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THE MASSACHUSETTS ENVIRONMENTAL INDUSTRY

Facing the Challenges of Maturity



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The Massachusetts Environmental Industry

*FACING THE CHALLENGES
OF MATURITY*

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Contents

DEFINING THE ENVIRONMENTAL INDUSTRY	1
NUMBERS SHOW STRENGTH IN THE COMMONWEALTH	3
The Industry's Core Sectors	4
Engineering/Consulting Leads Sectors	6
INDUSTRY EXECUTIVES ENUMERATE CONCERNS	
ABOUT FUTURE GROWTH	7
The Challenges Ahead	7
RECOMMENDATIONS	9
Increase Market Penetration	9
Increase Product Development	9
Establish New Markets	9
Improve Federal Assistance	9
OUTLOOK: NO IMMEDIATE CHANGES IN STORE	11
APPENDIX A, METHODOLOGY	12
APPENDIX B	13
SIC Categories for the Environmental Industry	13
SIC Categories by Sector	13
ENDNOTES	14



*F*or most of the past 20 years, the environmental industry has been a very significant one, both in Massachusetts and across the country. Some have placed it alongside the electronics, computer hardware, software, biotechnology, fiber optics, and composite materials industries as part of the high-technology sector that has diversified and strengthened the state's economy.¹ Nationally, environmental industry employment has exceeded that of several major manufacturing industries, including chemicals, paper, and aerospace.

In the late 1990s, the momentum of the environmental movement began to wane. A decline in both employment and sales suggests that many of the most pressing environmental concerns have been addressed, first by government regulations, then by companies' in-house pollution-reduction efforts. Industry executives are aware of certain steps that can be taken to keep Massachusetts moving forward in the environmental industry. Still, they have concerns about future growth.



Defining the Environmental Industry

One of the purposes of this study is to define the environmental industry in such a way that its employment and sales can be measured in a consistent fashion over time, using a reliable source of information that will allow comparisons between this and other major Massachusetts industries.

To understand the environmental industry in Massachusetts, it is important to study how it fared in the second half of the 1990s, to measure its significance relative to other technology industries in the state, to understand its position relative to environmental industries in other states, and to determine how well environmental firms are adapting to a maturing industry.

One of the purposes of this study is to define the environmental industry in such a way that its employment and sales can be measured in a consistent fashion over time, using a reliable source of information that will allow comparisons between this and other major Massachusetts industries. This will enable public policy organizations to fully understand the significance of the environmental industry and its contribution to the state's economy.

Because of the breadth of the activities it undertakes, the industry has generally been analyzed through qualitative methods, with a different methodology for each study. While this has the advantage of "customizing" the information gathering, it has created inconsistencies in the definitions used to categorize and analyze the industry. As a consequence, the industry has been defined differently in every major study, making it difficult

to tell a consistent story about its characteristics and past performance trends in Massachusetts.

The U.S. Commerce Department and Environmental Business International studies characterize the industry by relying largely on 1200 annual business profile surveys, supplemented by interviews with executives, and some standard industrial classification (SIC) data.² The industrial classification data, however, are disaggregated only to the four-digit level. This cannot fully capture the environmental industry, which consists largely of small firms and sub-sectors of traditionally classified industries. Therefore, as described in more detail in Appendix A, this study has needed to further disaggregate the data, using iMarket Inc.'s MarketPlace data.

A list of six- and eight-digit SIC codes that appear to track industry trends was developed and then confirmed in interviews with industry leaders. With these, the industry has now been defined precisely enough to follow aggregate employment, sales, and number of businesses, as well as to enable comparisons among this industry and others in Massachusetts. With this kind of information, the environmental industry can be monitored on an annual basis.

The U.S. Environmental Industry: Rapid Growth Followed by Maturity

According to the U.S. Department of Commerce's Office of Technology Policy's definition, the environmental industry includes all revenue-generating activities associated with: (1) compliance with environmental regulations; (2) environmental assessment, analysis and protection; (3) pollution control, waste management, and remediation of contaminated property; (4) the provision and delivery of the environmental resources of water, recovered materials, and clean energy; and (5) the technologies and activities that contribute to increased energy and resource efficiency, higher productivity, and sustainable economic growth (enabling pollution prevention). (U.S. Department of Commerce, 1998, p. 13.)

