



Successful Practices

of Environmental Management Systems in Small and Medium-Size Enterprises

A North American Perspective





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1. INTRODUCTION

This report examines the use of environmental management systems (EMSs) in small and medium-size enterprises (SMEs) in Canada, Mexico and the United States. In doing so, it provides a North American perspective on successful practices and some of the issues faced by SMEs in developing and implementing these systems. It also offers some suggestions for continued cooperation between the governments of Canada, Mexico and the United States on promoting EMSs.

Over the past decade, the three governments have promoted the use of EMSs to help companies improve their environmental performance and move beyond compliance with the law. The Commission for Environmental Cooperation (CEC) has served as a forum in which the three governments could share their experiences, practices, and successes on the use of EMSs in North America. In June 2000, for example, the CEC published *Improving Environmental Performance and Compliance: 10 Elements of Effective Environmental Management Systems*, which described those elements that the three governments agreed were important to address in implementing EMSs (CEC 2000). The CEC has also encouraged a North American dialogue on the use of environmental management systems through its support of and participation in numerous workshops and forums, including most recently those of the North American Pollution Prevention Partnership, Mexico's Pollution Prevention Roundtable, the Auditing Roundtable and the Canadian Environmental Auditing Association.

In recent years, the private sector has developed various types of EMSs for identifying and managing the impacts that commercial, industrial and service operations have on the environment. Although the use of EMSs is becoming more common among larger companies, their use by small and medium-size enterprises is less common.

A successful EMS can enhance efficiency and lower costs, reduce resource use and waste, help to ensure compliance with regulatory requirements, encourage employee involvement in environmental performance and improve relations with customers. In examining a variety of experiences in North America, this report identifies six common characteristics of successful EMSs adopted by small and medium-size enterprises:

1. designed with a strong business case in mind
2. managerial support and commitment of resources
3. engaged employees
4. integrated into business
5. clearly defined objectives and targets
6. continual monitoring and measurement.

Not all EMSs, however, are effective in improving environmental performance. Most SMEs face few incentives and many difficulties in implementing environmental management systems. The owner of a business must believe that an EMS will create real tangible value for the business. Yet most SMEs do not know what an EMS is and, if they do, how it could benefit their business. Even if they are familiar with the concept of an EMS, many smaller businesses lack the technical expertise and resources needed to develop and implement one.

Although business needs may ultimately determine whether an SME implements an EMS, government or private sector technical assistance and outreach efforts are often crucial to providing the conditions under which businesses—particularly small and micro-businesses—are likely to implement a successful EMS. Continued cooperation among the governments of Canada, Mexico and the United States could help improve the delivery of sector-specific information and technical assistance and specific advice on EMS methodologies to SMEs.

Organization of This Report

The chapters that follow describe a North American perspective on the use of environmental management systems in small and medium-size enterprises. The definitions of an EMS and a SME in Chapter 2 are followed by a closer look in Chapter 3 at the effectiveness of environmental management systems in improving environmental performance. Chapters 4 and 5 then look at the benefits and characteristics of a successful EMS and the drivers and barriers to EMS adoption by small and medium-size businesses. Chapters 6 and 7 review the technical assistance and outreach, and the incentive programs and policies in the three countries. Chapter 8 concludes by examining areas for future cooperation by the three governments on EMS promotion in North America. The two appendices to the report provide general information

on environmental management systems. Appendix A lists some useful web sites in addition to those found as reference to this text, and Appendix B presents the CEC's "10 Elements of Effective Environmental Management Systems."

With the growing integration of the North American economy under the North American Free Trade Agreement (NAFTA), the CEC is in a unique position to step back and examine the development of EMS policies and programs in all three countries. Such an examination can help those promoting environmental management systems in Canada, Mexico and the United States to learn from the experiences of the other countries and can help to inform and stimulate discussion and critical comment among those assisting small and medium-size enterprises with environmental issues.

2. DEFINING SMALL AND MEDIUM-SIZE ENTERPRISES AND ENVIRONMENTAL MANAGEMENT SYSTEMS

Small and medium-size enterprises in North America vary widely in their impacts on the environment. An environmental management system offers the methodology a company needs to identify and implement ways in which to improve the environment both inside and outside a plant or business, from mere good housekeeping steps to strategies to prevent pollution.

This chapter examines the various definitions of small and medium-size enterprises and some of the different types of environmental management systems in the three countries. Although the definition of a small and medium-size enterprise varies from country to country, it is useful to examine SMEs as a general category. These kinds of enterprises generally have fewer resources to address their environmental impacts and are thought to be less likely to implement EMSs than larger companies. They also do not, by most definitions, have a parent company on which to rely for assistance. Despite these limitations, SMEs can use the basic methods of implementing an EMS as described in this chapter to integrate environmental planning into their everyday business practices.

What are Small and Medium-Size Enterprises?

SMEs are found in the largest and most dynamic sectors of the North American economy, ranging from those that are pollution-intensive and resource-intensive, such as manufacturing and natural resource extraction, to those that are more environmentally benign, such as retail. They often face unique environmental challenges that are related to their size and their place in the economy. (See Table 2.1)

The economic importance of SMEs in North America is significant. Over 98 percent of businesses in Canada, Mexico and the United States are small and medium-size enterprises. SMEs are found in all the economic sectors of the three countries, producing approximately 40 percent of their gross domestic product (GDP) and over half of their private sector employment. In the manufacturing sector, SMEs generate 55 percent of manufacturing employment in Canada, 66 percent in Mexico and 41 percent in the United States (OECD 2002).

Although most SMEs serve local markets, they are increasingly operating as part of a global marketplace, purchasing products produced abroad, supplying multinational companies and selling directly to overseas buyers. In North America, SMEs play an important role in the market-driven coordination of production across the US-Mexico and US-Canada borders, especially in sectors such as automobile, telecommunications equipment, computer, electronic products and textiles and apparel.

SMEs face widely differing environmental issues based on the economic sector, employee base and jurisdiction in which they operate. The requirements, demands, pressures and issues they face will more often resemble those faced by companies in their own economic sector, regardless of size, than those in other sectors. In addition, within the SME category differences often exist in the technical capabilities of small and medium-size businesses, with medium-size business much more likely to have engineering expertise than small enterprises, especially related to energy efficiency and conservation.

SMEs, even those in the retail sector, can have significant impacts on the environment, including those from nonregulated activities such as resource consumption, packaging and methods of hazardous and nonhazardous waste disposal. According to Environment Canada (2003), of the 2 million Canadian SMEs, the 400,000 most pollution-intensive are in the agriculture, primary and manufacturing sectors.[1] A

1. The primary sector includes activities such as fisheries, mining, forestry and oil and gas extraction.

Small and Medium-Size Enterprises?

The threshold of 500 employees guides the classification of small and medium-size enterprises (SMEs) in Canada, Mexico and the United States. Environment Canada typically classifies enterprises with less than C$50 million in annual revenues that are not wholly owned subsidiaries as follows: less than 5 employees, microenterprise; 5–49 employees, small enterprise; 50–499 employees, medium-size enterprise (Environment Canada 2003).

The medium-size category is not commonly used in the United States, and the US Environmental Protection Agency considers a small business for research grant programs to be a for-profit organization with no more than 500 employees that is not dominant in the field of operation. For Performance Track Purposes (see Chapter 7), a small business is defined as a facility with fewer than 50 employees. These facilities may be part of larger organizations. The US Small Business Administration has devised sector-specific definitions with both employee and revenue limits. See <http://es.epa.gov/ncer/sbir/2005SBIRfactsheet.pdf> and <http://www.sba.gov/size/>.

In Mexico, Profepa follows a classification (by number of employees) established by the Secretary of Economy in 1999:

	Industrial	Commercial	Service
Micro	0–30	0–5	0–20
Small	31–100	6–20	21–50
Medium	101–500	21–100	51–100

Mexico's National Institute of Statistics, Geography and Informatics *Instituto Nacional de Estadística Geografía e Informática*—INEGI) has more specific classifications.

Table 2.1 Distribution of Employment in Manufacturing by Size Class

Country	0–9	10–49	50–99	100–499	500+	Total
Canada	4.1	17.8	8.8	24.2	45.0	100
Mexico	18.9	12.0	7.5	27.6	34.0	100
United States	3.6	4.1	16.0	17.4	58.9	100

Source: OECD 2002.

study prepared for the Organization for Economic Co-operation and Development (OECD) found that SMEs in the United States are significant contributors of pollution in three branches of manufacturing: chemicals, primary metals and building materials (e.g., stone, clay and glass). The largest impacts from these SMEs were on biological oxygen demand (BOD) in water and suspended particulates in air, followed by the release of toxic chemicals (OECD 2002). But those statistics for the United States were developed in a study done specifically for OECD; generally, "comprehensive pollution or resource consumption statistics for SMEs do not exist, making it difficult to determine their contribution to environmental degradation" (OECD 2002).

What Is an Environmental Management System?

An environmental management system is a tool used by a company to identify measure and manage the effects of its activities on the environment. An EMS sets out the company's goals for environmental performance and a plan for achieving those goals. Ideally, company managers will set goals in areas such as compliance with environmental laws, minimization of risks to human health and the environment, use of natural resources, and prevention and reduction of pollution.

The evolution of EMSs in North America can be traced to the 1970s and the pollution prevention programs of companies such as 3M, with its "Pollution Prevention Pays" program, and Dow, with its "Waste Reduction Always Pays" (WRAP) program. In the 1980s, EMS programs largely focused on due diligence and compliance with laws and regulations as well as ways to cut costs in disposing of wastes and treating effluents. Also in the 1980s, trade associations began to develop codes of environmental practices, which approximated the definitions of environmental management systems (Pacific Institute for Studies in Development, Environment, and Security 2000).

EMS Models

Today, EMSs can range in complexity from simple reminders of regulatory deadlines at a single facility to an elaborate, Internet-based, enterprise-wide performance management system that tracks regulatory requirements, assigns tasks, controls documentation and records, provides training, and shares information across multiple operations and facilities around the world.

