



Recycling and Jobs in Massachusetts

A Study of Current and Future Workforce Needs

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EBC Environmental Business
Council of New England



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Conducted by:

Perlmutter Associates
Green LMI
JFYNetWorks
Green Economy

Recycling is an important part of Massachusetts' green economy. Massachusetts is home to over 2,000 recycling businesses that employ close to 14,000 people with a payroll approaching \$500 million annually, according to a 2009 study by the Northeast Recycling Council (NERC).

These businesses play a critical role in helping the Commonwealth achieve its current 46% recycling rate. They include companies that collect recyclable materials from businesses and residents; facilities that sort mixed recyclables into commodity grades for sale to end-markets; reuse industries that resell items such as clothing, books, building materials and electronics; remanufacturers that clean and upgrade products like toner cartridges and office equipment; organics processors that turn food and yard waste into products that provide nutrients to our soils; and manufacturers that make new products out of paper, glass, textiles, and plastics. Added to that are public sector employees who design, manage, and/or run recycling programs and related educational programs.

To learn more about the kinds of public and private sector jobs that help keep the Commonwealth's almost five million tons of recyclables out of landfills and incinerators the Environmental Business Council of New England (EBC) and MassRecycle, the state recycling coalition, joined forces to undertake a study of Jobs in Recycling. Our goals for this study were to:

- better quantify the number and types of jobs in the Massachusetts recycling workforce,
- identify where job growth and contraction might be occurring,
- uncover the factors that drive job growth or contraction, and
- provide valuable information to workforce development programs that would enable them to develop effective training and job development strategies to match growth in the sector.

Our findings show that the recycling industry is growing in Massachusetts, with over 1,200 jobs expected to be added in the next two years by the private sector alone. Our research also found that employers will need workers trained in specific technical and customer service skills in order to meet this demand.

Recycling saves energy and natural resources, protects habitats, reduces pollution, saves communities money, and creates jobs that require a range of skill levels and education. The Department of Environmental Protection's 2010-2020 draft Solid Waste Master Plan calls for significantly increased levels of recycling. Recycling is, and will continue to be, an important part of Massachusetts' green economy.

We thank SkillWorks, the Massachusetts Department of Environmental Protection, E.L. Harvey and Sons, Inc, and Costello Dismantling Co, Inc. for funding this project. We would also like to thank the consulting team of Perlmutter Associates, GreenLMI, JFYNetWorks, Green Economy, and our project advisors for helping us to produce this study.



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I. Executive Summary

The promise of a “green economy” is very real, and recycling jobs are and will continue to play an important role. Recycling creates environmental benefits throughout the product chain from reduced pressure to mine new resources through avoided disposal of discarded products. The recycling industry is a promising job creator in Massachusetts, with activities in collection, processing, remanufacturing, manufacturing, organics management, reuse, and deconstruction. The Northeast Recycling Council’s (NERC) 2009 study¹, The Economic Impacts of the Recycling Industry, found that, in Massachusetts, this sector comprises over 2,000 establishments employing close to 14,000 people, with a payroll approaching \$500 million annually.

The Environmental Business Council (EBC) and MassRecycle joined together to conduct a study of the existing and anticipated workforce needs of the recycling industry in Massachusetts. The study employed a three part methodology:

1) a survey of private and public sector recycling organizations to identify where growth or contraction is expected and the issues employers face in finding qualified employees; 2) interviews with private sector employers in industries representative of growth sectors to gain an understanding of their organizational structure and issues finding qualified workers; and 3) interviews with employees of representative industries to learn more about their job experience.

There is no one ‘recycling’ industry. Rather, recycling is a series of activities that cut across industries. NERC identified 26 separate activities falling into three categories: 1) Recycling Industries (public or private sector collection and processing of recyclables); 2) Recycling Reliant Industries (turning recyclables into new products); and 3) Reuse or Remanufacturing. Many of these employers, however, perform activities that fit into more than one category. For the purposes of this report, an additional activity was included- government recycling coordination.

The survey found that, despite the slow economy and the decrease in recyclable materials recovered in recent years, there is optimism about the growth of the recycling industry over the next two years. Almost one-third of the private sector employers and twelve percent of the public sector employers are expecting to hire new, permanent recycling employees. These are defined as full-time or part-time permanent workers that spend at least half of their time on work related to recycling or recycled materials.

In the private sector, a 15% growth in recycling jobs over the next two years is expected. This translates into 1,200 new positions. In the public sector, a 5% growth is expected. The highest rate of growth is expected in the Reuse and Remanufacturing sector, followed by Recycling Industries.