Based on this definition, the domestic environmental industry is estimated to have had \$188.7 billion in sales in 1998, up 1.6 percent from the previous year, with 1,354,100 employees in 115,850 companies. The worldwide market for environmental goods and services is estimated to have been \$484 billion in 1998, up 2.3 percent from the previous year. Environmental goods and services exported by U.S. companies totaled \$18.7 billion in 1998, or about 6 percent of the non-U.S. market. This was far less international activity than occurred in Germany and Japan, which averaged over 20 percent of their business from export activities (E.B.I., Fall 1999, pp. 29-34).

The last time industry sales grew rapidly (10 to 15 percent a year) was in the latter half of the 1980s. Reauthorized legislation dealing with clean air, clean water, and hazardous waste resulted in expanded private and public cleanup programs, and U.S. firms sought significant outside help in their efforts to comply with federal and state air, water, and hazardous waste laws.

During the 1990s, industry growth in terms of sales slowed to less than 5 percent per year. Customers in the industrial area became experienced in compliance. Government-sponsored cleanup programs often stalled after the characterization phase. Competition increasingly resulted in standardized, lower-margin environmental services. The pace of new regulations slowed, and government enforcement efforts seemed to ease off, as the government focused instead on cooperative programs between regulators and the industries they regulated. The traditional drivers of the industry, which had experienced rapid double-digit growth in the 1980s, began to disappear as the industry matured.

Along with the decline in sales growth, average profit margins were 50 percent to 70 percent less in the mid-1990s than they were earlier in the decade.³ The investment of venture capital into the environmental industry also declined steeply, falling from over \$200 million in 1990 to \$30 million in 1996.⁴

As is often true of maturing industries, environmental services firms began a period of significant mergers and acquisitions in attempts to enter new geographic markets, reduce administrative overhead burdens, and add new services.

Companies in the environmental industry were advised by analysts to start looking to international markets for growth opportunities, to move their focus from "end of the pipe" cleanup activities to pollution prevention, and to sell products and services that integrated environmental management with overall business strategies and contributed to core businesses. All firms were advised to pay more attention to costs of doing business and to the management of their projects.⁵



Numbers Show Strength in the Commonwealth

In Massachusetts, the industry has generated total sales near \$5 billion annually, from roughly 2,400 businesses employing more than 31,000 people in 1998. Environmental industry employment represented 1 percent of Massachusetts workers, and its sales volume was almost 2.5 percent of statewide personal income.

Massachusetts has long been considered one of the nation's leading states in the environmental industry, thanks to its landmark policies in source reduction, recycling, hazardous-waste cleanup, water pollution prevention, and energy co-generation and conservation. These policies have encouraged Massachusetts companies to develop state-of-the-art environmental and energy products and services.

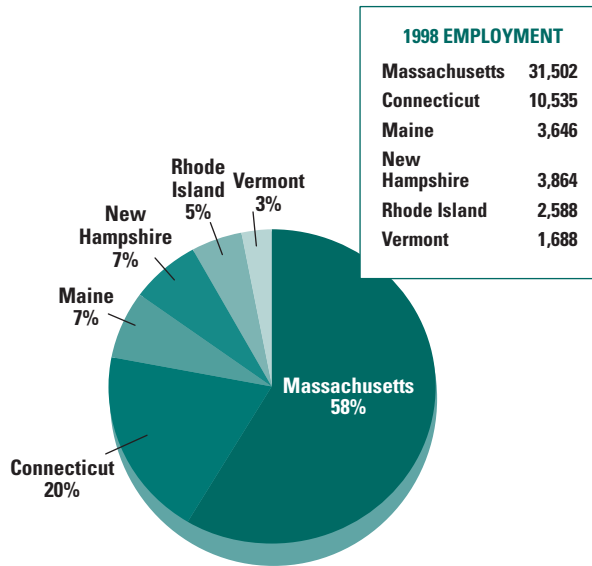
Past studies have noted that the regional New England industry is dominated by small firms, more than 80 percent of which have fewer than 50 employees and revenues below \$10 million. Many companies are new; 27 percent were started in the past seven years. The regional industry has been heavily focused in the service sector; more than 55 percent of companies provide consulting and engineering ser-

vices. In 1996, 73 percent of the business for New England firms was within the region, probably reflecting the predominance of small companies. The international market for New England firms accounted for only 3 percent of their customer base, versus 6 percent nationally.⁶

Environmental Technology in New England States: Employment, Number of Businesses, and Sales, and Percent Change from 1996

State	Employment		Number of Businesses		Sales	
	1998	% change from 1996	1998	% change from 1996	1998 (in millions)	% change from 1996
New England	53,823	1.7	5,378	5.4	\$7,046	4.3
Massachusetts	31,502	14.2	2,383	4.0	4,893	11.1
Connecticut	10,535	-23.6	1,302	4.3	1,029	-13.9
Maine	3,646	9.3	588	10.5	321	-16.2
New Hampshire	3,864	-1.3	537	11.0	293	-5.3
Rhode Island	2,588	-7.5	300	-5.1	288	-16.7
Vermont	1,688	12.5	268	15.0	222	88.5

