

4-1-2000

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Recommended Citation

Diener, Betty J.; Terkla, David; and Cooke, Erick, "The Massachusetts Environmental Industry: Facing the Challenges of Maturity" (2000). *Management and Marketing Faculty Publication Series*. Paper 7.

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The Massachusetts Environmental Industry

Facing the Challenges of Maturity

BETTY J. DIENER, DAVID TERKLA, AND ERICK COOKE

For 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. Nationally, environmental industry employment exceeded that of several major manufacturing industries, including chemicals, paper, and aerospace.

In the late 1990s, however, 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.

Massachusetts has been considered one of the nation's leading states in the environmental industry, thanks to its landmark policies in source reduction, recycling, hazardous waste clean-up, 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 have fewer than 50 employees and revenues below \$10 million. The regional industry has been heavily focused in the service sector; more than 55 percent of companies provide consulting and engineering services. 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.¹

Developing a More Reliable Definition of the Industry

It is important to understand the significance of the Massachusetts environmental industry relative to other technology industries in the Commonwealth, to understand its position relative to environmental industries in other states, and to determine how well environmental firms are adapting to industry maturity.

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.

In addition to this qualitative information, therefore, it is useful to use quantitative techniques, which provide an easily replicated methodology based on published economic data.² A list of 6- and 8-digit SIC codes that appear to track industry trends was developed and then confirmed in interviews with industry leaders. Using 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.

Numbers Show Strength in the Commonwealth

For analytical purposes, the industry is viewed strictly in terms of its core sectors: the environmental engineering and consulting firms sector, the waste-collection and disposal sector, and the pollution equipment sector. It does not include related support activities in law, finance, accounting, insurance, and education.

In Massachusetts, the industry has generated total sales near \$5 billion annually, from roughly 2,400 businesses employing more than 31,000 people in 1998.³ Environmental industry employment represented almost 1 percent of Massachusetts workers, and its sales volume was almost 2.5 percent of statewide personal income.⁴ Among the 15 major Massachusetts industries in 1996, the environmental industry ranked seventh in terms of number of businesses, twelfth in total employment, and fifteenth in sales.

Massachusetts is among the eleven largest environmental industry states, which together account for almost 60 percent of national sales, employment, and number of businesses in the industry in 1998. Nationally, the Commonwealth is the seventh largest state in terms of sales (representing 4 percent of total U.S. sales in the industry), eighth in employment (accounting for almost 4 percent of national employment), and tenth in number of businesses (3 percent).

Paralleling the industry nationally, growth rates in Massachusetts slowed during the latter half of the 1990s.

Top Eleven Environmental Technology States: Sales, Employment, and Businesses

1998 and Change from 1996

	Employment		Number of Businesses		Sales (in millions)	
	1998	Percent Change from 1996	1998	Percent Change from 1996	1998	Percent Change from 1996
US	815,022	5.9	74,895	5.1	\$115,167	16.8
CA	111,263	0.0	10,228	4.7	\$22,154	9.6
TX	59,510	7.8	5,293	8.9	\$5,435	6.8
NY	46,889	4.9	4,414	5.3	\$5,459	9.4
PA	46,084	16.5	3,730	5.0	\$6,242	18.4
FL	40,492	7.0	4,499	11.4	\$3,445	13.6
IL	37,677	4.7	2,772	3.9	\$6,438	4.6
OH	35,007	5.2	2,835	7.8	\$5,818	18.9
MA	31,502	14.2	2,383	4.0	\$4,893	11.1
NJ	30,615	0.3	2,917	5.4	\$4,194	-18.2
MI	26,663	7.8	2,620	4.1	\$2,718	6.8
LA	16,546	24.1	1,312	18.1	\$1,530	23.2

These numbers represent core activities only, a narrower definition than the one used by the U.S. Department of Commerce.

Source: iMarket, Inc.

The U.S. Environmental Industry Has Followed a Similar Path

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).

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.

