

An Examination of Trade in Environmental Goods and Services in the NAFTA Region



Environmental Business International, Inc.



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ISBN 2-923358-14-7

Legal Deposit–Bibliothèque nationale du Québec, 2004

Legal Deposit–Bibliothèque nationale du Canada, 2004

Disponible en français–Disponible en español



Printed in Canada on recycled paper containing 100% post-consumer waste fiber that is process chlorine free.

Cite as:

Environmental Business International. An Examination of Trade in Environmental Goods and Services in the NAFTA Region. Commission for Environmental Cooperation. Montreal, December 2004.

Preface

One of the mandates of the CEC is to conduct an ongoing assessment of the environmental impacts of trade liberalization in North America, and to further our understanding of the linkages between trade and the environment. One of the hypotheses being tested within this area of work is whether liberalized rules under NAFTA serve to increase the use of environmental products. The CEC's work shows that liberalized trading rules under NAFTA do not in and of themselves lead to the increased use of environmental products. The CEC's project on *Trade in Environmentally Preferable Goods and Services* (alternatively, *Greening Trade in North America*) seeks to understand what constrains this development. That work is helping to break down barriers to environmental goods and services, including low consumer awareness of the environmental effects of purchasing habits, confusion about eco-labeling, difficulties in financing small companies in this field, lack of understanding about the best use of market-based approaches to support environmental protection and the conservation and sustainable use of biodiversity; and supporting cooperative efforts to increase these programs (e.g., renewable energy and energy efficiency, shade coffee, sustainable palm). It also aims to connect the growing numbers of suppliers and consumers of greener goods and services throughout North America.

The first step along these lines is to document the level of trade within North America and with the rest of the world in environmental goods and services. Given the lack of any definitive quantification of trade in these goods and services, or any established or consistently used industry codes that could result in ongoing government statistics on environmental trade, the CEC commissioned this study to provide an update on an earlier publication entitled *Assessing Latin American Markets for North American Environmental Goods and Services*.

Chantal Line Carpentier

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Commission for Environmental Cooperation

Introduction

The Commission for Environmental Cooperation (CEC) conducts policy and research work on environmental goods and services (EGS) in eleven different activities. One specific activity is to “Identify changes/trends in trade in green goods and services in the NAFTA region.”

Lacking any definitive quantification of trade in EGS or any established or consistently used industry codes that could result in ongoing government statistics on environmental trade, in 2003 the CEC commissioned this study to provide a classification and quantification of trade in EGS in the NAFTA region.

Data highlights and tables depicting trade in EGS are presented first, followed by an analysis of emerging trends and potential for further environmental trade. More details on these industry sectors and examples of clients are presented in the appendix.

Research Methodology

Obtaining industry size, market share and import/export estimates for each NAFTA country drew heavily on annual surveys of environmental product and service firms conducted by EBI. Secondary research was conducted by EBI to assess government business and trade statistics in Canada, Mexico and the United States, in addition to that generated by private companies, investors, and academic and nonprofit institutions. These data were used to quantify and build export/import models for each sector of the environmental industry. A partial list of documents referenced is available at the end of this report. Of particular note is research performed by Statistics Canada in surveying Canadian environmental product and service firms, research on a scale not assembled by the governments of Mexico and the United States.

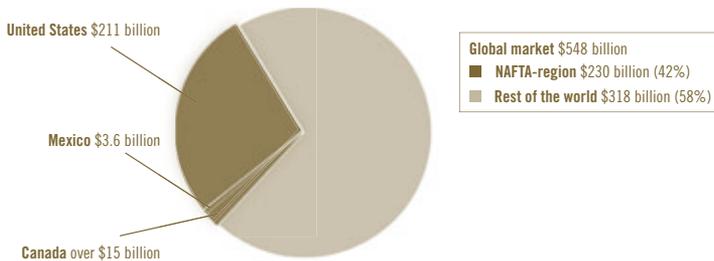
To obtain industry sector sizes, the basic methodology is to create a tabulation of the 'industry sector universe,' classifying all industry sector participants into several categories according to revenue size (e.g., US \$10–20 million in annual revenues). An accurate database of companies in that sector built from industry directories, association memberships, professional certification societies and other sources is first required. Surveys of these companies are then conducted by telephone, fax, e-mail and via the Internet to obtain year-by-year revenue information export sales figures, regional distribution of exports (both of the latter have pertinence to this project), and a number of other statistics such as product sales breakdowns, customer type breakdowns, growth forecasts, etc. Survey data was then compiled and figures extrapolated for the 'missing' companies from the response set by statistically acceptable methods for each size category.