Environmental Technology Employment,
New England States, 1998



The New England environmental industry is dominated by Massachusetts, which accounts for 69 percent of the region’s sales, 58 percent of employment, and 44 percent of the businesses. Massachusetts and Vermont are the only New England states that did not see sales decline from 1996 to 1998. Massachusetts had the highest increase in employment during the period, yet all the other New England states, except Rhode Island, saw the number of environmental businesses increase by a greater amount.

THE INDUSTRY’S CORE SECTORS

It is recognized that there are a number of law firms, financial and accounting institutions, and insurance firms with practices devoted to the support of the core environmental industry. There are also a number of educational institutions (including vocational schools, community colleges, four-year colleges, and universities) with programs devoted to environmental sciences. For this study, the industry is defined strictly in terms of the following core sectors:

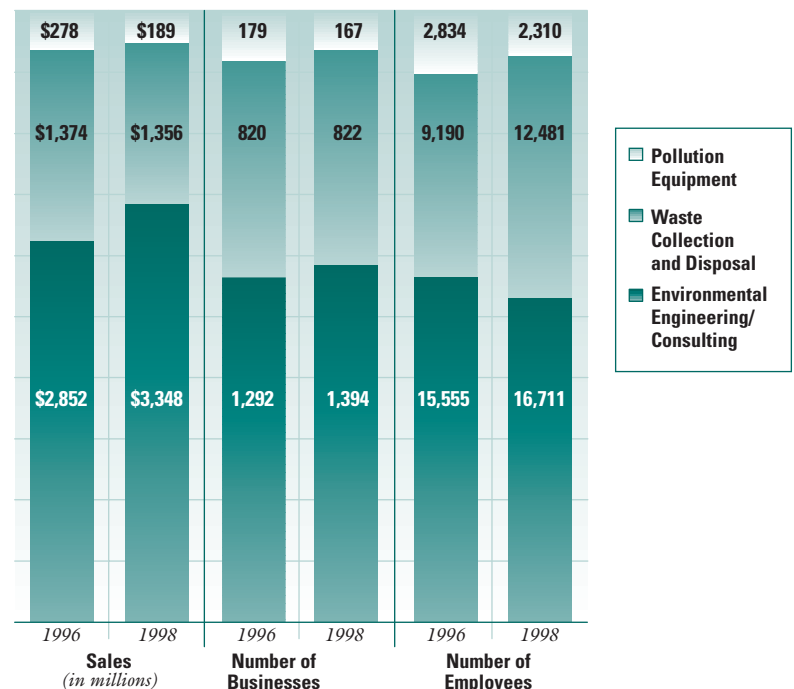
Environmental engineering and consulting
(environmental engineering, construction, remediation, and consulting firms)

Waste collection and disposal
(solid and hazardous waste and recycling services)

Pollution equipment
(monitoring instruments, information systems, and pollution prevention, control, and remediation equipment)

In Massachusetts, the industry, as defined above, has generated total sales near \$5 billion annually,

Massachusetts Environmental Industry Sectors,
Sales, Number of Businesses, and Number of Employees



**Top Eleven Environmental Technology States:
Sales, Employment, and Number of Businesses,
1998 and Percent Change from 1996**

State	Employment		Number of Businesses		Sales	
	1998	% change from 1996	1998	% change from 1996	1998 (in millions)	% change from 1996
US	815,022	5.9	74,895	5.1	\$115,167	16.8
California	111,263	0.0	10,228	4.7	\$22,154	9.6
Texas	59,510	7.8	5,293	8.9	\$5,435	6.8
New York	46,889	4.9	4,414	5.3	\$5,459	9.4
Pennsylvania	46,084	16.5	3,730	5.0	\$6,242	18.4
Florida	40,492	7.0	4,499	11.4	\$3,445	13.6
Illinois	37,677	4.7	2,772	3.9	\$6,438	4.6
Ohio	35,007	5.2	2,835	7.8	\$5,818	18.9
Massachusetts	31,502	14.2	2,383	4.0	\$4,893	11.1
New Jersey	30,615	0.3	2,917	5.4	\$4,194	(18.2)
Michigan	26,663	7.8	2,620	4.1	\$2,718	6.8
Louisiana	16,546	24.1	1,312	18.1	\$1,530	23.2

from roughly 2,400 businesses employing more than 31,000 people in 1998.⁷ Environmental industry employment represented 1 percent of Massachusetts workers, and its sales volume was almost 2.5 percent of statewide personal income.⁸