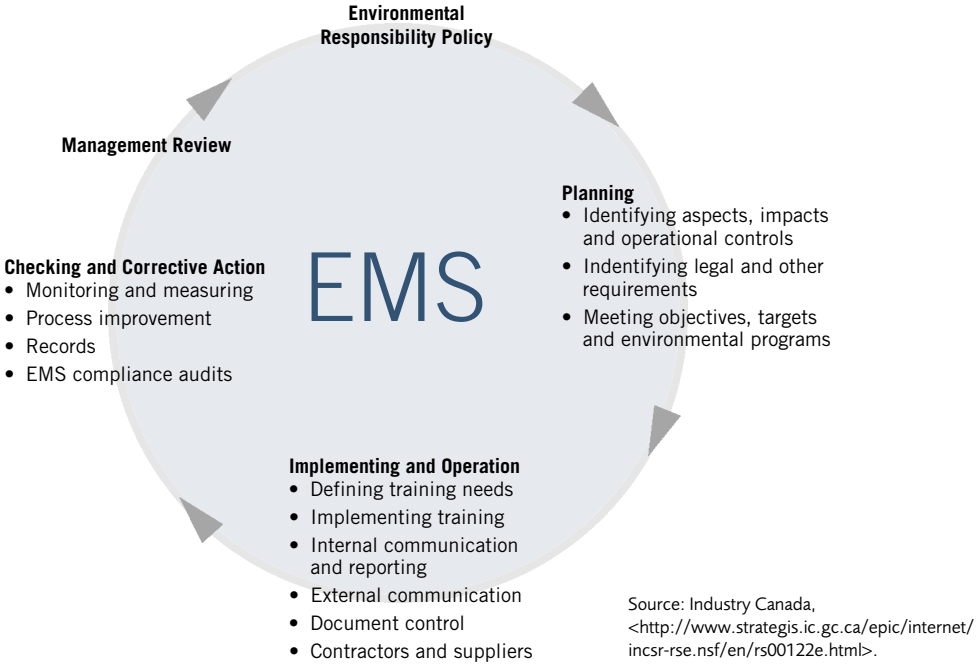
EMSs are most effective when they are part of normal business activities rather than treated as separate programs or initiatives. Although businesses typically have many elements of an EMS already in place, the EMS provides a systematic way to integrate those efforts and direct them toward company-established goals. The significant range and variations of EMSs can be attributed to the differences among organizations in size, activities, impacts, regulatory requirements, corporate culture and

Total Quality Management

Most systematic approaches to addressing performance issues derive from the work of W. Edward Deming, the US statistician who is credited with dramatically improving the performance of Japanese industry after World War II with a system that has come to be known as Total Quality Management (TQM). Deming also popularized the plan–do–check–act cycle that is at the root of all such systems: identify and analyze the problem (plan), develop and implement solutions (do), evaluate and measure the results (check), and fix the problems identified and incorporate the lessons learned into a feedback loop that begins the process anew (act). The feedback loop involves all personnel and elements of an organization and runs counter to traditional top-down "management by objective" approaches. Environmental management systems turn the TQM process to a specific concern for reducing environmental impacts.

Source: Welch 1998.

Figure 2.1 BC Hydro's Environmental Management System



Source: Industry Canada, <http://www.strategis.ic.gc.ca/epic/internet/incsr-rse.nsf/en/rs00122e.html>.

policy commitments. Figure 2.1 depicts the EMS of BC (British Columbia) Hydro and is representative of the structure of many EMSs.

The International Organization for Standardization (ISO) 14001

The most widely recognized model for an EMS is the International Organization for Standardization (ISO) 14001 standard. This standard, which is applicable to organizations of all types and sizes, is based on five components:

1. An *environmental policy* that commits the organization to "prevention of pollution," "continual improvement" and compliance with "relevant environmental legislation and regulations."
2. *Planning* to implement the environmental policy, which entails identifying all of an organization's interactions (activities, products or services) with the environment (its "environmental aspects") and designating the "significant" aspects and setting quantifiable objectives and targets for addressing those significant aspects.
3. *Implementation and operation*, which requires an organization to ensure the availability of resources, define roles and responsibilities, develop documented procedures, emergency preparedness plans and ensure employee competency, training and awareness.
4. *Checking and corrective action* to measure and track the performance of the system against its own goals and to evaluate compliance with the relevant laws and regulations. The organization must also identify, investigate and correct any nonconformities. The organization must ensure that internal audits are conducted.
5. *Review* of the EMS by top management "to ensure its continuing suitability, adequacy, and effectiveness."

The ISO standard focuses on conformance with established policies, plans and procedures, but it does not specify requirements for environmental performance beyond compliance with the relevant legislation. Organizations are, however, free to set goals that exceed compliance requirements.

Companies implementing ISO 14001 may choose to have their EMS certified. They can seek third party certification from either accredited certificate bodies (those recognized by a national accreditation body) or no accredited bodies. Most firms seeking certification employ accredited bodies; these may be perceived on the market as having greater credibility, although a firm that implements ISO 14001 solely for internal management purposes (without expectation of benefits from regulators, customers or public perception) may choose not to seek third party certification by accredited certificate bodies.[2]

The European Office of Crafts, Trades and Small and Medium-Sized Enterprises for Standardisation (*Le Bureau Européen de l'Artisant, et des Petites et Moyennes Enterprises pour la Normalisation*), better known by its acronym NORMAPME, has formally asked the ISO to "explore alternative ways to use the environmental management system standard ISO 14001 that are in line with their members' limitations." NORMAPME seeks changes that might include allowing an incremental implementation of ISO 14001 or allowing organizations to be certified in batches, sharing procedures and administrative costs. The ongoing revisions of ISO 14004 are intended to simplify EMS requirements for SMEs in order to facilitate implementation. ISO, through its Sub-Committee 1 of Technical Committee 207, has formed an ad hoc group to study EMS penetration among small businesses, and a report is expected in September 2005.[3]

The Eco-Management and Audit Scheme

Many European countries require large manufacturing facilities to implement the Eco-Management and Audit Scheme (EMAS). The components of EMAS are similar to those of ISO 14001. However, EMAS has two significant additions: a baseline environmental assessment and a public environmental performance report. Many companies outside Europe have also chosen to implement the EMAS system or variations.

The CEC's "10 Elements of Effective Environmental Management Systems"

In June 2000, the Commission for Environmental Cooperation published the "10 Elements of Effective Environmental Management Systems" (CEC 2000). The "10 elements" were negotiated by Canada, Mexico and the United States just after the ISO 14001 standards were published and served as the first general policy statement by the three governments on what they believed were important features of an EMS. The "10 elements" are generic in nature and not specifically geared toward small and medium-size enterprises. Notably, they place greater emphasis on compliance with environmental regulations than the ISO 14001 standard. Like the ISO standard, the "10 elements" state that a company's environmental policy should include a provision for compliance with environmental requirements. But the "10 elements" go beyond the ISO in stating that an EMS should establish

ISO 14001 Trends in North America

As of December 2003, the breakdown of North American certifications for ISO 14001 was Canada, 1,274; Mexico, 406; and the United States, 3,553 By contrast, in 1998 the breakdown was Canada, 104; Mexico, 39; and the United States 291. See <http://www.iso.org/iso/en/iso9000-14000/pdf/survey2003.pdf>. No specific numbers exist for SMEs, which are more likely to use third-party registrars and therefore are less likely to be reported in the ISO system.

2. For more on ISO certification, see <http://www. iso.org/iso/en/iso9000-14000/basics/general/ basics_5.html>.

3. See <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=31808>.

objectives and targets for achieving and maintaining compliance with environmental requirements and a commitment to continuous improvement in environmental performance (see Appendix B for the CEC's "10 elements").

A Sample EMS from the Metal Finishing Industry

Various sample EMSs are available for small and medium-size enterprises. The most useful samples tend to be those tailored to a specific industry and designed with input from the industry itself. For example, the Texas Commission on Environmental Quality (TCEQ) developed a sample EMS for small businesses in the metal finishing industry. (See Table 2.2) The EMS for the fictitious company, Papa Plating, covers all on-site operations, including metal finishing and processing activities, groundskeeping, offices and waste disposal.

Table 2.2 Selected Aspects of Sample EMS Addressing Water Usage

Form 7: Environmental Management Action Plans

Significant Environmental Aspects	Water Use
Goal	Reduce the amount of water purchased by 50%
Action Plan	Analyze how water is used and what can be done to minimize water use Consider different potential rinsing methods
Review Cycle	Willie Scott will review every 6 months

Form 8: EMS Work Instructions

Significant Environmental Aspects	Associated Job Functions	Work Instructions Needed	Responsible Person
Water Use	Parts Rinsing	Yes – employees should monitor the drip time over the various rinse tanks and withdraw the parts at the proper speed	Plating supervisor
	Parts Racking	Yes – employees should rack parts to minimize solution dripping on other parts	Plating supervisor

Form 9: Alternatives Identification — Significant Environmental Aspect: Water Use

Activity	Current Practice	Potential Alternatives
Rinsing methods	Dip rinsing	Try spray rinses in the various processes to try to improve rinsing performance and decrease water consumption
Water flow	Rinse water is being flowed at a high rate during production	Research the use of conductivity meters and/or flow restrictions
Treatment	Currently chemically treated and discharged to waste-water treatment facilities	Consider the use of reverse osmosis and/or ion exchange after the initial treatment and reuse the treated effluent back in our process
Rinse tank	None	Consider the use of air agitation in the rinse tanks to improve agitation the rinsing process

Source: TCEQ

Papa Plating's EMS contains elements of ISO 14001 and the CEC's "10 elements." The EMS provides a sample action plan on water use, energy use, sludge generation and disposal, metal use and use of natural resources, organic emissions from a degreaser and human exposure to toxic materials and chromium emissions. A look at the selected portions of an EMS regarding water aspects of the Papa Platings EMS usefully illustrates some of the specific elements of an EMS.

Papa Plating's system is just one example of how to create an EMS. An environmental management system can be designed to address the needs of any size organization. Standards groups, trade associations and governments have all designed different types of environmental management systems and programs to help businesses improve environmental performance by integrating environmental planning into everyday business processes.

3.ARE ENVIRONMENTAL MANAGEMENT SYSTEMS EFFECTIVE?

An effectively designed EMS can, under the right circumstances, significantly help a company to improve its environmental performance and bottom line

Recent studies indicate that not all environmental management systems lead to improved environmental or business performance. However, several projects and numerous case studies of successful EMS practices in small and medium-size enterprises support the proposition that an effectively designed EMS can, under the right circumstances, significantly help a company improve its environmental performance and bottom line. Because not all EMSs produce positive benefits, it is important to understand the potential benefits of an EMS, the common characteristics of successful EMSs, the drivers and barriers to EMS implementation, and the programs available to help SMEs improve their performance. These subjects are covered in the chapters that follow.

Empirical Studies of EMSs

Empirical studies of the performance of EMSs have only recently begun to emerge. One of the only studies in North America was conducted in the United States by the University of North Carolina and the Environmental Law Institute between 1997 and 2002. The National Database on Environmental Management Systems (NDEMS) study examined environmental performance data at 83 facilities over a five-year period. Ultimately, 30 facilities completed all five years of the study. The participating facilities ranged from large, publicly traded major manufacturers and electric utilities to small businesses such as auto parts suppliers and electroplaters and government organizations, including military bases and municipal water treatment plants. Approximately 70 percent of the organizations participating in the NDEMS study were part of a larger business or government organization.

The final report of the study concluded that evidence from the pilot facilities "suggests that the introduction of an EMS can be expected to be at least somewhat beneficial to the environmental performance of most facilities, as well as to their operating and management efficiencies, and in some cases to their regulatory compliance patterns. These results are more likely for facilities that are subsidiaries of publicly traded corporations, owing to their greater access to management capabilities, resources, and assistance from their parent organizations, but they occur in privately held and government facilities as well." The NDEMS study is inconclusive on the financial benefits of an EMS, but notes that benefits were "moderately impressive" for the facilities that realized them. Thirty-two facilities reported quantified monetary benefits from EMS adoption; the average net benefit for those reporting a benefit through the first three years was $90,320. (NDEMS 2003)

One study completed by the University of Sussex in July 2000 compared EMS use in EMAS and ISO systems in 280 European companies at 430 production sites and found no statistically significant relationship between the adoption of a formal EMS and improved environmental performance. The companies included 9 computer companies, 58 electric power generators, 26 fertilizer manufacturers, 90 pulp and paper producers, 46 printers and 45 textile finishers.[4]

Another study of electronic firms observed that firms that adopted ISO 14001 were able to catch up to industry best practices, especially if they produced significant toxic emissions (Russo 2000). A study conducted in the automotive supply sector before Ford and General Motors required their suppliers to be ISO-certified found minimal reductions after ISO 14001 adoption. In terms of toxic releases and compliance with regulatory requirements, environmental performance was about the same in facilities that had adopted EMSs under ISO 14001 and those that had not (Matthews 2001).