Survey respondents were asked what two biggest general skills deficiencies they found in recent entry or mid-level hires. Both public and private sector respondents reported technical competence by far as being the biggest deficiency.

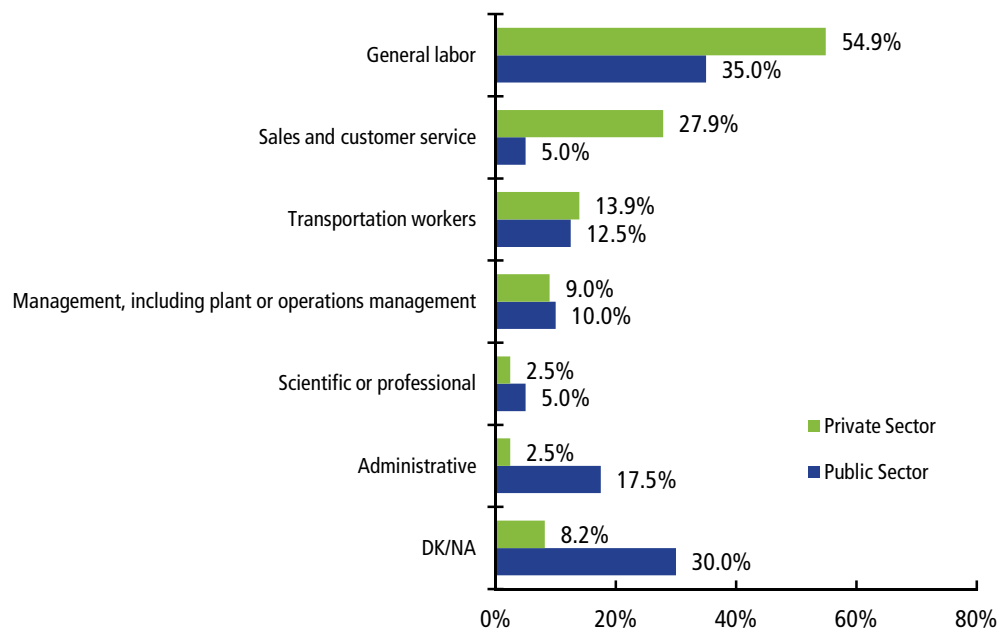
¹ http://nerc.org/projects/completed_projects.html#reiuupdate

Figure ES 1: Recycling employment and expected growth In three industry categories

	Number of Firms Surveyed	Number of Recycling Employees at Surveyed Firms	Average Number of Recycling Employees	Expected Change in Recycling Employees: Next Two Years
Supply recyclables to another company (i.e., broker, manufacturer, retailer)	60	1,198	20.66	+14.3%
Turn recyclables into new products	25	440	18.33	+6.9%
Reuse or remanufacture old products	53	399	8.14	+29.8%

The area where the most recycling employee growth is expected in both the public and private sectors is in general labor. Transportation workers ranked third in both public and private sector anticipated growth, with management ranking fourth. Where the public and private sectors diverged was in the sales and customer service categories—this ranked second for the private sector, and fifth for the public sector. The public sector ranked administrative jobs as the second area of growth; this was the lowest expected category in the private sector. Scientific or professional jobs ranked near the bottom of both lists.