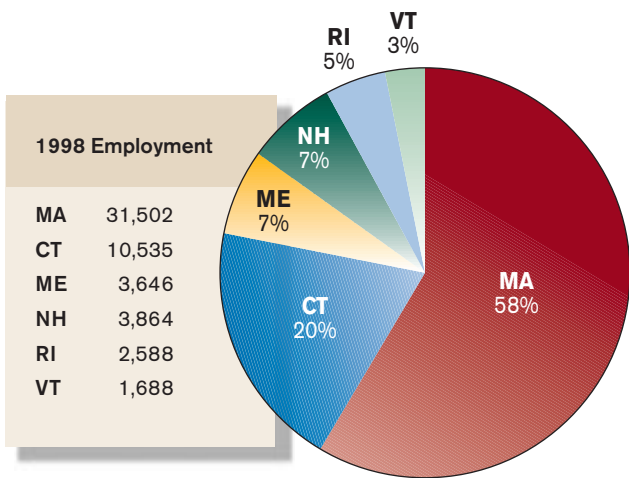
The last time industry sales grew rapidly (10 to 15 percent a year) was in the latter half of the 1980s. Reauthorized legislation dealing with clean air, clean water, and hazardous waste resulted in expanded private and public clean-up programs, and U.S. firms sought significant outside help in their 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 clean-up 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 in 1990. The investment of venture capital into the environmental industry also declined steeply during the 1990s, falling from over \$200 million in 1990 to \$30 million in 1996.

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

Companies in the environmental industry have been advised by industry analysts to consider international markets for growth opportunities, to move their focus from "end of the pipe" clean-up activities to pollution prevention, and to sell products and services that integrate environmental management with overall business strategies and contribute to core businesses. These changes have not yet occurred in any significant way.



Environmental Technology Employment in New England States

Source: iMarket, Inc.

Still, the state performed much better than the nation in terms of employment growth from 1996 to 1998, ranking third among the largest environmental industry states. Sales growth lagged behind national rates, and in net growth in the number of environmental firms, the Commonwealth ranked tenth.⁵ This implies that much of the employment

increase in the Massachusetts environmental industry over the last few years has come from firm expansion.

In New England, Massachusetts dominates the environmental industry, accounting for 69 percent of all sales, 58 percent of employment, and 44 percent of total businesses. The Commonwealth had the highest increase in employment during the 1996 to 1998 period. Massachusetts and Vermont are the only New England states that have not seen sales decline from 1996 levels.

Engineering/Consulting Leads Sectors

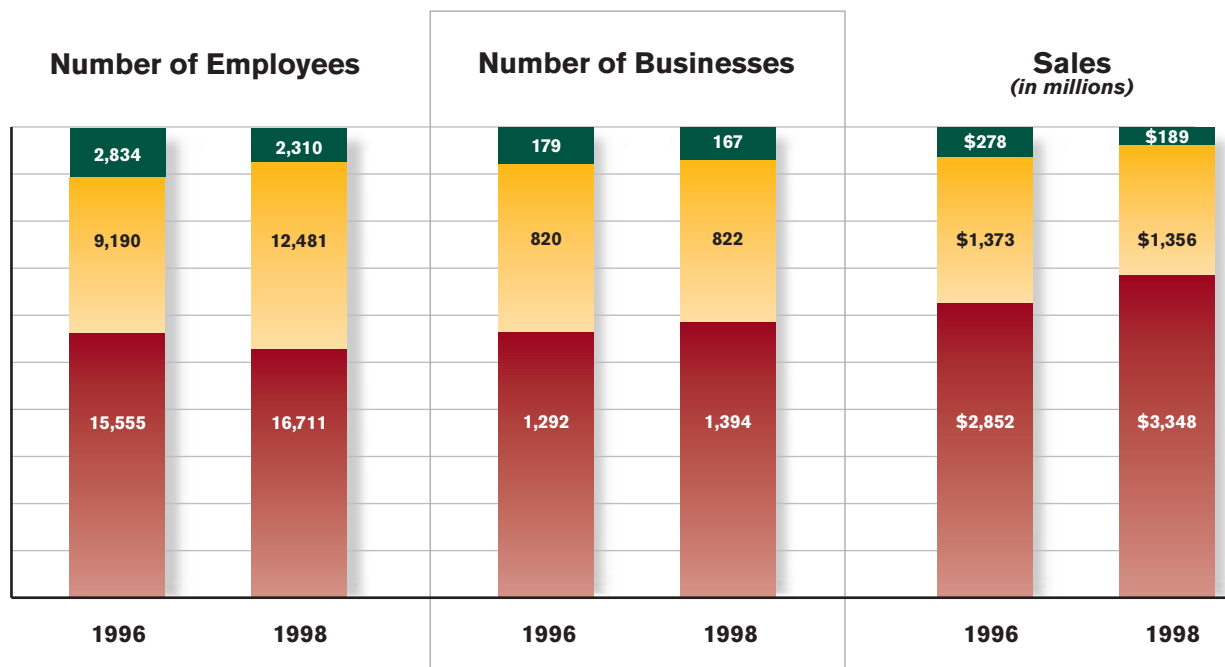
The engineering and consulting sector dominates the environmental industry in Massachusetts, accounting for more than 66 percent of total industry sales, nearly 60 percent of businesses, and over half of the employment. This is the highest paying sector, with an average annual wage of almost \$57,000. It is followed by pollution equipment at \$55,000 and waste collection and disposal at \$42,000. These salaries exceed the average state wage of just under \$38,000.