Projects and Case Studies

Although little empirical work exists on the impacts of EMS adoption, the literature and case studies contain valuable information on how companies have used EMSs to improve environmental and business performance.

The US Environmental Protection Agency's web site includes a case study index with links to EMS success stories, several of them on SMEs.[5] The EPA case studies generally include an introduction to the facility, an overview of the planning and implementation of the EMS, a list of the benefits achieved, and a description of the lessons learned. One case study, for example, explains how the Mott's Aspers plant, an apple juice and apple sauce plant with 378 full-time employees in Pennsyl-

4. See <http://www.environmental-performance.org/analysis/index.php>.
5. See <http://www.epa.gov/ems/studies/index.htm>.

vania, implemented a EMS that resulted in the production of less solid waste, reduced water usage, increased recycling, savings on energy usage and wastewater treatment costs.[6]

The Manual for Implementing EMS in SME, issued by the International Finance Corporation (IFC), also includes 15 case studies from facilities throughout the world, including the United States, on the actual benefits realized by small and medium-size businesses that have implemented EMSs (IFC 2004). Some summaries of selected case studies from the IFC manual appear in Table 3.1.

In Mexico, several projects have been undertaken to provide SMEs with technical assistance in implementing environmental management systems. The Guadalajara Environmental Management Pilot (GEMP), financed by the World Bank, studied the effects of EMS use in small and medium-size enterprises in Mexico. In this project, 11 large companies in Guadalajara, Mexico, signed a voluntary agreement with Mexico's Ministry of Environment, Natural Resources and Fisheries (*Secretaría de Medio Ambiente, Recursos Naturales y Pesca*—Semarnap), now known as the Ministry of Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*—Semarnat), to mentor small suppliers in implementing EMSs. Within three months of completing the formal EMS training, over 80 percent of the 20 participating companies in the GEMP study had reduced their environmental releases, nearly 70 percent had improved their work environment, and over 50 percent had improved their economic performance.

Slightly less than 50 percent reported improvements in waste handling, materials and energy efficiency, and compliance. The study concludes that "gains from good housekeeping are potentially very large in the case of SMEs, and … an EMS provides a means to capture

6. See <http://www.epa.gov/ems/studies/mott.htm>.

Table 3.1 Selected EMS in SME Case Studies, Worldwide

Company	Environmental Benefit	Cost Savings
Leff-Marvins Cleaners Inc.	Replaced its old equipment with new system to recycle PERC (perchloroethylene). Eliminated most VOC (volatile organic compound) emissions and also reduced purchase of PERC from 200 gallons per month to 40 gallons per month. Reduced hazardous waste stream from over 1,900 gallons of spent PERC per year to just 35 gallons of still residues per month.	The company realized a net savings of US$1,400 per month with the new system.
Company A	Introduced more efficient ways of handling cardboard. Reduced its waste by 577 tons in the first year.	Waste elimination bills were cut by 55 percent. Saved staff time.
Mounstevens Ltd., a manufacturing and retail baker	Increased staff awareness and introduced careful separation of waste.	Expected benefits include cutting waste bills in half and saving US$8,800 and 26 tons of waste.
Company B	Instituted a facility-wide municipal waste recycling program, including metal, cardboard, paper, wood, plastic and glass. More than 50 percent of the municipal waste generated by the company is now recycled.	Reduced disposal costs and gaenerated enough revenue from marketing the recyclables to fund the program's operating expenses, including wages and benefits, equipment operation and maintenance, utility costs and program improvements.
Jamestown Paint Company	Reduced its use of toluol by 95 percent and xylol by 74 percent by developing water-based products to replace solvent-based coatings.	Information not available.
A manufacturer of power steering gears, engine timing devices and power transmission boxes	Installed a green sand recycling system in its foundry that puts recovered sand directly back into the processing lines, recovering about 95 percent of silica sand.	Reduction in the purchase of sand from 4 million pounds of sand per year to only 80,000 pounds per year, saving on sand purchase and disposal costs.

these gains very quickly." The project's preliminary findings indicate the following:

- The ISO 14001 EMS model can be applied by SMEs without any modifications, with the exception of documentation.

- Although the ISO 14001 EMS model is appropriate for SMEs, most SMEs require substantial implementation support, particularly in the areas of simplified formats, discrete milestones, management systems thinking and staff assistance.

- The business culture of a firm is probably a more important factor than size in determining whether it can implement an EMS (World Bank 1998).

Within three months of completing the formal EMS training, over 80 percent of the 20 participating companies in the GEMP study had reduced their environmental releases, nearly 70 percent had improved their work environment, and over 50 percent had improved their economic performance.

Because the GEMP study was undertaken in the early stages of EMS implementation, the longer-term economic and environmental affects of EMS implementation have not been analyzed.

In another project, Proyecto Administación Ambiental Monterrey (PAAM), undertaken in Monterrey, Nuevo Leon, large companies and the Multilateral Investment Fund of the Inter-American Development Bank (IADB) supported an effort by the Instituto Protection Ambiental (IPA), a nongovernmental association of businesses in Monterrey, to train 19 SMEs in the use and application of a modified environmental management system based on the ISO 14001 model. One of the project objectives was to determine whether EMSs were a useful tool in improving SME environmental performance. Four companies could to point to specific environmental and economic benefits of participating in the project. The project's report noted that the vast majority of the "root causes" of significant environmental problems identified by the firms could to be addressed through changes in management practices such as improved maintenance, improved procedures and better training. Relatively few of the solutions, according to the report, required significant capital expenditures (Lexington Group 2002).

These studies and projects point the way to understanding the potential benefits of an EMS, while serving as a reminder that many obstacles and barriers to effective EMS implementation exist.

4. THE BENEFITS AND COMMON CHARACTERISTICS OF SUCCESSFUL ENVIRONMENTAL MANAGEMENT SYSTEMS

Designing and implementing an EMS can have tangible benefits for business enterprises. A system can help a company to enhance efficiency and minimize resource use and waste, thereby reducing costs, help to ensure compliance with regulatory requirements, encourage employee involvement and improve relations with customers. Despite variation in the sophistication, scope and achievements of environmental management systems, successful EMSs share common characteristics that are directly related to the benefits of an EMS. The benefits and the characteristics of successful EMSs are described in this chapter.

Lower Insurance Costs

The most reliable financial quantification of the benefits of an environmental management system is often lower insurance costs; companies that minimize risks may receive better insurance rates. The current case studies, however, provide only a few examples of small and medium-size enterprises that realized this benefit. In one example, DESC, a holding corporation in Mexico that owns several companies from different sectors, including the chemical sector, chose to expand its company-wide EMS to include outsourced carriers. As part of this effort, suppliers, customers, carriers, terminals and all who were in the supply chain were evaluated. During the first two years, the main focus was the carriers, who were audited under a specific risk reduction program. By developing tools to evaluate the risks along its transportation routes, DESC was able to achieve a substantial reduction in insurance fees. In turn, the carriers, once they implemented these practices across their operations, were able to negotiate a reduction in their own insurance. Accidental index was reduced from six accidents in 2001 to zero in 2004. Part of the evaluation tools used came from the Responsible Care System of Mexico's National Association of the Chemical Industry (*Asociación Nacional de la Industria Química*—ANIQ)

Source: Margarita Ferat Toscano, corporate environmental manager, DESC, SA de CV, e-mail message to Ignacio González, CEC, 4 october 2004.

The Benefits of Environmental Management Systems

Various books, articles and studies have identified the benefits an environmental management system can have for a company. In this section, these benefits are categorized into five main areas that are most relevant to SMEs.

Enhanced Efficiency and Lower Costs

EMS manuals and case studies point most frequently to the financial benefits of implementing an environmental management system. Cost savings are often linked with consuming fewer resources and producing less waste, but savings can also accrue from operational efficiencies, a higher level of management efficiency, reduced liabilities and shorter permitting times because of better relations with regulators and communities.

Operational efficiency usually involves replacing or renovating equipment and facilities, as well as improving the production process design and paying closer attention to all inputs and outputs. Such changes can reduce inputs (energy, water, etc.) or make operations more efficient, so that production is higher, faster or cheaper than before. Costs are compared pre- and post-EMS implementation.

Even small changes in operational efficiency can produce significant results. During its EMS identification process, one company highlighted in the IFC case studies (Figure 3.1) noticed that one of its large machines had a serious oil leak. The leak was quickly repaired with a $5 gasket. This easy, inexpensive action cut the amount of oil consumed by the company by half, resulting in significant cost savings. In addition, the local municipal authority reclassified the plant as no longer generating hazardous waste (IFC 2004). In another example, during the development of its EMS a company in Mexico, *Químicos y Papeles del Norte*, identified the use of excessive rinse water as a significant environmental aspect of its operations: the short production runs of incompatible products required the equipment to be rinsed between products. The company implemented a more systematic production programming to eliminate product changeovers and increased product storage capacity. The results were more efficient utilization of product and storage space, water savings, reduced product waste and improved labor utilization (Lexington Group 2002).

Reduced liability is another financial criterion that can be used to measure the success of an EMS. A court or the government may view a company with an EMS in place more favorably when determining sanctions. For example, in Nova Scotia a judge dismissed a case against a pulp and paper mill for a small oil spill because the company had an EMS in place that addressed spill issues. The judge cited the company's due diligence, stating "the supervisor who found the leak . . . knew the equipment, what to do to stop the leak and did so immediately. . . . He had been instructed on what to do in the event of any oil spill and he did that." R. v. Stora Forest Industries Ltd., [1993] N.S.J. No. 330 (N.S. Prov. Ct. Jun 23, 1993) Chapter 7 describes how government policies encouraging EMS usage may also affect penalty calculations.

Reductions in Resource Use, Waste and Emissions

Many SMEs rate the success of their EMSs by monitoring the resources used and the waste minimized, both of which are closely related to cost savings. Implementing an EMS allows a company to identify opportunities for improvement and to plan expenses. Key performance indicators include: the volume of raw materials, water and energy consumption, recycling rate, hazardous and nonhazardous waste generation and the number and volume of releases. Organizations use self-generated records, bills or data from various utilities to measure consumption and waste pre- and post-EMS implementation.

Both large corporations and small and medium-size enterprises use EMSs to reduce resource and energy consumption, as well as

Fourteen of 15 International Finance Corporation case studies claim reduced waste, consumption or toxicity as companies' main goals in EMS design and implementation, as well as the primary criteria for evaluating EMS usefulness.

the volume and toxicity of waste generation. Fourteen of 15 International Finance Corporation case studies claim reduced waste, consumption or toxicity as companies' main goals in EMS design and implementation, as well as the primary criteria for evaluating EMS usefulness. Elsewhere, in a survey of 580 manufacturing plants with more than 50 employees, Florida and Davison (2001) found that facilities with EMSs resoundingly pointed to recycling and reductions in air emissions and solid waste and electricity use as evidence of facility-level improvement.

Regulatory Compliance

Another frequent indicator of a successful EMS is achieving the goal of regulatory compliance. The criteria an organization selects to measure improvement can vary widely and depends on the company's compliance history and regulatory burden. Management can use an EMS to monitor the legal requirements and thereby plan expenses associated with permitting, reporting and monitoring to ensure compliance with the law. Ideally reducing the frequency and severity of violations and the associated costs.