This 'sell-side' research has been the basis of EBI's annual quantification of the US and global environmental industries since the early 1990s. Sell-side models are continually reconciled by spending statistics (or the results of 'buy-side' research) and adjusted with the addition of new data sources on an annual basis. Industry classification methodology can be found in the appendix.

The addition of three 'consumer goods and services' sectors to the analysis for this report provided an additional challenge as these areas had not received careful prior research attention on an annual basis. In each of these sectors secondary research was sought, but in only the sustainable agriculture sector, where considerable data on organic foods are becoming available, was anything found with reasonable statistical merit. In each of the other two sectors, efforts were made to identify companies selling sustainable forestry products or eco-tourism services and to build sell-side models with existing data.

Data Highlights

Environmental market sizes in 2001 (US\$) (Table 1a)



Intra-NAFTA environmental trade statistics (Tables 2 and 3)

- Total environmental trade within the NAFTA region totaled \$4.1 billion in 2001.
- Canada-Mexico environmental trade totaled \$32 million in 2001, \$18.9 million in Canadian exports to Mexico and \$12.8 million in Mexican exports to Canada.
- Canada-US environmental trade totaled \$3.0 billion in 2001, \$1.2 billion in Canadian exports to the US and \$1.8 billion in US exports to Canada.

- Mexico-US environmental trade totaled \$1.0 billion in 2001, \$116 million in Mexican exports to the US and \$919 million in US exports to Mexico.

Extra-NAFTA environmental trade statistics (Tables 4 and 5)

- Total environmental exports from the NAFTA region to the rest of the world totaled \$17.6 billion in 2001.
- Total environmental imports in the NAFTA region from the rest of the world totaled \$16.7 billion in 2001, resulting in a trade surplus for the NAFTA region of \$896 million.
- Equipment sectors accounted for two-thirds of environmental trade in the NAFTA region in 2001.
- Within equipment, water equipment and chemicals, air pollution control and waste management equipment were the largest sectors in environmental trade.

Environmental Trade Data

Table 1. World Trade in Environmental Goods and Services

a) The Global Environmental Market, by Region

By Region	2001 (billions of US\$)	% of Total
USA	211.2	38.5
Western Europe	160.8	29.3
Japan	93.3	17.0
Rest of Asia	25.6	4.7
Mexico	3.6	0.7
Rest of Latin America	9.2	1.7
Canada	15.2	2.8
Australia/NZ	8.6	1.6
Central and Eastern Europe	10.2	1.9
Middle East	7.0	1.3
Africa	3.6	0.7
Total	548	100

Table 1. (continued)

b) The 2001 Global Environmental Market, by Sector

	Global	USA	Canada	Mexico	USA	Canada	Mexico
	(billions of US\$)				(percent)		
Equipment							
Water Equipment and Chemicals	43.0	17.1	1.72	0.40	39.8	4.0	0.9
Air Pollution Control Instruments and Info Systems	34.0	18.2	0.86	0.14	53.5	2.5	0.4
Waste Management Equipment	6.6	2.4	0.13	0.08	36.5	1.9	1.2
Process and Prevention Technology	32.6	9.5	0.88	0.23	29.0	2.7	0.7
	3.0	1.4	0.06	0.04	46.8	2.0	1.2
Services							
Solid Waste Management	120.7	41.9	2.93	0.46	34.7	2.4	0.4
Hazardous Waste Management	17.8	5.0	0.44	0.08	28.2	2.5	0.4
Consulting and Engineering	31.5	16.6	1.33	0.11	52.9	4.2	0.4
Remediation/Industrial Services	29.4	11.1	1.05	0.30	37.8	3.6	1.0
Analytical Services	3.8	1.3	0.13	0.03	32.8	3.3	0.8
Water Treatment Works	78.6	31.6	2.37	0.65	40.2	3.0	0.8
Resources*							
Water Utilities	87.0	33.7	2.25	0.76	38.7	2.6	0.9
Resource Recovery	35.7	10.5	0.75	0.22	29.5	2.1	0.6
Clean Energy Systems and Power	23.9	10.8	0.33	0.11	45.4	1.4	0.5
Total	548	211.2	15.2	3.6	38.6	2.8	0.7

Table 2. Intra-NAFTA Environmental Trade

a) Canada-Mexico Environmental Trade (millions of US\$)