In this sector, Massachusetts ranks second in sales volume nationally, seventh in number of employees, and ninth in number of businesses. This is in contrast to the waste collection and disposal and pollution equipment sectors, where Massachusetts ranks low among the top-tier states in all three areas.

Massachusetts Environmental Industry Sub-Groups Number of Employees, Number of Businesses, and Sales

Sub-Groups

- Pollution Equipment
- Waste Collection & Disposal
- Environmental Engineering/Consulting



Industry Executives Enumerate Concerns About Future Growth

While the employment and sales data help illustrate the general characteristics and recent trends of the state's environmental industry, it is also important to get behind the numbers to understand what dynamics are currently influencing industry performance and in what direction the industry appears to be heading. To facilitate this, individual interviews and focus groups have been conducted with industry leaders.

Most of those interviewed are concerned about future growth prospects. 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.

Market penetration. Executives hope that opportunities for additional remediation work will be identified, perhaps through partial—as opposed to total—clean-ups of “brownfields” sites. Some companies have increased the types of characterization and remediation services offered. Others have reduced services and focused on more specialized areas.

Product development. Overall, executives perceive that the engineering component of their work is increasingly viewed as a standard commodity, with margins declining in recent years. Many expect this to continue. A focus on pollution prevention has been suggested to offset this trend. Companies have also been encouraged to develop and sell products and services that integrate environmental management with overall business strategies. A large number of companies interviewed indicate that changes in basic services have not yet been made.

New markets. A few companies have expanded to new geographic markets in the United States, but there is also opportunity 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 responding 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.

Additional Industry Concerns

Mergers and acquisitions. One of the most significant changes in this industry is in the amount of consolidation, largely through horizontal mergers. There has been substantial activity among environmental remediation firms and among environmental engineering and consulting firms. In the latter sector, firms engaged in a total of 125 mergers and acquisitions during 1997.⁶ It is expected that long-term survivors will be either small companies with unique niches or large companies with multi-product, multi-regional services. Companies in the \$50 million – \$100 million range will virtually disappear.

Retaining and recruiting personnel. As the industry matures and is perceived as less attractive, engineering work is increasingly viewed as a standard commodity. Contracts are often awarded solely on the basis of the lowest bid. Perhaps as an outgrowth of this, many firms have had difficulty attracting and retaining bright engineers and key staff. There is hope, however, that talented engineers will become available to the industry as the “Big Dig” reaches completion.

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Opportunities for Enhanced Government Involvement

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 expressed hope that the U.S. government would continue to clean up its own

facilities and would pay for clean-ups more promptly. They also feel that the government needs to identify more ways of privatizing 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 clean-up 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.

Another obstacle is the wide variety, among New England states, of requirements for issuing permits. This makes efficient regional service delivery by the private sector quite difficult. Because most of the companies interviewed do a significant amount of business in the New England region, they suggest that regulations among the states be better standardized.

Outlook: No Immediate Changes in Store

Though the environmental industry has entered a period of maturity, it continues to be a significant one 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 clean-up, 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. ▮

1 PriceWaterhouse, LLP, "A Profile of New England's Environmental Industry," April 1996.

2 It was decided to use iMarket Inc.'s MarketPlace data for the quantitative portion of this study. MarketPlace is the only data source that publishes quarterly Standard Industrial Classification (SIC) data to the 6-digit and 8-digit levels. This enables us to capture firms located in a wide range of industrial classifications.

3 Numbers are based on data from the 2nd quarter of the year. Because of the way MarketPlace 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 have data comparable to that used for other industries for the *Massachusetts Benchmark* series. There is no evidence of a high degree of seasonality in industry employment, and therefore the 2nd quarter is an adequate representation of annual employment.

4 *Massachusetts Benchmarks*, Vol. 1, Issue 4, Fall 1998, p. 12.

5 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.

6 PriceWaterhouseCoopers, "Environmental Business in an Age of Consolidation," January 1999.

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