Describing the industry with regard to total state numbers understates its significance in the economy. In a list of sixteen major Massachusetts industries in 1996, the environmental industry would have ranked seventh in terms of number of businesses, twelfth in total employment, and fifteenth in sales.⁹

Another basis for measuring the relative importance of the industry is to compare the environmental industry in Massachusetts with that in the ten other states with the highest number of businesses, sales, and employment in 1998. Together, these accounted for almost 60 percent of national employment, sales, and number of businesses in the industry in 1998.

Massachusetts ranks seventh in sales (representing 4 percent of total U.S. sales in the industry), and eighth in employment (accounting for almost 4 percent of national employment), while it ranks tenth in number of businesses (3 percent of the nation). With the exception of sales, where Massachusetts increased its ranking from eighth in 1996, its relative position has not changed since 1996.

Like the environmental industry nationwide, the Commonwealth's industry growth rates slowed during the latter half of the 1990s, at least in the case of employment and new businesses in our more narrowly defined environmental industry.

Sales growth has improved slightly, but is still far below the rapid annual increases of a decade ago.

The Massachusetts environmental industry performed much better than that of the nation in terms of employment growth between 1996 and 1998. Employment grew at 14.2 percent, almost two and one-half times the national rate of 5.9 percent, and Massachusetts ranked third in employment growth among the largest environmental industry states. Sales growth lagged behind the nation overall (11 percent compared to 16.8 percent), and Massachusetts ranked tenth in terms of growth in the number of environmental firms (4 percent), versus the nation's 5.1 percent.

These figures imply that much of the growth in the Massachusetts environmental industry over the last few years has come from firm expansion, rather than the addition of new businesses.¹⁰ This supports interview findings and reports in national studies of increased mergers.

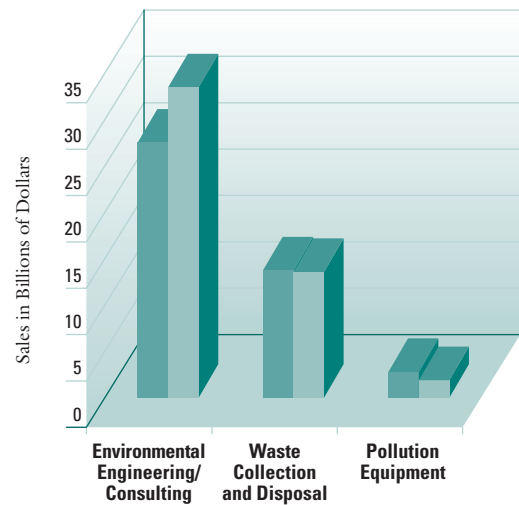
ENGINEERING/ CONSULTING LEADS SECTORS

As noted earlier, the industry has been divided into three sectors: environmental engineering and consulting, waste collection and disposal, and pollution equipment. Consulting dominates the industry in Massachusetts, accounting for more than two-thirds of total industry sales, over 50 percent of the employment, and 59 percent of the businesses. Environmental engineering/consulting is also the highest paying of the sectors, with an average annual wage of almost \$57,000, followed by pollution equipment at \$55,000 and waste collection and disposal at \$42,000. All three sectors have annual average wages exceeding the state average of roughly \$38,000.¹¹

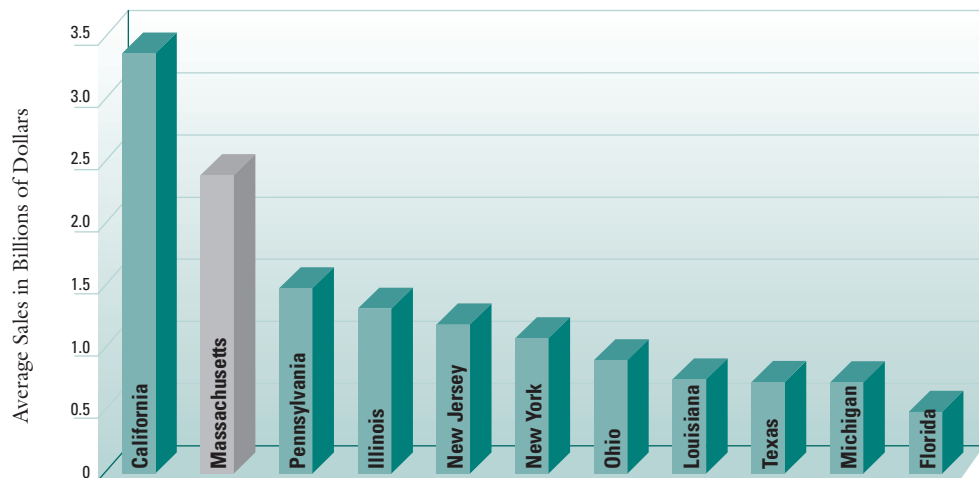
When the Massachusetts subgroups are compared to their national counterparts, it is clear that the overall industry average masks the concentration of the Massachusetts industry in the cutting-edge sector of engineering and consulting. In this sector, Massachusetts ranks

