides have been reduced by 98%, 96%, 90% respectively;
- GM Canada has pioneered the used of water-based vehicle paints, which release fewer vapours than solvent-based points; using water-based paints has lowered hydrocarbon emissions at assembly plants by 70% since 1977;
- GM Canada was the first auto manufacturer in Canada to provide dealers with CFC recycling units to prevent freon from being vented during routine servicing of vehicle air conditioner.

3. Enhancement of Material Recyclability

All of the scrap steel from GM Canada stamping plants is recycled, as is all of the fuel-stock cast iron and 85% of the aluminum used in GM Canada foundries.

Environmental Management System

1. Environmental Policy Statement

In 1991, the GM Board of Directors adopted the GM Environmental Principles, which guide GM=s activities in environmental management and sustainable development. The principles are the following:

- commitment to actions to restore and preserve the environment;
- commitment to reducing waste and pollutants, conserving resources, and recycling materials at every stage of the product life cycle;
- continue to participate actively in educating the public regarding environmental conservation;
- continue to work with governmental entities for the development of technically sound and financially responsible environmental regulations;
- continually assess the impact of GM plants and products on the environment and the communities in which GM operates,

with a goal of continuous improvement.

2. Identification of Environmental Impacts

GM Canada has a National Pollutant Release Inventory (NPRI), which is an initiative to collect data on releases, transfers, and recycling of 176 chemicals from facilities that manufacture, process, or use them. These data are then used to support various environmental initiatives, such as pollution abatement and prevention.

Carbon dioxide is the only greenhouse gas generated by stationary GM sources. Methane and nitrous oxide are emitted in small amounts from waste water treatment facilities. GM Canada assembly operations account for 70% of the company=s energy consumption and, therefore, are major contributors to the company=s GHG emissions.

3. Environmental Objectives and Targets

- achieving continuous improvement in energy consumption and greenhouse gas emissions;
- reduce energy consumption by 1% per year from 1990 to 2000;
- stabilize GHG emissions at 1990 levels by 2000.

4. Proper Training and Education of Employees, Contractors, and the Interested Public

GM Canada educates its employees about energy conservation and encourages them to generate ideas on how the company can achieve additional energy savings. Communications and awareness initiatives include an energy newsletter, energy workshops, technology transfer seminars, and an annual conference where energy coordinators across GM meet and exchange ideas. In addition, AEnergy Awareness Week@ is conducted each spring to inform and educate employees of the benefits associated with energy efficiency.

Case Study: Chrysler Canada
2450 Chrysler Center Windsor, ON N8W 3X7
Paul Hansen, Manager of Environmental Affairs
(519) 973-2864 Fax: (519) 973-2613

Background

Chrysler Canada is a wholly-owned subsidiary of the Chrysler Corporation. The company has over 13 000 employees in the areas of marketing, sales, and manufacturing with its head office in Windsor, Ontario. There are 5 manufacturing plants, all of which are in Ontario, and 600 dealerships. Over 225 000 vehicles are sold on an annual basis, and in 1997, the company had total revenues of $16.7 billion and total assets of $7.2 billion.

Environmental Documentation

In Chrysler Canada= s Annual Reports, there is a section on the company=s Corporate Environmental Policy and objectives. This section outlines the goals that the company has for environmental management. For example, in the 1997 Annual Report, the company reports on its contribution to the creation of a 44 km nature trail in Essex County, which is to be used as a recreational and

educational tool.

Chrysler Canada=s Web site is a good source of information on the company=s sustainable development and environmental practices. The site contains information on the company=s initiatives, including energy reduction, electric vehicles, ozone protection, life cycle management of products, and vehicle recycling.

Chrysler Canada has submitted an Action Plan and one Progress Report to the Voluntary Challenge and Registry program. These reports contain the following information:

- goals for energy and greenhouse gas emissions reduction;
- the Corporate Environmental Policy;
- energy and environmental programs at facilities;
- corporate partnerships in environmental management.