An EMS can also help a company to prepare for a more stringent application of environmental regulations by the government. For example, the IFC case studies include the example of a manufacturer of office furniture that eliminated methyl chloroform from its cleaning and fastening processes and reduced the volume of emissions of volatile organic compounds (VOCs) by converting to a powder-based coating system. These pollution prevention alternatives saved the company more than $1.1 million a year and gave the company a return on its $1 million investment in less than one year. This effort helped the company to comply more easily with increasingly stringent environmental regulations and eliminated incineration fees for solid and liquid hazardous wastes (IFC 2004).

Employee Involvement

Many companies recognize that the success of an EMS depends on the participation of the full spectrum of employees. Indeed, employee engagement is at the heart of the Total Quality Management (TQM) process on which EMS principles depend. Different types of employees have different insights into environmental performance and suggestions for improvements. Proper implementation of an EMS requires employee involvement and, if successful, creates as a benefit a sense of responsibility and accomplishment among the employees.

A 90-person metal finishing company in the United States, which was cited in the National Database on Environmental Management Systems study, designed its EMS without employee involvement, but then engaged employees in a series of classes and meetings to introduce and reinforce EMS concepts. It also trained a dozen employees from the company to act as internal auditors. By contrast, another company cited in the NDEMS study, a 350-person manufacturing plant, selected a wide range of employees, from managers to engineers to line operators, to make up the team responsible for creating the EMS. The company considered employee engagement in the design process as important as engagement in implementation.

Improved Relations with Customers

An EMS can improve relations with customers. For an SME, improved relations usually means larger purchasers in a dominant market position, such as Ford and GM, which require their suppliers to be ISO 14001-certified. Smaller companies, however, may also find that an EMS means wider appeal in a more local market. For example, *Framboisière de l'Estrie*, a berry farm in Quebec, was one of the first two farms with ISO 14001 certification in North America (see sidebar). It markets its environmental improvements and the positive economic benefits it has reaped from ISO certification.

The Benefits and Common Characteristics of Successful Environmental Management

The success of an organization's EMS can be evaluated by monitoring the organization's progress toward meeting its environment-related objectives and targets. Understanding the common characteristics of a successful EMS will help to ensure that the conditions needed to support successful EMS design and implementation are present.

Designed with a Strong Business Case in Mind. A successful EMS is developed with a strong business case in mind. Its purpose is to improve the value of the company through risk reduction, revenue enhancement and cost reduction.

Supported by Management and Commitment of Resources. Unless the owner and upper management are committed to and supportive of the EMS, it is extremely difficult to obtain the resources and cooperation needed to successfully develop and implement an effective system. The environmental policy, as endorsed and supported by management, defines the strategy of the organization and specifies the scope and commitments of the EMS to employees, customers and those outside the company,

such as local agencies, investors and community groups.

Engaged Employees. When employees at all levels of an organization are engaged in an EMS, it is more likely to succeed. Under a well-designed EMS supported by management, individual employees understand their roles and responsibilities, receive adequate training and information, and are aware of the potential environmental impacts of their jobs. Typically, when employees are engaged in such a program they enjoy a sense of ownership and possess the motivation to make a positive contribution to the success of the program.

Integrated into Business. The most successful EMSs are not stand-alone projects or initiatives; they are part of the standard decision-making process of a business. They also are integrated into all aspects of a company's activities, products and services. In the NDEMS study, all companies that had adopted EMSs asserted that they saw a business value in improving their environmental performance.

Clearly Defined Objectives and Targets. Successful EMSs tend to set both abstract/overarching and specific/measurable goals. An abstract/overarching goal may be "transparency," whereas a specific/measurable goal may be "Have Michael document the EMS design and implementation process" or "Reduce air emissions by 35 percent by 2006." Abstract/overarching goals allow for creativity and problem solving, because managers and employees are not bound to follow certain codes. Specific and measurable goals ensure that the abstract is translated into the feasible and achievable. This duality also places smaller objectives in the context of larger goals.

Continual Monitoring and Measurement. Monitoring and measurement are always cited in EMS success stories, but companies go to widely different lengths to monitor and measure their progress.

After setting objectives and targets, a company should devise a means of monitoring and measurement, preferably in quantifiable terms. Are changes being implemented? Are the correct policies being pursued? Is the amount of waste being reduced, and, if so, by how much? How much money is being saved through waste reduction? Are targets being met? Are more effective means of reducing waste available? Should objectives and targets be revised? Questions like these should be asked daily by any company and not limited to the start-up period of the EMS. A key element of any management system is the opportunity it provides for learning from experience. Given the size, resources, and variety of structures, as well as the obstacles faced by small and medium-size enterprises in implementing environmental management systems, it is important that those systems be flexible. Whenever possible, the goals and complexity of an EMS should be set by the company itself. Those goals will necessarily be limited by financial and economic considerations, including the profitability requirements of the organization.

* * *

With these potential benefits, why aren't more SMEs designing and implementing successful EMSs? One reason is that, in most cases, the driving forces are not strong enough to overcome the barriers. It is essential that those promoting an EMS to such enterprises understand the drivers and barriers faced by an SME. The driving forces or barriers that are most important depend on the type of industry, the size of the business and its customers.

Improving the Value of the Raspberry Business

Situated at Johnville, near Lennoxville, Quebec, the *Framboisière de l'Estrie* stretches over 11 hectares. Each year the farm grows and sells 43,000 kilograms of fruit and markets associated products such as syrup. As a result of going through the ISO process, the farm did away with all pesticide use and replaced fertilizers with compost, maintained water consumption while increasing production surface by 50 percent and reduced the cardboard content of its boxes by 50 percent, which reduced its purchase, transportation and storage costs. Overall, its production costs decreased while yield increased.

The Case of Salsa de La Laguna

In adopting an environmental management system, employee engagement and buy-in can be particularly important when a company has a recognized brand name. The Guadalajara Environmental Management Pilot (GEMP) study recounts the case of *Salsa de La Laguna* (SLL), a 30-person Mexican company that makes hot sauce and supplies one of the largest tequila manufacturers in Jalisco with sangrita.

The company faced environmental issues associated with excessive noise, the discharge of raw materials, generation of excessive waste, effluent discharges to a lake and an excessive risk of fire. SLL developed a comprehensive EMS by mobilizing work teams to analyze and respond to problems in industrial hygiene, raw material use and control of wastes, effluent discharges and noise. Among the ideas that they, together with management and a university consultant, had were sorting solid waste into reusable and recyclable bins, cleaning up work spaces, improving the maintenance of company vehicles, reducing effluent discharges through water conservation, reducing the use of sanitizing chemicals, requiring suppliers to use strong containers in order to reduce waste and loss, and rinsing out drums of orange juice to salvage concentrate. Some of these measures resulted in savings of over US$10,000 a year. This new environmental consciousness went beyond the factory. According to the report on the project, some workers "began wearing T-Shirts describing their new environmental concerns, to speak at local schools, and to participate in environmental cleanup activities in the community" (World Bank 1998).

5. DRIVERS AND BARRIERS TO EMS ADOPTION BY SMALL AND MEDIUM-SIZE ENTERPRISES

Driving forces are factors that create or change an organization's environmental performance by pushing it to utilize environmental management tools, including environmental management systems. The drivers are usually directly related to the benefits articulated in the case studies in Chapter 4: enhanced efficiency and lower costs; reduced resource use, waste and emissions; regulatory compliance; employee involvement and improved relationships with customers. Other drivers might be motivators such as building relationships with government agencies, achieving faster approval of projects, seeking fewer inspections and less scrutiny, creating a good public image and responding to pressures from internal stakeholders within a company.

Unlike large companies with a recognized brand name and large public exposure, smaller businesses, especially suppliers to larger companies, are unlikely to implement an EMS as a way enhance their reputation with the public. The owner of the business must believe that the EMS will create real tangible value for the business. When a strong business case exists, the business owner's active support for the design and implementation of the EMS is critical to help ensure its success.

The owner of the business must believe that the EMS will create real tangible value for the business.

Driver - Economic Factors

An EMS can, in many instances, create real tangible value for a business in risk reduction, revenue enhancement and cost reduction. A small background survey conducted by the National Environmental Education and Training Foundation (NEETF) in the preparation of its 2001 report "Standardizing Excellence: Working with Smaller Businesses to Implement Environmental Management Systems" found that the top five factors likely to drive EMS adoption in smaller enterprises were

1. business benefits of an EMS
2. tax breaks for EMS implementation
3. customer EMS purchasing requirements for suppliers
4. insurance benefits of an EMS
5. a performance-based regulatory system.

In heavily regulated sectors, an EMS may be a way to demonstrate to regulators, lenders, insurers and buyers that a company is managed in an environmentally responsible way. The Canadian Federation of Independent Business (CFIB) survey of SMEs revealed that respondents in the most regulated industries—that is, those in the primary and agricultural sectors—were more likely to adopt a formal environmental management system. Businesses in these sectors were also subject to higher levels of customer requests for EMSs (CFIB 2001).

Driver - Customer Requirements

For a small and medium-size business, one tangible value in creating and implementing an EMS is that such a step will meet the requirements of larger customers, or dominant buyers. Large multinational companies are increasingly requiring their suppliers to adopt environmental management systems—a development that directly affects SMEs. By choosing not to do business with firms that do not adhere to their environmental policies, large multinational companies are able to greatly influence the environmental impacts of their smaller suppliers and distributors. DaimlerChrysler, Ford, General Motors and Sony, for example, now require ISO 14001 certification of their primary and secondary suppliers. Large companies impose these requirements for a variety of reasons. Among them are reduced risk, new European Union regulations restricting substances in consumer products, direct financial savings, improved relations with their customers or regulators and recognition of responsibility for their environmental impacts.

An example of the effect large corporations can have on their supply chain is illustrated by the Environmental Performance Agreement between the Canadian Automotive Parts Manufacturers' Association (APMA), Environment Canada Ontario Region and Industry Canada. The agreement, entered into in 2002, committed participating APMA member companies to be ISO 14001–registered by December 2003 and to take action to reduce emissions of volatile organic compounds, carbon dioxide and other substances. APMA members collectively account for over 90 percent of the $35 billion automotive parts industry production in Canada. This agreement was a response to the supply chain requirements of DaimlerChrysler, Ford Motor Company and General Motors. Specific targets and timelines for this initiative are an aggregate

Mexico's National Association of the Chemical Industry (*Asociación Nacional de la Industria Química—ANIQ*) was the first association to design its Responsible Care program as an environmental health and safety management system (*Sistema de Administración de Responsabilidad Integral*—SARI).

reduction of 20 percent in VOCs and 3 percent in carbon dioxide and CEPA toxic substance substances (where applicable) by 2007.[7]

A recent pilot project by the World Environment Center (WEC) illustrates this trend. The WEC is a not-for-profit organization composed of many large multinational corporations. The Center's Supply Chain Management Partnership promotes the adoption of improved environmental management techiniques and cleaner production programs among companies that supply WEC member companies. The WEC is implementing pilot projects with multinationals and a select number of their suppliers in Mexico, Brazil and China (where the project is in the planning stage). In Mexico, the project involves Janssen-Cilag, an operating subsidiary of Johnson & Johnson that produces drugs for clients around the world, and Alcoa Fujikur, whose lines of business include automotive and electronic distribution systems and fiber-optic cable.