	Canada Exports to Mexico (or Mexico Imports from Canada)	Mexico Exports to Canada (or Canada Imports from Mexico)
Equipment		
Water Equipment and Chemicals	4.44	0.09
Air Pollution Control	4.47	0.13
Instruments and Info. Systems	0.16	0.00
Waste Management Equipment	4.26	1.62
Process and Prevention Tech.	0.02	0.02
Services		
Solid Waste Management	0.59	0.00
Hazardous Waste Management	0.13	0.00
Consulting and Engineering	0.59	0.05
Remediation/Industrial Services	0.90	0.34
Analytical Services	0.19	0.00
Water Treatment Works	0.08	0.00
Resources		
Water Utilities	0.07	0.00
Resource Recovery	1.15	0.07
Clean Energy	0.29	0.01
Systems and Power	1.26	4.45
Sustainable Agriculture	0.00	0.70
Sustainable Forestry	0.33	5.36
Total	18.93	12.84

Table 2. (continued)

b) Canada-US Environmental Trade (millions of US\$)

	Canada Exports to USA (or USA Imports from Canada)	USA Exports to Canada (or Canada Imports from USA)
Equipment		
Water Equipment and Chemicals	314.5	848.9
Air Pollution Control	316.8	169.6
Instruments and Info. Systems	18.1	69.9
Waste Management Equipment	301.9	155.4
Process and Prevention Tech.	2.0	6.3
Services		
Solid Waste Management	14.4	71.4
Hazardous Waste Management	3.1	13.3
Consulting and Engineering	60.4	251.9
Remediation/Industrial Services	22.1	15.8
Analytical Services	9.1	2.4
Water Treatment Works	7.8	9.4
Resources		
Water Utilities	7.4	8.7
Resource Recovery	11.5	79.7
Clean Energy Systems and Power	29.5	10.3
Sustainable Agriculture	69.3	86.2
Sustainable Forestry	9.6	3.6
Ecotourism	16.5	2.9
Total	1,213.9	1,805.6

Table 2. (continued)

c) Mexico-US Environmental Trade (millions of US\$)

	Mexico Exports to USA (or USA Imports from Mexico)	USA Exports to Mexico (or Mexico Imports from USA)
Equipment		
Water Equipment and Chemicals	1.3	300.5
Air Pollution Control	1.3	98.4
Instruments and Info. Systems	0.0	35.0
Waste Management Equipment	10.5	62.1
Process and Prevention Tech.	0.2	3.2
Services		
Solid Waste Management	3.3	40.8
Hazardous Waste Management	0.4	31.8
Consulting and Engineering	0.5	58.7
Remediation/Industrial Services	0.7	23.8
Analytical Services	0.0	3.7
Water Treatment Works	5.4	46.9
Resources		
Water Utilities	0.3	26.1
Resource Recovery	0.3	142.2
Clean Energy Systems and Power	1.1	41.1
Sustainable Agriculture	32.1	4.3
Sustainable Forestry	5.6	0.0
Ecotourism	53.6	0.1
Total	116.6	918.7

Table 3. Total Environmental Trade in the NAFTA Region

(sum of three bilateral groups: US-Can, US-Mex, Mex-Can; exports and imports)

	Total Trade Value (millions of US\$)	Percent of Environmental Trade
Equipment		67
Water Equipment and Chemicals	1,469.8	
Air Pollution Control	590.7	
Instruments and Info. Systems	123.2	
Waste Management Equipment	535.8	
Process and Prevention Tech.	11.7	
Services		17
Solid Waste Management	130.6	
Hazardous	48.7	
Waste Management		
Consulting and Engineering	372.1	
Remediation/Industrial Services	63.6	
Analytical Services	15.4	
Water Treatment Works	69.5	
Resources		16
Water Utilities	42.5	
Resource Recovery	235.0	
Clean Energy	82.2	
Systems and Power		
Sustainable Agriculture	197.6	
Sustainable Forestry	19.5	
Ecotourism	78.8	
Total	4,086.6	100

Table 4. Environmental Trade between the NAFTA Region and Latin America (LatAm) and the Rest of the World (ROW)

a). Canada-LatAm and ROW Environmental Trade
(millions of US\$)