Voluntary Challenge and Registry

Action Plan

Chrysler Canada submitted its Action Plan on August 16, 1996.

The following activities are expected to limit or reduce emissions:

- replacing conventional lighting in facilities with highly efficient fluorescent lighting that consumes 50% less power;
- upgrading insulation in buildings to limit heat loss and energy use;
- improving fuel efficiency of the company=s vehicle fleet;
- developing alternative fuel vehicles, such as propane, natural gas, and flexible fuels.

Chrysler Canada has collaborated with the Canadian Auto Workers Union to form a Joint National Environmental Committee. The Committee=s goal is to promote awareness and environmental education of all Chrysler Canada employees. The objectives of the Committee are the following:

- encourage employee participation in all existing and future environmental, reduction, reuse, recycling, and energy conservation programs adopted by Chrysler;
- develop and issue educational materials to employees and their families to inform and encourage participation at work and in the community;
- raise public awareness of Chrysler=s environmental achievements.

A new program that has been created by Chrysler is Van Pooling. In this system, 7-15 commuters ride to work each day in a passenger van. This program is helping to reduce auto emissions and traffic congestion. There are currently 38 full size vans and 49 minivans used by 730 employees.

Chrysler Canada has established 1990 as the base year for calculation of emission reductions. The greenhouse gas emission reduction goal is to reduce emissions by 25% from 1990 to 2000. Another goal is to increase energy efficiency per vehicle produced by 1% per year from 1990 to 2000. However, Chrysler Canada is actually projecting a 25% energy efficiency improvement over this time

period.

Elements of Eco-Efficiency

1. Reduction of the energy intensity of goods and services.

Process and technology improvements have allowed Chrysler Canada to reduce the energy input per vehicle produced by 13% from 1990 to 1995. Since 1990, fuel efficiency in passenger vehicles has increased by 6%. However, fuel efficiency in light duty trucks has decreased by 4% due to increased demand for powerful utility vehicles. These reductions and others have been the results of the following initiatives:

- lighting changes in facilities to more efficient fluorescent tube lighting, which consumes 50% less power than the conventional lighting;
- improvements in insulation in facilities has reduced the amount of energy required for heating and cooling;
- switching from hydraulic to electric manufacturing robots.

2. Reduction of Toxic Dispersion

One of Chrysler Canada=s main goal for the environment is to reduce greenhouse gas emissions per vehicle produced by 25% of 1990 levels by 2000. Because of increases in demand and production, it would be extremely difficult and not economically feasible to reduce absolute emissions to 1990 levels. Chrysler Canada projects that absolute emissions of carbon dioxide, methane, and nitrous oxide will increase by 33.1% from 1990 to 2000. Notwithstanding, it is projected that there will be absolute reductions in emissions from 1996 to 2000. The company projects that carbon dioxide emissions will be decreased by 13.2%, methane by 3.9%, and nitrous oxide by 4.1%. These reductions will result in a total absolute reduction of these gases of 13.1% from 1996 to 2000.

3. Enhancement of Material Recyclability

Currently, 75% of vehicles by weight produced by Chrysler Canada is recyclable. By addressing the recycling issue in the design stage of vehicles, Chrysler is attempting to reduce this percentage even further. Components of new vehicles, such as instrument panels, are being designed for quick and easy disassembly so that the materials can be readily sorted, separated, and prepared for recycling.

4. Increase in the Service Intensity of Goods and Services

Through recycling of materials and using already recycled materials in its new vehicles, Chrysler Canada is increasing the service intensity of these materials. Rather than land filling these materials, they are reproduced and used again in new products.

Environmental Management System

1. Environmental Policy Statement

Chrysler Canada implemented a Corporate Environment Policy and Procedures statement in 1989, which was updated in 1993 to include new issues, such as pollution prevention. The formal statement is the following:

To ensure that all Chrysler business operations in Canada, as they relate to facilities, are conducted in a manner consistently demonstrating due regard for protection of the environment, fulfilling all legal requirements and demonstrating a level of concern consistent with responsible corporate citizenship.