Driver - Trade Association Requirements

Some trade associations require their members to have an environmental management system in place or to adhere to environmental codes of conduct. For example, national chemical associations in 52 countries run Responsible Care® programs. Under Responsible Care, member companies must commit to adopting a set of guiding principles, codes, guidelines and checklists on health, safety and environmental matters, and to developing indicators and verification procedures. They must communicate their "good faith efforts" to implement the codes to employees and stakeholders.[8]

Mexico's National Association of the Chemical Industry (*Asociacion Nacional de la Industria Quimica*—ANIQ) was the first association to design its Responsible Care program as an environmental health and safety management system (*Sistema de Administracion de Responsabilidad Integral*—SARI). It incorporates elements of ISO 14001 and fulfills other requirements of different known management systems related to environmental, health and safety issues. Adoption of the Responsible Care program is a condition for becoming a member of ANIQ. Members must commit themselves is to actively participating in assistance activities designed to support the Responsible Care program in member SMEs.

Responsible Care had a strong impact on the decision by the National Association of Chemical Distributors (NACD) to develop an environmental code of its own (the NACD has members in Canada and the United States, and many of its members are small businesses). The NACD code is based on Responsible Care, but is stronger in several respects; it requires third-party verification of members' performance, as well as health, safety, and security, and has a history of suspending and terminating members for noncompliance (Nash 2000).

The Environmental Commitment and Responsibility program of the Canadian Electricity Association (CEA), which counts small and medium-size businesses among its members, stipulates that adoption of an ISO 14001–consistent EMS is a condition of membership. Under the Environmental Commitment and Responsibility program, a verification team visits a selected number of utilities each year to determine whether the EMS implemented satisfies the program's requirements.

For SMEs, market forces are particularly important. This is especially true in Mexico, which has a large, informal economy and whose smaller businesses may be subject to fewer regulatory pressures. A recent Inter-American Development Bank study of ISO 9000, and to a lesser degree ISO 14001, in certain areas of Latin America, including Nuevo León in Mexico, found that a key determinant of the quality of the environmental management system was the extent to which management demanded the system (IADB 2004). However, despite these market forces, for most SMEs the barriers to EMS adoption outweigh the drivers.

Barriers to EMS Adoption

Barriers are factors that hamper and can even bring to an end the design, implementation and operation of an environmental management system. Even when driving forces exist, SMEs may face imposing barriers when designing and implementing an EMS that larger companies are less likely to face. A Lack of knowledge about and awareness of environmental management

The Importance of the Business Owner

For small and medium-size enterprises, a central factor in the implementation of an environmental management system is the leadership of the top manager in pushing for continual improvement. Observers have noted that a commitment to achieving environmental improvements is a far bigger factor in achieving environment results than merely having an EMS in place; an EMS just makes a company be able to achieve these improvements. In fact, a Canadian Federation of Independent Business (CFIB) survey found that for 87 percent of respondents the personal views of owners were the primary motivation for improved environmental performance (CFIB 2001).

The Guadalajara Environmental Management Pilot (GEMP) and Proyecto Administración Ambiental Monterrey (PAAM) studies highlight the importance of manager support for employee involvement in the EMS process. Those managers who enthusiastically adopted EMS concepts and who worked with their employees achieved successful EMS implementation during the study time period, whereas those managers who did not with their employees failed. A manager who sees an economic benefit in EMS implementation and actively supports its design and development is a critical factor in EMS implementation (Lexington Group 2002).

7. B. Brad Cummings, manager, Pollution Prevention and Innovative Technologies, Environment Canada Ontario Region, e-mail message to Tim Whitehouse, CEC, January 28, 2005.

8. See <http://www.responsiblecare.org>.

Barriers to EMS Implementation

MOTIVATION

- Lack of customer requirements or demand to have an environmental management system
- Misconception that environmental issues are a low organizational priority or are believed to be under control
- Belief that an EMS is not important or relevant to the business or capable of adding to the bottom line
- Lack of public or nongovernmental organization pressure to implement an EMS
- Belief that an EMS is the current management "flavor of the month"
- Belief that an EMS is not widely accepted or used in an industrial sector or geographic area

RESOURCE ISSUES

- Concern about the cost and time needed to establish an EMS
- Concern about the operational management costs after implementation
- Perception that an EMS is complicated and unattainable

IMPLEMENTATION CONCERNS

- Fear of discovering noncompliance with regulations or permits
- Fear of discovering or uncovering internal problems within the organization (staff issues, process issues, company policies, etc.).

Source: NEETF 2001.

systems are big barriers to their implementation. A 2001 Canadian Federation of Independent Businesses survey found that nearly three-quarters of the 4,322 respondents to an environmental survey of its members were not aware of the ISO 14000 series (CFIB 2001). About half the federation members have fewer than five employees.

Studies and academic articles also generally note that SMEs are less likely to implement EMSs, because they are largely occupied with the day-to-day concerns of keeping their businesses viable and retaining existing customers. When compared with larger businesses that are not a subsidiary of a multinational, SMEs generally do not have dominant market positions; they have less well-defined management structures; they have no support from a parent company; they generate less environmental data; they have less environmental expertise and fewer financial and technical resources available to pursue environmental management; and they tend to have less interaction with regulatory agencies (Hillary 1999; CFIB 2001;Coglianese and Nash 2002).

Several efforts have been made to identify existing barriers to EMS adoption in both the United States and Europe. In the United States, the National Environmental Education and Training Foundation (NEETF) identified some of these barriers in its report *Standardizing Excellence: Working with Smaller Businesses to Implement Environmental Management Systems* (NEETF 2001). The report, developed by means of a grant from the US Environmental Protection Agency, grew out of the findings of workshops held for government and private sector participants who identified practical and effective ways to promote and design EMSs and to help SMEs implement them (NEETF 2001, 10). These barriers fall into three categories: motivation, resource and implementation issues (see box).

In Europe, a 1999 analysis of 33 studies published between 1994 and 1999 found that in small and medium-size enterprises "internal barriers to EMS adoption are more important than external ones" (Hillary 1999) The barriers identified in that analysis are closely related to the barriers listed by NEETF (see sidebar). The analysis does mention two types of barriers worth highlighting. One is that EMS implementation is "an interrupted and interruptible process in SMEs," and the other is "the lack of sector specific guidance and material tailored to different sizes of the firms" (Hillary 1999).

The European analysis also raised the issue of the cost of certification, which echoes the concerns raised by NORMAPME about the high cost of ISO certification. Because small firms generally do not have in-house expertise, they usually need to hire consultants to help them design, implement and verify the EMS and auditors to certify the EMS, costs which larger firms can more easily handle.

The US NDEMS study noted that many firms were not measuring or monitoring the EMS-related aspects of their operations as actively as they should. Only 27 of the 83 companies studied actually quantified data for environmental performance, and only 32 of 83 quantified the financial benefits. The rest relied more on a qualitative assessment, which can be attributed to a failure to establish clear objectives in the EMS design (NDEMS 2003).

Within North America, government-supported programs are available to help SMEs improve their environmental performance. Included as part of these programs are government efforts to encourage SMEs to design and implement EMSs.

Keeping the Costs Down

Here are two examples of the many efforts being made to address the ISO certification costs that SMEs may face.

ENVIROREADY

EnviroReady, launched from Canada with government and private sector support, is positioned between self-declaration and third party certification. Under this process, the company signs a self-declaration of conformance with EMS requirements. This documentation is then examined by a professional accountant for evidence that the client's EMS meets or exceeds ISO 14001 certification. If so, the business is issued an EnviroReady Report <http://www.14000registry.com>.

THE HACKEFORS MODEL

The Hackefors Model was developed to implement group ISO 14001 certification in Sweden. Originally, the network consisted of 26 SMEs in the Hackefors Industrial Park outside the city of Linköping, Sweden. Established in 1995, the group was by 1999 certified under ISO 14001 through the application of group certification, although each individual enterprise has its own EMS. By 2002, 24 networks and over 450 SMEs were using the model to achieve ISO 14001 group certification. Each network has a central coordinator, a steering committee and an EMS group. These networks have helped to significantly lower the costs of EMS design and implementation and overcome the size and resource issues faced by SMEs.

6. TECHNICAL ASSISTANCE AND OUTREACH

Domestic policies and programs that disseminate information, advice and technical assistance tools on environmental management systems are important ways of encouraging the adoption of those systems by small and medium-size enterprises. Technical assistance tools can help address the environmental issues identified during EMS implementation.

Technical assistance programs for SMEs can be found in Canada, Mexico and the United States. Environmental management systems do not provide an organization with explicit tools on how to manage waste, prevent discharges or reduce air emissions, therefore, technical assistance programs can help to address the technical shortcomings of smaller businesses and respond to the specific needs of a particular industrial sector. Outreach programs and technical assistance tools tend to be most successful when they are developed and delivered at the regional level and tailored to the specific needs of businesses.

Technical Assistance in Canada

Environmental Canada, Industry Canada and the provincial and territorial governments have programs designed to improve the environmental performance of SMEs (see Table 6.1). These programs are largely developed to support non regulatory pollution prevention initiatives targeting SMEs (Environment Canada 2003).

Programs such as the Eco-Efficiency Partnership in British Columbia <http://www.scbc.org/eep>, the Eco-Efficiency Centre in Nova Scotia <http://www.mgmt.dal.ca/sres/eco%2Dburnside/> and the EnviroClub of Quebec <www.enviroclub.ca/en/contact> exemplify the general approach to improving the environmental performance of SMEs in Canada. These programs are supported by federal, provincial and corporate sources. The program in British Columbia provides financial assistance for an environmental audit to identify potential efficiency gains. The audit is followed by a report developing site-specific options and a business plan detailing the costs and benefits of implementation. In addition to performing environmental reviews, the Eco-Efficiency Centre in Nova Scotia and the EnviroClub in Quebec offer tools, technical assistance and guidance on "best practices" within an industry and encourage environmental cooperation among businesses.

One example of the type of support these partnerships can bring is Bain Ultra, located near Quebec City. Bain Ultra, which has 225 employees, produces baths, hot tubs and shower cases. With the assistance of EnviroClub, the company identified the significant environmental aspects of its business and developed a plan to implement an environmental management system so that it could achieve its ISO 14001 certification by 2006. This exercise allowed the company to target several measures, easily implemented that could improve the company's environmental performance: recuperating polystyrene scraps; improving the pulverization process for manufacturing baths and showers; changing the pulverized resin for one with a 7 percent lower styrene content; and reducing acetone emissions by 30 percent. These measures, which will be carried out during 2005, are projected to save the company over C$300,000 a year.[9]

9. F. Huppé, acting head, Toxic Substances and Prevention, Environment Canada, e-mail message to Tim Whitehouse, CEC, February 10, 2005.