	Canada Exports to LatAM	Canada Exports to ROW
Equipment		
Water Equipment and Chemicals	8.5	49.0
Air Pollution Control	8.6	49.3
Instruments and Info. Systems	0.5	7.6
Waste Management Equipment	8.2	47.0
Process and Prevention Tech.	0.1	0.8
Services		
Solid Waste Management	1.2	3.9
Hazardous Waste Management	0.3	0.8
Consulting and Engineering	42.7	80.6
Remediation/Industrial Services	1.8	6.0
Analytical Services	0.2	1.2
Water Treatment Works	5.5	10.4
Resources		
Water Utilities	5.2	9.9
Resource Recovery	1.2	101.6
Clean Energy Systems and Power	20.8	39.3
Sustainable Agriculture	2.5	52.9
Sustainable Forestry	0.0	70.4
Ecotourism	0.3	15.8
Total	107.5	546.5

Table 4. (continued)**b) Mexico-LatAm and ROW Environmental Trade**
(millions of US\$)

	Mexico Exports to LatAM	Mexico Exports to ROW
Equipment		
Water Equipment and Chemicals	0.2	0.2
Air Pollution Control	1.0	0.1
Instruments and Info. Systems	0.0	0.0
Waste Management Equipment	3.2	0.8
Process and Prevention Tech.	0.0	0.0
Services		
Solid Waste Management	0.4	0.0
Hazardous Waste Management	0.0	0.0
Consulting and Engineering	1.7	0.2
Remediation/Industrial Services	5.5	0.3
Analytical Services	0.3	0.1
Water Treatment Works	3.6	0.0
Resources		
Water Utilities	4.9	0.0
Resource Recovery	0.4	0.6
Clean Energy Systems and Power	0.3	0.1
Sustainable Agriculture	1.0	11.9
Sustainable Forestry	0.0	0.7
Ecotourism	3.2	45.0
Total	25.8	60.0

Table 4. (continued)

c) USA-LatAm and ROW Environmental Trade
(millions of US\$)

	USA Exports to LatAM	USA Exports to ROW
Equipment		
Water Equipment and Chemicals	292.1	4,901.4
Air Pollution Control	303.9	2,077.0
Instruments and Info. Systems	69.9	1,573.2
Waste Management Equipment	93.2	1,242.9
Process and Prevention Tech.	3.2	50.4
Services		
Solid Waste Management	30.6	61.2
Hazardous Waste Management	5.3	2.7
Consulting and Engineering	169.6	1,674.4
Remediation/Industrial Services	27.7	328.8
Analytical Services	5.8	47.0
Water Treatment Works	56.3	75.0
Resources		
Water Utilities	26.1	26.1
Resource Recovery	79.7	2,285.0
Clean Energy Systems and Power	61.6	913.8
Sustainable Agriculture	12.9	327.4
Sustainable Forestry	0.0	8.4
Ecotourism	0.3	25.5
Total	1,238.2	15,620.1

Table 4. (continued)

d) NAFTA Region-LatAm and ROW Environmental Trade
(millions of US\$)

	NAFTA Exports to LatAM	NAFTA Exports to ROW
Equipment		
Water Equipment and Chemicals	300.8	4,950.6
Air Pollution Control	313.5	2,126.4
Instruments and Info. Systems	70.4	1,580.8
Waste Management Equipment	104.6	1,290.7
Process and Prevention Tech.	3.2	51.3
Services		
Solid Waste Management	32.2	65.1
Hazardous Waste Management	5.6	3.5
Consulting and Engineering	213.9	1,755.2
Remediation/Industrial Services	35.0	335.1
Analytical Services	6.4	48.3
Water Treatment Works	65.3	85.4
Resources		
Water Utilities	36.2	35.9
Resource Recovery	81.3	2,387.2
Clean Energy Systems and Power	82.7	953.2
Sustainable Agriculture	16.4	392.2
Sustainable Forestry	0.0	79.5
Ecotourism	3.8	86.4
Total	1,371.4	16,226.7

Table 5. Total Environmental Trade between the NAFTA region and the Rest of the World (ROW; millions of US\$)