The policy elements of the statement provide for the review of the environmental management system and its objectives, compliance with regulations, and presentation of the system elements to employees. These elements include the following:

- to actively pursue compliance with legal requirements and other regulations;
- to report environmental issues to management;
- to communicate throughout Chrysler the importance of protecting the environment;
- to recognize environmental planning as a key element of the Business Plan;
- to maintain a cooperative responsible liaison with all levels of government to protect the environment.

2. Environmental Objectives and Targets

- increasing the percentage of each vehicle by weight that can be recycled from the current 75%;
- reducing greenhouse gas emissions per unit of production by 25% by 2000 from the 1990 level;
- increasing energy efficiency per vehicle produced by 1% per year from 1990 to 2000.

3. Proper Training and Education of Employees, Contractors, and the Interested Public

Employees are informed of the environmental policy statement and the elements of this statement so that employees can take them into consideration in their daily tasks. In addition, Chrysler Canada formed the Joint National Environmental Committee with the Canadian Auto Workers union. A goal of this Committee is to develop and issue educational materials to employees and their families to inform them of and encourage participation in environmental management at work and in the community.

Chrysler Canada Energy Consumption (millions of BTUs)
*1996-2000 projected

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Natural Gas	3 342 974	3 228 775	4 034 966	4 358 298	4 327 573	4 317 458	5 540 015	4 814 925	4 766 610	4 718 780	4 671 429
Electricity	1 515 680	1 251 422	1 387 518	1 520 371	1 520 462	1 441 505	1 848 969	1 830 415	1 812 048	1 793 865	1 775 865
Fuel Oil	0	123	75	2 376	9 446	1 691	0	0	0	0	0
Total	4 858 654	4 480 320	5 422 558	5 881 045	5 857 481	5 760 654	7 388 984	6 645 340	6 578 658	6 512 645	6 447 294

Analysis

	Change 1990-2000*	Change 1996-2000*	Change 1990-1995	Change 1993-1995
NATURAL GAS	+39.7%	-16.0%	29.2%	-0.9%
ELECTRICITY	+17.2%	-4.0%	-4.9%	-5.2%
FUEL OIL	0	0	100%	-28.8%
TOTAL	+32.7%	-12.7%	+18.6%	-2.0%

Chrysler Canada Greenhouse Gas Production (thousands of tonnes)
*1996-2000 projected

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Carbon Dioxide	240.85	223.42	276.40	296.71	292.62	288.11	369.49	330.70	327.39	324.10	320.85
Methane	0.43	0.35	0.42	0.44	0.42	0.40	0.51	0.51	0.50	0.50	0.49
Nitrous Oxide	1.60	1.32	1.58	1.66	1.58	1.50	1.93	1.91	1.89	1.87	1.85
Total	242.87	226.09	278.40	298.81	294.63	290.01	371.94	333.12	329.78	326.47	323.19

Analysis

	Change 1990-2000*	Change 1996-2000*	Change 1990-1995	Change 1993-1995
CARBON DIOXIDE	+33.2%	-13.2%	+19.6%	-2.9%
METHANE	+14.0%	-3.9%	-7.0%	-9.1%
NITROUS OXIDE	+15.7%	-4.1%	-6.3%	-9.6%
TOTAL	+33.1%	-13.1%	+19.4%	-2.9%

Table of Contents

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.8 Association and Company Web Sites