Table 6.1 Sample Technical Assistance Programs in Canada

Program	Description
Industry Canada <http://strategis.ic.gc.ca/epic/internet/inee-ee.nsf/en/Home>	Operates an eco-efficiency web site offering tools and best practices. Sponsors, with Natural Resources Canada and the National Research Council, free two-day workshops for SMEs on eco-efficiency (which includes EMSs). Involved in the Environmental Supply Chain Management Pilot Project, a voluntary initiative aimed at reducing greenhouse gas emissions from SMEs in the Canadian manufacturing sector.
National Research Council, Industrial Research Assistance Program (NRC-IRAP) <http://dfe-sce.nrc-cnrc.gc.ca/dfestra/dfestra_e.html>	Directed at building the capacity of Canadian SMEs. Offers assistance for improving resource efficiency. Produces "Design for Environment" online resources to facilitate the integration of environmental considerations into the product and process designs of SMEs.
Toronto Region Sustainability Program (TRSP) <http://www.oceta.on.ca/toronto.htm>	Provides one-stop pollution prevention technical assistance for SME manufacturers in the Greater Toronto Area (GTA), and a 50% cost-share funding incentive. The GTA is Canada's largest and busiest urban area, and includes a number of diverse manufacturing SMEs that generate smog, greenhouse gases, and toxic releases to the air and sewers, and hazardous wastes.
Business Water Quslity Program (BWQP) <http://www.oceta.on.ca/bwqp.htm>	Designed to assist SMEs in preventing spills to groundwater, surface water and sewers in the Regional Municipality of Waterloo (Ontario). Grants are provided to local SMEs to cost share facility a review and assessment, and to implement best management practices, including EMSs. This includes an inventory of chemical substances; identifies risk areas and potential for spills; reviews pollution prevention plans; and identifies opportunities for SMEs to improve environmental performance.
Business Air Quality Program (BAQP)	A pilot program to reduce criteria air pollutants generated by SME industrial manufacturing operations in Southwest Ontario. The goal is to identify opportunities for SMEs to reduce emissions of key criteria air pollutants (nitrogen oxides, sulphur dioxide, particlulate matter and volatile organic compounds), to improve their environmental performance and economic competitiveness.
Canadian Environmental Technology Advancement Centres (CETACs) <http://www.oceta.on.ca> <http://www.cetacwest.com> <http://www.enviroaccess.ca>	The three (3) CETACs provide business services to Canadian entrepreneurs, start-up companies and SMEs to support the development, demonstration, verification and deployment of innovative environmental technologies. This is accomplished through the provision of support services such as general business development counseling, market analysis, assistance in raising capital, and technical assistance.
Enviroclub, Quebec <http://www.ec.gc.ca/cppic/Search/en/SearchDetail.cfm?ID=2346&xTable=nopp_tbl>	Assists SMEs in Quebec by providing access to expertise and financing for pollution prevention projects, including EMSs. Provides workshops and professional consulting services to members for a fee.

Eco-Efficiency Partnership (EEP), British Columbia <http://www.c2p2online.com/main.php3?doc_id=381&section=154>	Helps small and medium-size manufacturing enterprises to find ways to become more competitive, using fewer resources such as energy, water or materials. Is a cost-sharing arrangement with participating companies, in which EEP provides matching funds to a company to pay for consultants able to recommend process improvements that make financial and practical sense.
Eco-Efficiency Centre, Nova Scotia <http://www.mgmt.dal.ca/sres/eco-burnside/>	Helps companies to adopt good environmental practices, while improving the efficiency of individual companies, primarily SMEs. Encourages companies to commit to conservation goals and to cooperate and exchange successful experiences. Also provides information on eco-efficiency, offers training sessions and workshops and contributes to education and research.
Reference Center for the Life Cycle Assessment, Interpretation and Management of Products, Processes and Services (CIRAIG, <http://www.congresbcu.com/ciraig/>	Provides tools and training for life cycle management and assessment. Is a partner in the UN Environment Program/Society of Environmental Toxicology and Chemistry Life Cycle Initiative, which is based in academic institutions in Montreal.

Technical Assistance in Mexico

Among the services available to help Mexican SMEs with the technical issues associated with environmental management are the Enterprise Committee for Sustainable Development and the Mexican Center for Cleaner Production.

Technical assistance is particularly important in Mexico, where SMEs are likely to face higher costs than those in Canada and the United States and greater technical hurdles and infrastructure difficulties in implementing and certifying to the ISO 14001 standard (Pacific Institute for Studies in Development, Environment, and Security 2000). Technical assistance for small and medium-size businesses taking steps to prevent pollution and introduce cleaner production techniques is an important component of the World Environment Center's effort and of the efforts of the sponsors of the Guadalajara Environmental Management Pilot (GEMP) and *Proyecto Administración Ambiental Monterrey* (PAAM) studies (see Chapter 3).

In the Guadalajara project, this support included assigning a consultant to each SME to provide implementation assistance as well as a mentor company to monitor progress (World Bank 1998). In the World Environment Center project in Mexico, partners held a workshop on cleaner production and environmental management training for suppliers and conducted one-day follow-up visits to the suppliers (WEC 2004)

Table 6.2 Sample Technical Assistance Programs in Mexico

Program	Description
Commission for Private Sector Studies in Sustainable Development (*Comisión de Estudios del Sector Privado para el Desarrollo Sustentable*—cespedes, <http://www.cce.org.mx/cespedes>	Promotes sustainable practices such as eco-efficiency and social responsibility in Mexico's industrial sector. Offers workshops and seminars on sustainable development, pollution prevention and environmental management systems.
Mexican Center for Cleaner Production (*Centro Mexicano para la Producción Más Limpia*) <http://www.cmpl.ipn.mx>	Serves as a vehicle for the UN Industrial Development Organization (UNIDO) and Mexican National Polytechnic Institute to implement pollution prevention projects.

Technical Assistance in the United States

In the United States, numerous state and federal agencies, nonprofit organizations and academic institutes offer programs that encourage EMS research, training and implementation. In addition, the US EPA has established partnerships with state agencies, universities and other organizations to maximize resources and support for EMS programs.

The US EPA's web site at <http://www. epa.gov/ems/index.htm> provides access to research papers, best practices, guidance documents and EMS templates. An example of the documents available is *Environmental Management Systems: An Implementation Guide for Small and Medium-sized Organizations* (reissued November 2003), providing simple, useful information and case studies to help small and medium-size businesses develop EMSs.

US EPA's Small Business Division serves as the primary entry point through which small businesses can access US EPA information. It also facilitates communications between the small business community, including national trade associations, and the US EPA. In 2003, the US EPA issued its revised "Small Business Strategy" that is designed to bring unity and improved effectiveness to Agency-wide efforts to assist small businesses in improving their environmental performance.

The US EPA Small Business Division has developed several documents to help small businesses design and implement an EMS. These documents include:

- *Practical Guide to Environmental Management*: The Guide describes a common sense process for improving the small business's environmental management activities and can be found at <http://www.smallbiz-enviroweb.org/html/pdf/EM_Guide0902.pdf>

- *Documenting Your Environmental Management Plan—A Workbook for Small Business*: This workbook is for small business owners who worry that what they don't know can hurt them and want to move away from "fire fighting" environmental issues. It shows how to get take a proactive stance without disrupting their day-to-day business operations. It can be found at <http://www.smallbiz-enviroweb.org/html/pdf/Documenting_EMP.pdf>

- A series of environmental best management practice (BMP) fact sheets for small businesses. The BMPs cover the following sectors: bakery, food services, furniture finishing, health care, hotels, landscaping, machine shops, marinas, retail stores, and service stations. These fact sheets were completed in October 2004 and will be updated periodically to ensure that the information they contain is useful to the target sectors. They are designed to be used with the publications listed above: "Practical Guide . . ." and the "Documenting . . . Workbook." These fact sheets can be found at <http://www.smallbiz-enviroweb.org/pollution/BMPs.htm>.

There are a wide variety of partnership programs providing technical assistance, training and tools to help with EMS development. The National Directory of EMS Technical Assistance Providers (TAP Directory) provides user friendly links to a wide variety of EMS assistance resources in the 50 states <www.epa.gov/ems/index.htm>. Also, the Public Entity EMS Resource Center (PEER) web site at <www.peercenter.net/> provides a broad array of information and tools to help public entities (primarily local governments) understand and adopt environmental management systems (EMSs) for their operations. The PEER Center is a collaboration between the office of Water at US EPA and the Global Environment and Technology Foundation (GETF). In addition, a number of organizations around the country called EMs Local Resource Centers, or PEER Centers, are reaching out to local governments to help them adopt EMSs.

Twenty-four states have developed public policy–related EMS policies and programs, internal EMSs or environmental laws that recognize EMSs.[10] Many of these programs promote multimedia environmental management, rewarding companies that achieve superior environmental performance by providing regulatory incentives and public recognition similar to US EPA's National Environmental Performance Track program (see Chapter 7).

Some US states coordinate and share their experiences (in an unofficial capacity) on EMS programs through the Multi-State Working Group on Environmental Performance (MSWG), which is composed of representatives of federal and state agencies, businesses, academia and nongovernmental organizations (NGOs). The organization was created to promote the use of EMSs through public and private policy innovation. The MSWG *develops and provides information on credible and effective environmental management systems and other public policy tools that can be used in pursing improved environmental performance*

10. These states are Arizona, California, Colorado, Connecticut, Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, New Hampshire, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Vermont, Virginia, Washington and Wisconsin.

and sustainability. For example, the External Value EMS Voluntary Guidance: Gaining Value by Addressing Stakeholder Needs (March 2004) offers advice to organizations that wish to develop an EMS that, in addition to providing improved internal value, delivers measurable and reliable value to external audiences, such as governmental authorities, local communities, customers and suppliers, environmental groups, and investors and the financial community, among others. This Guidance focuses on three key elements that should be addressed within an organization's EMS if it has these external value aspirations:

- Achievement and Demonstration of Legal Compliance;
- Involvement of External Stakeholders;
- External Communications: Transparency and Reporting.

The MSWG is also developing a web-based news source, library and e-network for EMS practitioners and leaders. It can be found at: <http://www.mswg.org>.

Table 6.3 Sample Technical Assistance Programs in the United States

Program	Description
US EPA's Small Business Ombudsman (SBO)/Small Business Division (SBD) <http://www.epa.gov/sbo> and <http://www.smallbiz-enviroweb. org/>	Serves as the advocate for small businesses and as their gateway to the Agency. Facilitates communications between small businesses and EPA to assist in resolving issues. Works within the Agency to increase their understanding of small businesses in the development and enforcement of environmental regulations. Most recently developed a *Small Business Strategy and Implementation Plan* to coordinate and unify the more than 100 EPA small business initiatives. Oversees the State Small Business Ombudsmen and State Small Assistance Programs that were established under section 507 of the 1990 Clean Air Act Amendments. Has produced several tools for small businesses including: *Practical Guide to Environmental Management for Small Businesses and Documenting Your Environmental Management Plan—A Workbook for Small Business* (see appendix A for more information).
US EPA's Sector Strategies Programs <http://www.epa.gov/ispd/program. html>	Works to enhance the environmental performance of 12 manufacturing and service sectors: agribusiness, cement, colleges and universities, construction, forest products, iron and steel, metal casting, metal finishing, paint and coatings, ports, shipbuilding and ship repair, and specialty batch chemicals. Aims to improve environmental performance through a knowledge-based approach to problem solving and implementation of systematic management of environmental issues. Will produce EMS implementation guidance documents for each of the targeted sectors
Design for the Environment (DfE) EMS program <http://www.epa.gov//dfe/pubs/ iems/iems_guide/index.htm>	Works in partnership with individual industry sectors to encourage the incorporation of environmental, health and safety considerations into the design of processes and products. For example, works with the Screen Printing and Graphic Imaging Association (SGIA) International Partnership to develop an industry-wide EMS that specifically address the environmental health and safety issues arising from the inks used in screen-printing. The SGIA developed tools and templates for conducting gap analyses, creating EMS manuals, evaluating processing, and auditing.