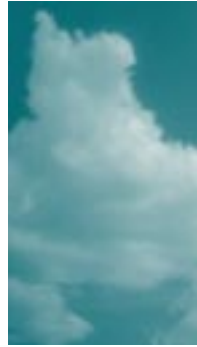
second in the nation in consulting sales volume, seventh in terms of number of employees, and ninth in number of businesses. This is in contrast to the other two sectors, where Massachusetts ranks near the bottom of the top tier states in all three categories.¹²

Environmental Industry Sector Sales, Massachusetts, 1996 and 1998



Average Sales per Business in Environmental Engineering/Consulting: Top 11 States, 1998





Industry Executives Enumerate Concerns About Future Growth

Employment and sales data help illustrate general characteristics and recent trends of the state’s environmental industry. It is also important to understand what dynamics are currently influencing industry performance and in what direction the industry appears to be heading. With this in mind, we interviewed members of the Environmental Business Council of New England, first assembled as a focus group in spring 1999. During the summer that followed, these 25 representatives of “core” companies were called individually, resulting in 16 complete interviews. A final focus group of 8, used to confirm and enrich the findings, was conducted in January 2000.

Thirteen of those interviewed were from environmental services companies, including environmental information management services and engineering, consulting, and remediation. Two were from pollution equipment manufacturers, and one represented a waste-collection and disposal facility. Seven of the sixteen had sales below \$10 million a year, which reflects the concentration of small companies in this industry.

After agreeing that the study’s quantitative data were reasonable, executives were asked what they

perceive as the greatest challenges that lie ahead and what government actions or policy positions might help the industry.

Public- and Private-Sector Sales by Sales Volume

Annual Sales per Company	Number of Firms Responding	Private Sector Sales	Public Sector Sales
		(%)	(%)
Under \$10 million	7	65-100	0-35
\$10-99 million (private)	4	40-70	30-60
\$10-99 million (public)	2	0-5	95-100
\$100 million or more	3	15-40	60-85

Source: Authors’ survey

THE CHALLENGES AHEAD

Company missions and strategies are slow to change.

As noted earlier, companies in this industry have been advised to move their focus from “end of the pipe” cleanup activities to pollution preven-

Growth strategies traditionally encompass efforts in market penetration, product development, new market development, or diversification. While industry leaders recognize the needs for these strategies, few have pursued them.

tion, look to international markets for growth opportunities, and sell products and services which integrate environmental management with business strategies that will contribute to core businesses. The interviews indicate that these shifts have not yet taken place.

Industry growth is stagnating.

Most of the executives interviewed are concerned about prospects for growth, particularly in what they perceive to be an increasingly competitive marketplace. Those interviewed generally agree that their sales growth paralleled that of the industry, at 5 percent or less per year, during the 1996–98 period. The smallest companies have achieved greater-than-average growth, while the largest companies have experienced relatively flat sales growth.

Growth strategies traditionally encompass efforts in market penetration, product development, new market development, or diversification. While industry leaders recognize the needs for these strategies, few have pursued them.

Attracting engineers has become increasingly difficult.

Many firms complain of difficulties in attracting engineers to the industry, particularly in project management work. There is a sense that the industry is not seeing the influx of bright, young engineers that it had seen during the “hot” growth period of the 1980s. There is also concern that it is difficult to retain key staff, as the industry matures and is perceived as less attractive. Those interviewed are hopeful, however, that engineers might become available as the major regional construction project, the “Big Dig,” is completed.

Citizen interest is declining.

Respondents sense a significant decline in citizen interest in pollution cleanup. This, together with a perceived decline in government enforcement efforts, has taken the steam out of external demand drivers. Industry experts often note that environmental studies (e.g., the 1999–2000 study

of mercury discharges by Boston-area hospitals and universities) often delay enforcement efforts for years. Furthermore, studies sometimes result in lower standards, rather than allowing the existing higher standards to encourage and mandate technological advances.