Company	Internet Address	Description of Site
Air Canada Ltd	www aircanada ca	Mainly a vehicle for booking flights and getting schedule information.
Alcan Aluminum Ltd	www alcan com	Company=s environmental policy statement, description of the company=s EMS, a discussion of its recycling and waste reduction efforts, and the company=s environmental achievements.
B C Hydro	www bchydro com	Electronic copies of annual environment reports. Environment policies and priorities
Chrysler Canada	www chrysler com	Energy reduction initiatives, life cycle management, vehicle recycling.
Consumers Gas Ltd	www consumersgas com	Only the Statement of Environmental Principles. No SD activities.
Dofasco Inc	www dofasco ca	Position papers on climate change. VCR submissions.
Dow Chemical Canada	www dow com	Annual progress reports on environment, health, and safety.
Du Pont Canada	www dupont ca	Environment policies and objectives Emission projections for 2000 and beyond. Responsible Care commitment.
E B Eddy Forest Products	www ebeddy com	No environment or SD info available.
General Motors of Canada	www gmcanada com	Environment policies and the national pollutant release inventory.
IBM	www ibm com	Copies of environment progress reports and corporate environmental policy.
Inco Ltd	www incoltd com	Information on metals recycling and land reclamation projects.
Northern Telecom	www nortel com	No separate environment information. Contains electronic copy of annual report and limited environment info within.
Orenda Aerospace Corporation	www orenda com	No sustainable development or environmental documentation.
Shell Canada	www shell ca	Electronic copy of SD Report.
Suncor Energy Inc	www suncor com	Approaches to dealing with GHG emissions and global warming.
Weyerhaeuser	www weyerhaeuser com	Environment policies and goals. Electronic copies of Environment Reports.
Association	**Internet Address**	**Description of Site**
Air Transport Association of Canada	www atac ca	No environment information available
Automotive Industries Association of Canada	www aftmkt com/ associations/AIA/	No environment information available.
Canadian Association of Petroleum Producers	www capp ca	Position on climate change and its plans for dealing with GHG emissions in the industry.
Canadian Chemical Producers Association	www ccpa ca	Outlines Responsible Care Program and presents position on environmental issues.
Canadian Electricity Association	www canelect ca	Paper on greenhouse gas management in the electricity industry; reduction

		initiatives and achievements.
Canadian Gas Association	www.cga.ca	Well organized. VCR reports. Information for energy efficiency in the home.
Canadian Pulp and Paper Association	www.cppa.org	Info on sustainable forestry, mill improvements, recycling.
Canadian Steel Producers Association	www.canadiansteel.ca	Easy to navigate. Info on emission reductions, energy efficiency, and recycling.
Information Technology Association of Canada	www.itac.ca	No environment information available.

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page

Author - Industry Canada - Strategic Policy Branch
Publication Date - 2000-03-31

3.9 Glossary of Terms

ARET: Accelerated Reduction/Elimination of Toxics, a voluntary, non-regulatory program that targets 117 toxic substances, including 30 that persist in the environment and may accumulate in living organisms

BIOMASS: a combination of dry plant material (phytomass) and dry animal material (zoomass) Of all biomass on the face of the planet, 99% is plant material

CH4: methane is a greenhouse gas associated with land fill emissions, leaks from gas and coal industries, and emissions from cattle and other ruminants

CIPEC: Canadian Industry Program for Energy Conservation is a program initiated by Natural Resources Canada to promote effective voluntary action which reduces industrial energy use per unit of production

CFC: chlorofluorocarbons are greenhouse gases used mostly in refrigerants, foam production, and fire retardants

CO2: carbon dioxide is a greenhouse gas whose main sources are fossil fuel combustion, wood burning and deforestation

ECO-EFFICIENCY: producing more valuable products or services using fewer material and energy inputs, and creating less pollution

ISO: the International Organization for Standardization is a non-governmental organization established in 1947 with the mission of promoting the development of standardization and related activities It is a federation of national standards bodies from 130 countries

N2O: nitrous oxide is a greenhouse gas associated with fossil fuel combustion, the use of fertilizers, and forest destruction

PCBs: polychlorinated biphenyls constitute a family of over 200 types of chemicals, and are used in plastics, electric insulators, and hydraulic fluids They accumulate in the fatty tissues of organisms and become increasingly concentrated as they move up the food chain

DOWNSTREAM: The business segment that manufactures, distributes and markets refined products from crude oil

UPSTREAM: These business segments explore for, acquire, develop, produce and market crude oil and natural gas

Table of Contents

Help What's New Sitemap Feedback About Us Français Top of Page