Manufacturing Extension Partnerships (MEP) <http://www.scitechresources.gov/Results/show_result.php?rec=2319> and <http://www.mep.nist.gov/environment/environment.htm>	A nationwide network of nonprofit centers that support small and medium-size businesses. Centers are located in all 50 states and linked through the National Institute of Standards and Technology (NIST) of the US Department of Commerce. Uses the EMS-based methodology of "clean manufacturing" to help companies reduce environmental impacts and costs through resource efficiencies and process optimization. Clean manufacturing focuses initially on specific processes, but the principal concepts encourage continuous improvement through systematic management. MEP program is now working with the US EPA's Green Supply Chain program in which major companies help to recruit their SME suppliers for "clean (and lean) manufacturing" projects.
Green Suppliers Network <http://www.epa.gov/p2/programs/gsn.htm>	As an innovative collaboration among industry, US EPA and 360vu, a provider of technical assistance to US manufacturers through its national network of MEP aims to work with all levels of the manufacturing supply chain to achieve environmental and economic benefits. By employing "lean and clean" methodologies, companies can learn how to decrease the use of toxic and nonrenewable materials, establish systems to use energy more efficiently, improve the use and selection of more environmentally friendly raw materials, institute work practices to reduce labor and costs, and promote a culture of greater employee participation in improvement activities.
US EPA National Environmental Compliance Assistance Clearinghouse (Clearinghouse) <http://www.epa.gov/clearinghouse>	Offers a wide variety of public and private sector environmental compliance information. Visit the Clearinghouse's collection of links to materials on EMSs at <http://cfpub.epa. gov/clearinghouse/index.cfm?TopicID=C:10:300:EMS>
The Sector Notebook series, <www.epa.gov/compliance/sectornotebooks.html>	The Sector Notebook series is a unique set of profiles containing a wealth of sector-specfic environmental information. Unlike many resource materials, which are organized by air, water and land pollutants, the over 35 Notebooks provide a holistic, "whole facility" approach by integrating manufacturing processes, applicable regulations and other relevant environment information.
Compliance Assistance Centers <www.assistancecenters.net>	Created through EPA sponsored partnerships with industry, academic institutions, environmental groups, and other agencies, help businesses, local governments and federal agencies understand Federal environmental requirements and save money through pollution prevention techniques. Through web sites, telephone assistance lines, fax-back systems, e-mail discussion groups and more, the Centers aim to help address real-world issues in language that is used by the regulated entities.
Pollution Prevention Resource Exchange (P2Rx) <www.p2rx.org>	A consortium of eight regional pollution prevention information centers, funded in part through grants from EPA. Represents a broad constituency, including state and local pollution prevention programs, manufacturing extension partnerships, cooperative extension and nonprofit organizations.

7. INCENTIVE PROGRAMS AND POLICIES

Seals of Performance Granted by the Mexican Environmental Audit Program

CLEAN INDUSTRY SEAL: Granted to manufacturing companies that have fully complied with the plan of action resulting from the environmental audit (which involves, among other things, complying with current environmental regulations).



ENVIRONMENTAL COMPLIANCE SEAL: Granted to organizations that do not use industrial processes in their operation, but have complied with the recommended plan of action.



ENVIRONMENTAL EXCELLENCE SEAL: Granted to organizations, recognized by an "excellence group," that have engaged in self-designed initiatives directed toward preventing pollution, seeking community outreach, developing suppliers, solving local environmental problems and participating in pollution reversion programs, among other measures. To obtain the seal, organizations must present documented and operational proof of environmental compliance and the availability of an environmental management system.



Within Canada, Mexico and the United States, the traditional environmental regulatory actions are being carried out in conjunction with non regulatory voluntary programs designed to provide incentives for greater environmental performance. Each country has programs designed to encourage the use of environmental management systems; however, unlike Europe's Eco-Management and Audit Scheme, which requires the use of environmental management systems in larger industrial facilities (see Chapter 2), these efforts are largely voluntary and incentive-based.

Both Mexico and the United States have recognition programs in which the use of an EMS by a company is one factor the government considers in determining whether to recognize a company as a top environmental performer. Although no federal incentive programs exists in Canada, the Canadian Environmental Protection Act (CEPA) recognizes the use of certified environmental management systems to achieve performance requirements and gives the courts the authority to require a company to become certified in a "recognized" EMS standard as part of the court-ordered option. Some Canadian companies have been required by the courts to develop a certifiable EMS as part of a sentence.[11]

Incentive Programs and Policies in Mexico

Mexico's Environmental Auditing Program (EAP) is based on a voluntary agreement between the Federal Attorney for Environmental Protection (Profepa) and an organization. Under the EAP, a plan of action is devised to recommend preventive and corrective measures related to air, water, soil, solid and hazardous waste, noise, industrial safety and hygiene, energy, natural resources, environmental risk, environmental management and any other issue with potentially adverse impacts on the environment.

Participating organizations are evaluated by independent auditors accredited by the Mexican Accreditation Entity, which has an agreement with Profepa to audit companies under EAP. Profepa also provides interested organizations with a guide for performing self-assessments of environmental impact and management in preparation for the environmental auditing process. Once the audit has been completed, the action plan implemented and all the preventive and corrective measures have been taken, organizations receive Profepa's certifications of Clean Industry or Environmental Compliance. Organizations that go further to achieve stronger environmental performance under pollution prevention and eco-efficiency schemes are granted the recognition of Environmental Excellence. Upon receiving the certification or recognition, organizations can use Profepa's performance seals to promote their public image (see sidebar).

Profepa acknowledges that organizations that have an EMS in use may reach and maintain environmental compliance more easily. However, while having an EMS in place is a requirement for achieving the Recognition of Environmental Excellence, it is not mandatory for the Clean Industry or Environmental Compliance Certifications .

The performance seals are registered at the Mexican Institute of Industrial Property. [12] Once granted to an organization, a seal can be displayed at its facilities, in its publicity and with its products and services. The right to use the seals is valid for the period of time specified in the agreement, but that period cannot exceed two years.

In over 12 years of operation, the program has certified 1,623 organizations; 1,454 organizations currently have active certification. Most of the organizations certified are large private and public companies located in large and medium-size cities such as Mexico City, Monterrey, Guadalajara, Tijuana and Puebla.

Incentive Programs and Policies in the United States

US EPA's National Environmental Performance Track program recognizes top environmental performers among participating public or private US facilities of all types and sizes whether public or private (US EPA 2004a). To be recognized under Performance Track, facilities must have:

11. Notable cases include Prospec Chemicals (1996), Coretec (1998) and Alberta Waste Management Facility (1999).

12. The misuse of the seals is subject to sanctions and fines under the Industrial Property Law and its regulation.

Ideal Jacobs Corporation

The Ideal Jacobs Corporation of Maplewood, New Jersey, is an ISO 9002/14001 registered facility that specializes in printing and the fabrication of plastic and metal parts.

OVERVIEW

Ideal Jacobs is one of the smallest facilities in US EPA's National Environmental Performance Track program, and yet it boasts an efficient environmental management system. The EMS is used to track and eliminate unnecessary production waste as well as to gain more control over the facility's budget. By gauging expenses and implementing programs to reduce those expenses, the company is initiating changes that ultimately contribute to environmental performance and cost effectiveness. Ideal Jacobs's EMS is also used to track the business aspect of production to observe investments and their subsequent effect on profits. The company's growth of 10 percent in 2000 reinforced the notion that environmental performance and cost-effectiveness can progress together.

BENEFITS

For this company, the direct results of its EMS were, in 2002, near-zero generation of hazardous wastes and compliance with the thresholds for all other levels of emissions to the extent that the company did not need permits of any kind. Cost savings in 2002 attributed to the EMS were approximately $25,000. Ideal estimated that the $20,000 cost it incurred to implement the EMS at its facility was captured in this one-year cost savings. Source: US Environmental Protection Agency, <http://www.epa.gov/ems/studies/jacobs.htm>

- an environmental management system in place for at least one full cycle that has been assessed by an independent party
- a history of sustained regulatory compliance and a commitment to continued compliance
- past environmental achievement and a commitment to continuous environmental improvement
- community outreach procedures in place.

Organizations accepted into the program receive special benefits, such as: low priority for routine federal inspections; special regulatory and administrative incentives, such as preference to Performance Track Members in developing flexible Title V air permits and reduced reporting frequency for Performance Track facilities that are minor or synthetic minor sources subject to Maximum Achievable Control Technology (MACT) standards; and more flexible requirements for large hazardous waste generators In addition, EPA informs elected officials of the Performance Track members in their districts.

Performance Track has a special program to promote participation by small facilities (that is, any facility with less than 50 persons), including those that are part of a larger corporate entity. For small facilities, the US EPA recognizes that the scope, level and formality of the EMS will depend on the nature, size and complexity of the facility and that the EMS will not require the same level of detail and verification procedures as the EMSs in place in larger facilities.

The US EPA issued a formal EMS Policy in May 2002. It calls for promoting the widespread development and implementation of EMSs based on the plan-do-check-act ISO 14001 framework. The EMS Policy provides that, while EMSs do not replace the need for regulatory and enforcement programs, they can complement them. Having an EMS in place can indicate to the EPA an opportunity to streamline regulations and consider the company to be in compliance assistance, monitoring, and enforcement. In support of this Policy, the EPA has developed EMS programs, training, tools and partnerships to help achieve the agency's goals of improving compliance, preventing pollution and reducing costs. In April 2004, the EPA issued the Strategy for Determining the Role of Environmental Management Systems in Regulatory Programs (US EPA 2004b). The Strategy was developed in response to the increasing interest of stakeholders in the US EPA's use of EMSs in permits, rules and enforcement actions. The EMS Strategy encourages carefully designed experimentation to determine whether EPA and the states, by considering EMSs in permits and regulations, can achieve better environmental results at less cost, improve compliance, target resources more effectively, and enhance public involvement. It states that although EMSs cannot guarantee any specific level of performance, EPA believes that, when properly implemented, EMSs can help facilities achieve significantly improved environmental results and other positive benefits. The US EPA is using the Strategy to explore ing the possible benefits of incorporating EMS options into the US regulatory structure, but it does not intend to mandate the use of EMSs (Bergeson 2004).

In 1995, the US EPA issued a policy called Incentives for Self-Policing, Discovery, Disclosure, Correction and Prevention of Violations (USEPA Audit Policy). It was revised in 2000. Under this policy, penalties may be reduced or eliminated for facilities that discover violations through self-auditing or under environmental management systems; and that self-disclose and correct the violations promptly and take measures to prevent recurrence and promptly comply with other requirements set under the policy.[13]

The US EPA's Small Business Compliance Policy promotes environmental compliance among small businesses with fewer than 100 employees by providing incentives to discover and correct environmental problems. The agency offers to eliminate or significantly reduce penalties for small businesses that voluntarily discover violations of environmental law and promptly disclose and correct them."[14]

In addition to establishing programs that encourage companies to systematically manage environmental performance, in 2003 the US EPA joined EMSs with enforcement efforts by issuing its Guidance on the Use of Environmental Management Systems (EMSs) in Enforcement Settlements as Injunctive Relief and Supplemental Environmental Projects (June 12, 2003). The Guidance reiterates EPA's compliance and enforcement office's support for the use of EMSs, by organizations of all sizes and types. The EMSs can be used as a tool to maintain compliance, achieve results beyond compliance, and minimize environmental impacts in non-regulated areas. More information can be found at: <http://www.epa.gov/compliance/resources/policies/incentives/ems/emssettlementguidance.pdf>.

The directive also explains how the EPA will encourage the use of compliance-focused EMSs (CFEMS) as injunctive relief in enforcement settlements where it is necessary to address the root causes of the violations. More information on Compliance-Focused Environmental Man-

13. See <http://www.epa.gov/compliance/incentives/auditing/auditpolicy.html>

14. See <http://www.epa.gov/compliance/incentives/smallbusiness>

agement System (CFEMS) - Enforcement Agreement Guidance can be found at: <http://www.epa.gov/compliance/resources/publications/incentives/ems/ems12elemr.pdf>.