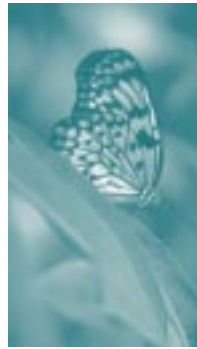
Private-sector clients continue to do environmental work not because of enforcement or citizen pressure but in order to comply with existing regulations. Some executives noted, however, that significant government-sponsored work finally appears to be moving to the construction phase, after long periods of investigation and design.

Mergers and acquisitions are becoming more prevalent.

A trend toward consolidation, largely through horizontal mergers, has affected the industry significantly in recent years. I.T. Corporation, for example, acquired OHM, Fluor Daniel GTI, and ICF Kaiser International’s Environment and Facilities Management Group, all of which were involved in environmental remediation. Dames & Moore acquired Radian International, which was then acquired by URS, representing a horizontal merger in the environmental engineering and consulting segment of the industry. In the environmental engineering and consulting sector, firms engaged in a total of 125 mergers and acquisitions during 1997.¹³

This merger activity is considered by industry experts and economists to be the normal result of a maturing industry, compounded by the demands of Wall Street on public environmental companies. As companies have grown larger through acquisition, they have struggled to cut overhead costs in order to improve profitability. The general consensus of the executive panel is that surviving companies will be either small ones with unique niches or large ones with multi-product, multi-regional services. Companies in the \$50–100 million range will disappear. Even with the consolidation, the biggest firm in the industry is reported to have only about 5 percent of the market, leaving lots of opportunities for further consolidation in the next several years.

A trend toward consolidation, largely through horizontal mergers, has affected the industry significantly in recent years. In the environmental engineering and consulting sector, firms engaged in a total of 125 mergers and acquisitions during 1997.



Recommendations

INCREASE MARKET PENETRATION

Executives would like to see opportunities for additional remediation work identified, perhaps through opportunities to clean up “brownfields” sites. (Brownfields are properties that might require only partial remediation, depending on the intended reuse.) As regulators begin to recognize this, properties for which total cleanup would be economically unprofitable could be partially remediated at lower cost, thus expanding demand for environmental industry services.

INCREASE PRODUCT DEVELOPMENT

Overall, executives perceive that the engineering component of their work is viewed as a standard commodity, with contracts often being awarded solely on the basis of the lowest bid. A focus on pollution prevention could help to offset this trend. Companies have been encouraged to develop and sell products and services that integrate environmental management with overall business strategies.

ESTABLISH NEW MARKETS

A few companies have expanded to new geographic markets in the United States, but there is also op-

portunity for growth in international markets. Among the companies that participated in the survey, only two of the largest have a long tradition of work in the international arena. Four have conducted one or more projects internationally as an outgrowth of work for domestic clients, but none has gone on to pursue international opportunities on its own. Three small companies have identified foreign opportunities with the assistance of federal technology programs or federal and state trade missions and have begun to do work internationally.

IMPROVE FEDERAL ASSISTANCE

Executives provided a number of suggestions regarding improved governmental support for the industry. There is a need for governments to expand their environmental enforcement efforts and to have better-trained, less-adversarial staff implementing programs. Respondents urge that permitting be streamlined through reductions in red tape, a higher level of staff commitment, and increased speed in decision-making.

Many executives would like to see the U.S. government continue to clean up its own facilities and pay for cleanups more promptly. They also feel that the government needs to identify more ways of priva-

tizing its activities by encouraging self-audits and certifications by industry, and by avoiding activities that would place government in competition with the private sector. In expanding its ability to offer technical assistance and information to firms facing cleanup tasks, for example, the government directly competes with private-sector environmental industry firms that offer these services. Government laboratories are perceived to undercut private-sector lab prices, threatening the ability of private firms to compete.

Rather than including private consultants in program design or implementation, federal and state agencies seem to be initiating programs internally to support pollution-prevention efforts (e.g., in the auto body and printing industries and by the Massachusetts Office of Technical Assistance), or to help companies develop environmental management system protocols.

Because most of the companies interviewed do a significant amount of their business in New England, they continue to suggest that regulations among the states become more standardized. Different sets of requirements for the issuance of permits make the development of efficient regional service by the private sector quite difficult, because it takes more staff to handle the unique permitting requirements of each state.

The environmental industry has long been interested in the possibility of major changes in The Comprehensive Environmental Resource, Compensation, and Liability Act (better known as CERCLA or Superfund). Changes would result in increased business, as more sites would be eligible for remediation. Partial site remediation would greatly expand the number of sites at which cleanup would be cost effective. However, only four of the smaller companies interviewed expressed significant interest in the reauthorization.