	NAFTA Exports to ROW	NAFTA Imports from ROW	Trade Balance	Total Imports into NAFTA Countries	Imports into NAFTA Countries from other NAFTA countries
Equipment	10,792.4	6,295.1	4,497.3	9,026.2	2,731.1
Water Equipment and Chemicals	5,251.3	2,210.4	3,040.9	3,680.2	1,469.8
Air Pollution Control Instruments and Info. Systems	2,440.0	2,371.2	68.7	2,961.9	590.7
Waste Mgmt Equipment	1,651.2	350.6	1,300.6	473.8	123.2
Process and Prevention Tech.	1,395.3	1,220.8	174.5	1,756.6	535.8
	54.5	142.0	-87.5	153.7	11.7
Services	2,650.9	5,388.3	-2,737.4	6,088.3	700.0
Solid Waste Management	97.3	1,349.0	-1,251.7	1,479.6	130.6
Hazardous Waste Mgmt.	9.1	214.9	-205.8	263.6	48.7
Consulting and Engineering	1,969.1	683.5	1,285.6	1,055.7	372.1
Remediation/Industrial Services	370.1	471.0	-100.9	534.6	63.6
Analytical Services	54.6	2.0	52.6	17.4	15.4
Water Treatment Works	150.7	2,667.9	-2,517.2	2,737.4	69.5
Resources	4,154.9	5,019.2	-864.3	5,674.7	655.5
Water Utilities	72.1	2,331.3	-2,259.2	2,373.8	42.5
Resource Recovery	2,468.5	320.0	2,148.5	555.0	235.0
Clean Energy Systems and Power	1,035.9	1,524.2	-488.3	1,606.4	82.2
Sustainable Agriculture	408.6	610.4	-201.8	808.0	197.6
Sustainable Forestry	79.5	41.5	38.0	61.0	19.5
Ecotourism	90.2	191.7	-101.5	270.5	78.8
Total	17,598.1	16,702.6	895.5	20,789.2	4,086.6

Emerging trends and potential for further trade

- Whereas equipment sectors represent the vast majority of environmental trade, the largest growth is occurring in sectors related to clean energy and sustainable consumer goods.
- Service and resource sectors related to waste and water infrastructure together represent the majority of global markets, but NAFTA nations are not global players in these markets.

Environmental Trade Trends by Sector

Environmental Services

Environmental Testing and Analytical Services	Increasing ability to ship samples will increase trade, but will remain a small market share as local tests and capacity are desired. On-site testing also increasing.
Wastewater Treatment Works	French and British water conglomerates have taken the lead, leveraging private ownership in home nations. Any export expertise in NAFTA countries lies in the C&E and WE&C sectors and not in insular municipal operators.
Solid Waste Management	Top NAFTA private waste firms (Waste Mgmt, Allied/BFI) have divested themselves of virtually all international waste assets. Not much cross border flow of waste.
Hazardous Waste Management	Not much cross-border flow of hazardous waste besides near some maquiladora facilities. Basel convention restricts broader movement. NAFTA haz waste firms not active in overseas business ownership.
Remediation/Industrial Services	US expertise is in demand for complicated cleanups in Japan and South America and, to a lesser extent, in Europe. Increasing amount of remediation is tied to property redevelopment so local partnerships are crucial. Industrial services are largely tied to oil and gas business.
Environmental Consulting and Engineering (C&E)	Opportunities exist for experienced solution-providers, but clients prefer local talent. Most C&E firms partner with locals or train and hire native engineers. Communication technology has greatly enhanced global transfer of expertise without travel.

Environmental Equipment

Water Equipment and Chemicals	Water scarcity, increased pollution and increased costs provide consistent growth prospects for water systems vendors.
Instruments and Information Systems	Desire for monitoring and measuring technology in transition economies provides growth.
Air Pollution Control Equipment	In stationary sources, historic reliance on the power sector is waning as sources of VOCs, NOx and other pollutants are regulated around the world. Vehicular emissions systems grow as automobiles penetrate transition economies, but long-term, lower emitting vehicles will not require APC devices.

Waste Management Equipment	Supplies for garbage infrastructure have fairly consistent demand, but follow economic cycles for private and municipal customers and are sensitive to commodity prices in recycled materials.
Process and Prevention Technology	Innovative process technology tends to remain inside developers that are not usually commercial vendors or exporters.

Environmental Resources

Water Utilities	French and British water conglomerates have taken the lead leveraging private ownership in home nations. Any export expertise in NAFTA countries lies in the C&E and WE&C sectors and not in insular municipal operators.
Resource Recovery	Secondary materials markets are tied to prices of primary or virgin materials. Shipping costs are also a factor. Many nations could suffice with exported secondary waste for the US but costs of collection, separation and shipping make it uneconomical.
Clean Energy Power and Systems	Growth is strong and interest high in solar energy for off-the-grid applications and wind systems and power for grid contribution. Developing alternatives from ethanol or other cleaner fuels all the way to fuel cells and zero-emission vehicles (ZEVs) have very strong potential for growth.