In addition, the directive explains when EMSs that meet the criteria in the Supplemental Environmental Project (SEP) Policy, according to their state and local governments, will be eligible for SEP penalty mitigation credit. More information can be found at: <http://cfpub.epa.gov/compliance/resources/policies/civil/seps/>.

Finally, the directive describes how persons who discover, correct, and disclose violations discovered through EMSs can be eligible for penalty mitigation under EPA's Audit Policy and statute-specific penalty policies.

Some US states are also developing rules and permits linked to EMSs. These state programs provide incentives for companies that implement EMSs and engage stakeholders. EMS concepts have been integrated as well into several federal and state pollution prevention and risk reduction programs. Organizations that exceed threshold quantities of chemical use or hazardous waste generation are required to evaluate risks and then implement programs and systems to minimize and mitigate potential releases to the environment. Components of these programs typically include planning, reporting, auditing and stakeholder involvement. In particular, Section 112(r) of the Clean Air Act establishes a federal focus on the prevention of chemical accidents. The objective of section 112(r) is to prevent serious chemical accidents that have the potential to affect public health and the environment. Under these requirements, industry has the obligation to prevent accidents, operate safely, and manage hazardous chemicals in a safe and responsible way.

Voluntary government incentives programs are relatively new in North America. While having an environmental management system is a required component of EPA's Performance Track Program and Profepa's Environmental Excellence Seal, time will reveal the extent to which SMEs participate in these programs and whether they affect EMS use over the longer term.

8. FUTURE DIRECTIONS

Governments are promoting EMSs as one of a variety of tools available to help SMEs improve their environmental performance and their bottom line. The experiences in North America suggest some "lessons learned" that can be valuable in helping to shape any future government or private sector initiatives designed to promote the use of EMSs by small and medium-size enterprises:

- *A business case must exist*. Governments are most successful in recruiting SMEs for voluntary environmental programs when the business case for environmental management is clearly demonstrated.
- *Business requirements are vital*. The power of the suply chain, business contracts and industrial associations are significant for many SMEs.
- *A tailored outreach can be helpful*. Outreach efforts that are narrowly tailored to the business sector, size and location of the SME will be far more successful than generic outreach efforts. Generic EMS toolkits can be time and resource consuming when applied to the different organizational structures and specific sectors of SMEs.
- *The right partners are essential*. When government programs have involved non-governmental organizations or SMEs themselves, as partners, the likelihood of success has been greater. The governments of the three countries should promote forums in which companies can present not only the results of their EMSs, but also the process used to implement and develop them.
- *A key factor is the knowledge and attitude of the owners*. For small and micro-enterprises, the knowledge and attitude of the owner/operator are often critical factors .
- *An EMS in and of itself does not mean better environmental performance*. EMSs are flexible , and so their impact depends on how they are implemented and integrated. EMSs do not necessarily lead to improved performance, unless pursuing and measuring environmental improvement are integral to the EMS.
- *Regulatory compliance pressure is a motivator of environmental performance*. In certain sectors and in certain parts of North America, the pressures of regulatory compliance can be an important motivator in prompting the search for least-cost solutions. EMSs can be associated with the current requirements of environmental agencies.

An EMS can provide the methodology a company needs to identify and implement ways of making environmental improvements. For small and medium-size businesses that are not part of a larger corporation, sector-specific technical assistance and outreach efforts are often critical in providing the expertise that may not exist within a company. Because very little empirical research exists on the extent to which successful EMS practices are being used by SMEs, continued research by academic institutions and government agencies is necessary. This research could help shed light on how and under what circumstances EMSs can improve environmental performance in small and medium-size enterprises and the success of assistance and outreach efforts. Specific areas of further research could include the following questions:

- Will government incentives for EMS adoption and use—such as technical assistance, public recognition and regulatory flexibility—increase the use of EMSs over the longer-term?
- If so, how will these incentive programs affect environmental performance over the longer term?
- How will the environmental requirements of large customers and trade associations affect the environmental performance of suppliers over the long term?
- How do successful EMS adopters overcome implementation problems? And what do their experiences offer subsequent adapters in the way of models?

Research that offers insights into environmental performance in specific sectors and specific geographic regions will be particularly important in driving future policy decisions of governments on the promotion of environmental management systems. As this type of research develops, continued cooperation between the three countries could occur in several areas. The goal of this cooperation should be to improve the delivery of sector-specific information and technical assistance to SMEs. Such an improvement could entail

- sharing sector-specific EMS implementation tools and lessons learned from specific sector activities
- exploring additional ways to support efforts to green the supply chain
- continuing to look for and share success stories, particularly as they relate to new and emerging programs such as USEPA's Performance Track program and Mexico's Environmental Auditing Program
- promoting greater interaction between local, state and provincial governments on the success of their programs.

This type of cooperation could be particularly beneficial to Mexico. Efforts to green the supply chain by large multinationals have great potential to improve the environmental performance of smaller suppliers in Mexico. Also, the technical assistance and outreach efforts in the United States and Canada could provide useful lessons for Mexico as it develops its own internal capacity to provide this type of support. In addition, the networks and information sharing that have developed in the United States as a result of the work of the Multi-State Working Group and other organizations can provide valuable lessons for Mexico's states as they take on more environmental responsibility.

While cooperation could be particularly beneficial to Mexico, it could also be of benefit to all of those promoting environmental management systems in Canada, Mexico and the United States. By sharing experiences and success stories, particularly as they relate to specific supply chains and sectors of the economy, governments and technical assistance providers can improve their delivery of services to small and medium-size businesses by building on existing lessons learned.

Appendix A

Useful Web Sites in Addition to References Provided

EMAS Toolkit for Small Organisations <http://www.inem.org/emas-toolkit>. This web site has information on how to create an environmental management system based on the "Plan, Do,Check, Act" model. It also contains case studies.

Energy Star Small Business <http://www.energystar.gov/smallbiz>. ENERGY STAR is a US government-backed program helping businesses and individuals protect the environment through superior energy efficiency. This web site has information and materials designed specifically for small business. English and Spanish versions available.

MEDS—Manufacturing Efficiency Decision Support Tool <http://meds.mmtc.org/>. This web site provides users with information on the performance, cost, and energy and environmental implications of alternative manufacturing technologies,

MAP—Manufacturing Assessment Planner Toolkit <http://map.mmtc.org/>. The Manufacturing Assessment Planner (MAP) Toolkit is designed to aid MEP field agents in performing low-cost assessments. The planner provides the necessary steps and procedures to conduct an eight-hour, integrated energy, environment, and manufacturing efficiency assessment for a small or midsized facility.

Ontario Clean Air Alliance—Emissions Calculator, <http://www.electricitychoices.org>. This web site allows users to calculate air quality impacts and provides information on green energy suppliers.

P2 World Information Network <http://www.p2win.org>. A global network bringing together pollution prevention roundtables and cleaner production networks to strengthen partnerships, encourage innovation and take collective action.

Environmental Management Accounting (EMA) <http://www.newmoa.org/prevention/topichub/toc.cfm?hub=105&subsec=7&nav=7>. EMA is the identification, collection, estimation, analysis, internal reporting, and use of materials and energy flow information, environmental cost information, and other cost information for both conventional and environmental decision-making within an organization. For companies that have the goals of saving money, especially environmental costs, and reducing environmental impacts, EMA provides essential information for meeting those goals

Green Purchasing <http://www.p2ric.org/TopicHubs/toc.cfm?hub=13&subsec=7&nav=7>. Green purchasing is a consideration of supply chain management and is also known as environmentally preferred purchasing (EPP), green procurement, affirmative procurement, eco-procurement, and environmentally responsible purchasing. Green purchasing attempts to identify and reduce environmental impact and to maximize resource efficiency.

Lean Manufacturing <http://www.zerowastenetwork.org/hub/p2rx-mod/subsection.cfm?hub=19&subsec=1&nav=1>. Lean Manufacturing is a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection

Small Business Environmental Homepage <http:// www.smallbiz-enviroweb.org>. This web site, funded by US EPA and maintained by the private sector, contains information on compliance assistance, pollution prevention, industry sectors, performance measurements, and awards and grants for small businesses in the United States Examples of material on this web site include:
Practical Guide to Environmental Management <http://www.smallbiz-enviroweb.org/html/pdf/EM_Guide0902.pdf>

Documenting Your Environmental Management Plan—A Workbook for Small Business, (September 2003) is a workbook for small business owners who worry that what they don't know can hurt them and want to move away from "fire fighting" environmental issues. It shows how to get a proactive stance without disrupting their day-to-day business operations. <http://www.smallbiz-enviroweb.org/html/pdf/ Documenting_EMP.pdf>.

Environmental Best Management Practices for Small Businesses <http://www. smallbiz-enviroweb.org/pollution/ BMPs.html>.
Best Management Practices (BMPs) for the following sectors: bakery, food services, furniture finishing, health care, hotel, landscaping, machine shop, marina, retail store, service station (these fact sheets were completed in October 2004 and are designed to be used with the

publications listed above: "Practical Guide . . ." and the "Documenting . . . Workbook <http://www.smallbiz-enviroweb.org/sba/key_smallbiz_publications.html>.

US Department of Energy—Industrial Assessment Centers Program <http://www.oit.doe.gov/iac>. The Industrial Assessment Centers (IACs) provide eligible small- and medium-sized manufacturers with no-cost energy assessments. Teams composed mainly of engineering faculty and students from the centers, located at 26 universities around the country, conduct energy audits or industrial assessments and provide recommendations to manufacturers to help them identify opportunities to improve productivity, reduce waste, and save energy. This web site contains tools and publications on energy saving methods and opportunities.

US EPA Compliance Assistance Centers <http://www.assistancecenters.net>, provide access to a broad array of information on environmental requirements and everyday issues faced by specific industry and government sectors. The web site also includes a link to the Compliance Assistance Platform <www.envap.org>, a rich resource for state environmental compliance assistance tools and environmental topics.

US EPA Small Business Advocate and Gateway, <http://www.epa.gov/sbo>. US EPA's portal for finding information that pertains to small businesses

Water Efficiency Manual for Commercial, Industrial and Institutional Facilities <http://www.p2pays.org/ref/01/00692.pdf>. North Carolina's Division of Pollution Prevention and Environmental Assistance web site which offers information and links geared toward small businesses, including information on water and energy efficiency techniques and environmental management systems.

Appendix B

10 Elements of an Environmental Management System

The Commission for Environmental Cooperation has identified the "10 Elements of Effective Environmental Management Systems":

1. Document and clearly communicate an environmental policy.
2. Clearly communicate all environmental requirements and voluntary undertakings.
3. Establish specific objectives and targets and establish appropriate time frames to meet those objectives and targets.
4. Establish the structure, responsibility and resources to ensure that the organization is equipped with sufficient personnel and other resources to meet the objectives and targets of its EMS.
5. Identify and provide for the planning and management of all the organization's operations and activities with a view toward achieving the objectives and targets.
6. Establish and maintain corrective and preventive action and emergency procedures.
7. Ensure adequate training and competence of employees.
8. Describe how the "10 Elements" will be integrated into the organization's overall decision making and planning.
9. Establish and maintain document control.
10. Require continuous evaluation and improvement.

The full text of the "10 elements" can be found at: <http://www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=243>.

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