Outlook: No Immediate Changes in Store

Though the environmental industry has entered a period of maturity, it continues to be a significant industry in Massachusetts. As the overall economy grew stronger at the end of the 1990s, sales and margins in this industry hit a plateau. A significant decline in citizen interest in pollution cleanup, together with a perceived decline in government enforcement efforts, has taken the steam out of external demand drivers.

Because it is comprised mostly of small companies, this service industry has had difficulty engaging in some of the pursuits that would normally be undertaken by competitors in mature markets. These include seeking international opportunities and making significant changes to core activities in order to meet changing customer needs.

Companies have not yet been forced to change their products or to expand their domestic-only focus. Instead, they have adjusted to the mature market by accepting reduced margins, searching for niche opportunities, and merging with other companies in order to reduce costs. Private clients continue to engage them for compliance work, and government clients appear to be initiating more construction projects, after long periods of site characterization, design, and planning.

As long as these conditions remain, it does not appear that there will be significant changes in this industry. Firms are likely to focus on cost savings so that they can continue to pursue their areas of greatest strength.

APPENDIX A

METHODOLOGY

In order to capture the environmental industry quantitatively, we began our research on three fronts simultaneously. We sought out industry experts, examined available Standard Industrial Classification data, and sought information from members of the industry. Grant Ferrier of Environmental Business International, Inc., is the primary source for the Department of Commerce study of the industry. EBI's information is derived from a variety of sources ranging from SIC data to 1200 nationally selected profile firms that are interviewed annually. Due to the difficulty in getting SIC data from public sources that are disaggregated enough to capture particular segments of the industry, EBI relies primarily on its profiles for much of its data.

Because we wanted a more quantitatively precise, less labor-intensive method for capturing the Massachusetts industry, we decided to rely more on SIC data. We first examined all four-digit categories for industries that might fit under the environmental industry umbrella. In addition to category titles, we also relied on industry trade books that often listed members' SICs. Other states trying to characterize their environmental industries were also consulted, and available lists of SICs from these studies were examined. Finally, all members of the Environmental Business Council, a group that represents the Massachusetts environmental industry, were polled to identify the SIC categories they had been assigned.

The result of these initial efforts was a list of four-digit SICs that was broad enough to capture the substantial segments of the industry. However, it also became clear that these four-digit categories included many firms with little or no activity related to the environment. Moreover, the vast majority of environmental industry firms are very small, and these are often missed by traditional data-gathering methods. Thus, we sought six-digit and even eight-digit categorizations in order to capture more accurately the core environmental industry. The only source readily available that provided these data was iMarket Inc.'s MarketPlace.

Because these data are proprietary, we were restricted to using the data the University of Massachusetts had purchased, which was for the years 1995 to 1998. Due to inconsistencies in the 1995 data, we limited our analysis to data beginning in 1996. Moreover, because the data are reported in quarters, we chose to compare them across quarters. The second quarter was the most recent quarter available, and it was used in the *Massachusetts Benchmarks* list of industries, with which we wanted to compare the environmental industry. There does not seem to be any substantial seasonality in employment in the industry, and sales figures reported for each quarter are annualized. Thus, we do not feel we are introducing any biases by comparing the same quarters of data rather than annualizing the data. Therefore, all data are reported for the second quarter of the year noted.

In order to fine-tune the data, we first examined the aggregate employment, sales, and number of businesses generated by our SIC selections to determine if these matched the impressions of local industry experts and those of the firms themselves. We then generated lists of the names of the firms in each of our categories. These lists were shown to industry experts in order to help us cull out any categories where there was very little environmental industry representation and to add categories for firms that were considered important to the industry, but that were missing from our initial choice of SICs.

The result of this process is what we believe to be the most accurate list of environmental industry SICs available. The list is presented in Appendix B. The second list illustrates how the SICs were categorized into the three core sectors referred to in the text.