Environmental Consumer Goods and Services

Sustainable Agriculture Products	US organic food standards and certification processes of 2002 are sustaining 20% growth in organic foods and their supply by farms. International agreement on the horizon.
Sustainable Forestry Products	Standardization and certification are expected to occur within five years, resulting in booming demand for sustainable timber and finished goods.
Eco-Tourism	Many nations have proposed or existing standards, but little international consistency exists. Many eco-tourism facilities now exist, but not many of them would qualify for the proposed high standards. Demand is strong for eco-tourism, however, with as much as 10–20% of travelers motivated to consider this option.

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Appendix: Environmental Industry Sectors

Industry Classification

To quantify trade in environmental goods and services, a consensus on industry classification must first be established. An objective of the classification was consistency and comparability with historical statistics on the environmental industry, with classifications used for international environmental trade and policy discussions with WTO, OECD, UNCTAD and other international bodies. In addition, the classification needed to be consistent with how the industry views itself and feature maximum accuracy in such tasks as quantifying environmental trade in the absence of consistent codes used in other, more established industry sectors.

Discussions were held to determine the parameters of environmental industry classification and encompass the existing research and multiple contacts each party has had in its respective history in environmental goods and services.

As a result of these discussions, the following classification system was used:

SERVICES

Analytical Services
Wastewater Treatment Works
Solid Waste Management
Hazardous Waste Management
Remediation/Industrial Services
Consulting and Engineering

EQUIPMENT

Water Equipment and Chemicals
Instruments and Information
Systems
Air Pollution Control Equipment
Waste Management Equipment
Process and Prevention Technology

RESOURCES

Water Utilities
Resource Recovery
Clean Energy Systems and Power

CONSUMER GOODS AND SERVICES

Sustainable Agriculture
Sustainable Forestry
Ecotourism

Environmental Industry Sectors and Examples of Clients

Sector	Description	Examples of Clients
Environmental Services		
Environmental Testing and Analytical Services	Provide testing of “environmental samples” (soil, water, air and some biological tissues).	Regulated industries, gov’t, C&E, Hazardous waste and remediation contractors
Wastewater Treatment Works	Collection and treatment of residential, commercial and industrial wastewaters. Facilities are commonly known as POTWs or “publicly owned treatment works.”	Municipalities, commercial establishments and all industries
Solid Waste Management	Collection, processing and disposal of solid waste.	Municipalities and all industries
Hazardous Waste Management	Collection, processing and disposal of hazardous, medical waste, nuclear waste.	Chemical, petroleum, mfgs government agencies
Remediation/Industrial Services	Cleanup of contaminated sites, buildings and environmental cleaning of operating facilities.	Government agencies, Property owners, Industry
Environmental Consulting and Engineering (C&E)	Engineering, consulting, design, assessment, permitting, project management, O&M, monitoring, etc.	Industry, government, municipalities, waste mgmt. companies, POTWs
Environmental Equipment		
Water Equipment and Chemicals	Provide equipment, supplies and maintenance in the delivery and treatment of water and wastewater.	Municipalities and all industries
Instruments and Information Systems	Produce instrumentation for the analysis of environmental samples. Includes info systems and software.	Analytical services, gov’t regulated companies
Air Pollution Control Equipment	Produce equipment and tech. to control air pollution. Includes vehicle controls.	Utilities, waste-to-energy industries, auto industry
Waste Management Equipment	Equipment for handling, storing or transporting solid, liquid or hazardous waste. Includes recycling/ remediation equipment.	Municipalities, generating industries, solid waste companies
Process and Prevention Technology	Technology for in-process pollution prevention and waste recovery.	All industries

Sector	Description	Examples of Clients
Environmental Resources		
Water Utilities	Selling water to end users.	Consumers, municipalities and all industries
Resource Recovery	Selling materials recovered and converted from industrial by-products or post-consumer waste.	Municipalities generating industries solid waste companies
Clean Energy Power and Systems	Selling power and systems in solar, wind, geothermal, small scale hydro, energy efficiency and DSM.	Utilities, all industries, and consumers
Environmental Consumer Goods and Services		
Sustainable Agriculture Products	Agricultural products or finished food products derived from certified organic materials and processes.	Consumers, food manufacturing companies, food service companies
Sustainable Forestry Products	Timber or finished forest products derived from certified sustainable forestry programs.	Consumers, manufacturers
Ecotourism	Tourism revenues derived from certified eco-tourism locations that minimize 'environmental footprint' in transportation and lodging facilities.	Consumers