APPENDIX B

SIC CATEGORIES FOR THE ENVIRONMENTAL INDUSTRY

SIC	DESCRIPTION
1781-00	Water well drilling
1781-99	Water well drilling (n.e.c.)
1799-08	Decontamination services
1799-0800	Decontamination services (n.e.c.)
1799-0801	Asbestos removal
1799-0802	Lead burning
3589-0300	Sewage and water treatment equipment
3589-0301	Sewage treatment equipment
3589-0302	Sewer cleaning equipment, power
3822-02	Hardware for environmental regulators
3822-99	Environmental controls (n.e.c.)
3823-0301	Industrial flow and liquid measuring instruments
3823-0506	Water quality monitoring and control systems
3826-05	Gas testing apparatus
3826-9905	Dust sampling and analysis equipment
3826-9907	Environmental testing equipment
4952-00	Sewerage systems
4953-01	Hazardous waste collection and disposal
4953-02	Refuse collection and disposal services
4953-03	Nonhazardous waste disposal sites
4953-99	Refuse systems (n.e.c.)
4959-03	Toxic or hazardous waste cleanup
5093-00	Scrap and waste materials
5093-01	Waste paper and cloth materials
5093-02	Metal scrap and waste materials
8711-01	Sanitary engineers
8711-04	Construction and civil engineering
8711-9903	Consulting engineer
8711-9909	Professional engineer
8731-0302	Environmental research
8734-03	Pollution testing
8734-9909	Soil analysis
8734-9911	Water testing labs
8748-9905	Environmental consultant
8748-9906	Fisheries consultant

SIC CATEGORIES BY SECTOR

Waste Collection and Disposal

1799-08	Decontamination services
1799-0800	Decontamination services (n.e.c.)
1799-0801	Asbestos removal
1799-0802	Lead burning
4952-00	Sewerage systems
4953-01	Hazardous waste collection and disposal
4953-02	Refuse collection and disposal services
4953-03	Nonhazardous waste disposal sites
4953-99	Refuse systems (n.e.c.)
4959-03	Toxic or hazardous waste cleanup
5093-00	Scrap and waste materials
5093-01	Waste paper and cloth materials
5093-02	Metal scrap and waste materials

Pollution Equipment

1781-00	Water well drilling
1781-99	Water well drilling (n.e.c.)
3589-0300	Sewage and water treatment equipment
3589-0301	Sewage treatment equipment
3589-0302	Sewer cleaning equipment, power
3822-02	Hardware for environmental regulators
3822-99	Environmental controls (n.e.c.)
3823-0301	Industrial flow and liquid measuring instruments
3823-0506	Water quality monitoring and control systems
3826-05	Gas testing apparatus
3826-9905	Dust sampling and analysis equipment
3826-9907	Environmental testing equipment
8734-03	Pollution testing
8734-9909	Soil analysis
8734-9911	Water testing labs

Environmental Engineering and Consulting

8711-01	Sanitary engineers
8711-04	Construction and civil engineering
8711-9903	Consulting engineer
8711-9909	Professional engineer
8731-0302	Environmental research
8748-9905	Environmental consultant
8748-9906	Fisheries consultant

Endnotes

- 1 Commonwealth of Massachusetts, "Green Businesses: A Profile of the Massachusetts Environmental Industry," April 1993.
- 2 U.S. Department of Commerce, "Meeting the Challenge: U.S. Industry Faces the 21st Century: The U.S. Environmental Industry," Office of Technology Policy, 1998 and Environmental Business International, Inc., "Survey of the Industry," Fall 1999. E.B.I. is a publishing and research company that is focused on the environmental industry.
- 3 U.S. Department of Commerce, 1998, pp. 26–27.
- 4 *Ibid.*, pp. 89–90.
- 5 *Ibid.*, pp. 110–113.
- 6 PriceWaterhouse, LLP, "A Profile of New England's Environmental Industry," April 1996.
- 7 All data in the tables are based on data from the 2nd quarter of the year. Because of the way MarketPlace, Inc., computes sales data, these are essentially annualized data. We chose the 2nd quarter in order to be able to use the most recent data and to ensure comparability to data used for other industries for the *Massachusetts Benchmarks* series. There is no evidence of a high degree of seasonality in industry employment. Therefore, the 2nd quarter is an adequate representation of annual employment.
- 8 *Massachusetts Benchmarks*, Vol. 1, Issue 4, Fall 1998, p. 12.
- 9 *Massachusetts Benchmarks*, Vol. 1, Issue 1, Fall 1997, p. 12.
- 10 The higher growth of employment compared to sales is due to the increased use of cheaper workers coming out of two-year vocational programs to conduct much of the standard work product.
- 11 Division of Employment and Training (DET), ES202 data, 1998.
- 12 We do not report trend data for these subsectors, because at this level of disaggregation, the accuracy of iMarket Inc.'s MarketPlace data are questionable and therefore not reliable enough to support analysis of trends in employment, and particularly sales, in these subsectors.
- 13 PriceWaterhouseCoopers, 1999

All data used for this study are from iMarket Inc. MarketPlace, unless otherwise noted.

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