Figure ES 2: Fastest growing occupational categories over the next 24 months

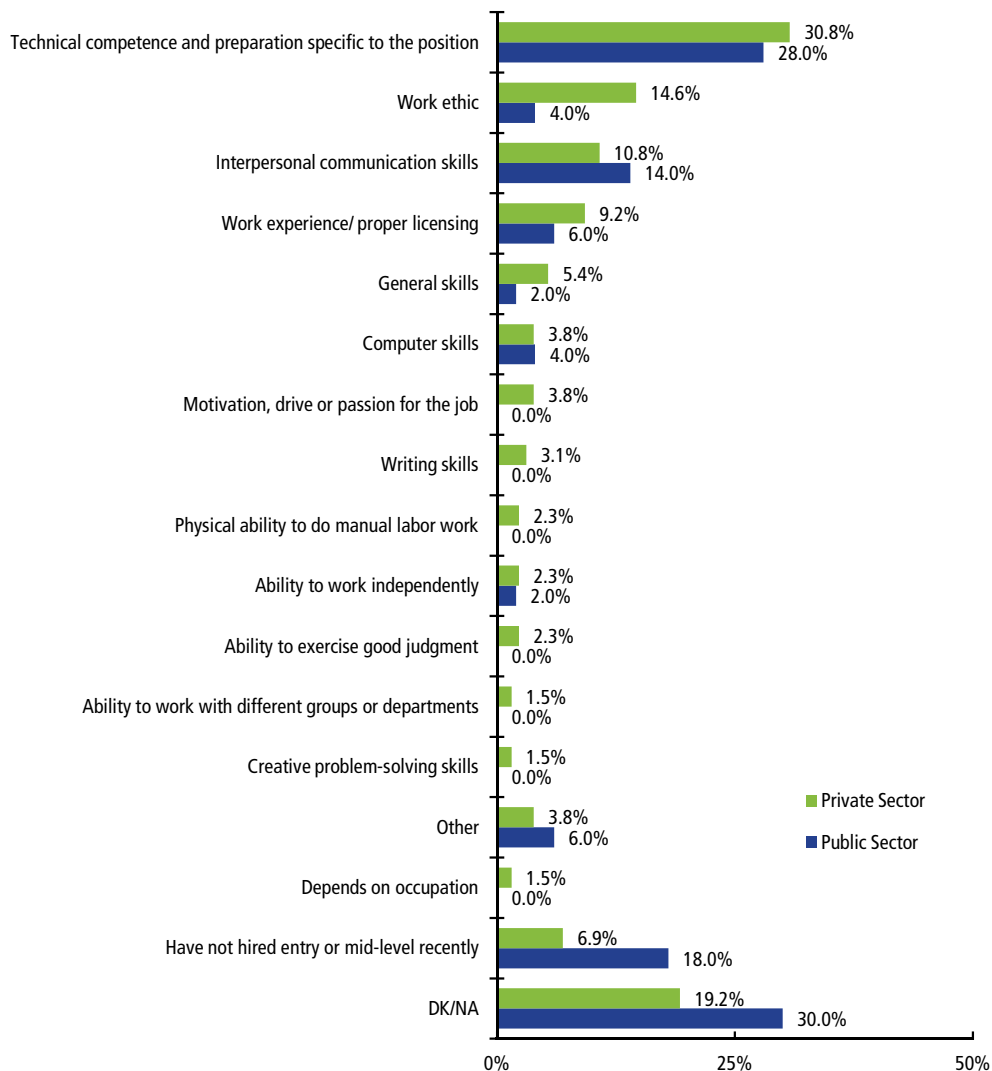


The survey showed that the employees in the majority of companies spend at least half of their time on recycling, and that companies tend to be small—64% of the surveyed companies have ten or fewer employees working on recycling, and only 3.1% have 100 employees or more engaged in work related to recycling.

Both public and private sectors reported difficulty in finding applicants with professional skills, work experience, and relevant technical skills. But, overall, the public sector had the easiest time finding qualified applicants.

Survey respondents were asked what two biggest general skills deficiencies they found in recent entry or mid-level hires. Both public and private sector respondents reported technical competence by far as being the biggest deficiency. Work ethic was next for the private sector, followed by interpersonal communication skills, and then work experience and proper licensing. Questions were not asked about specific examples of deficiencies, such as types of licenses needed. In the public sector, work ethic and work experience were not as big problems, although a larger percentage than the private sector reported that interpersonal communication skills were an issue.

Figure ES 3: Skills that recent entry- or mid-level hires tend to be most deficient in



In a roundtable discussion with employees of recycling companies, most employees reported that they were not necessarily attracted to their jobs because they were in the environmental field. However, being in these jobs has made them more aware and active recyclers. They found their jobs in varying ways, including word of mouth and craigslist. Workers also reported that their job training has been on-the-job, and that they would like additional training in management and leadership and other skills for the job. It was clear that environmental health and safety would also be important training topics.

This study discusses several findings that can help workforce development programs in the state support recycling companies:

- A. Recycling industry employer engagement with the workforce development community needs improvement—creating lasting partnerships will take time, but will pay off.
- B. The recycling industry needs a regional approach—recycling industries are not uniform across the Commonwealth.
- C. The recycling industry in Massachusetts needs an economic development strategy at least as much as a workforce strategy—the workforce development community should develop a relationship with the Massachusetts DEP and MassRecycle.
- D. Incumbent workers in the Massachusetts recycling industry want and need high quality training—including workforce readiness, supervisor and leadership education, and health and safety.
- E. Promoting recycling jobs as “green” may not be effective as a recruitment tool in some job categories, but greater eco-awareness comes from working in the recycling field.

II. Recycling Jobs are Green Jobs

The promise of a “green economy” is very real, and green careers encompass more than the popular focus on the energy efficiency and renewable energy sectors. Recycling jobs are “green” and create significant environmental benefits throughout the product chain. For example, recycling precludes the need to mine and to process raw materials, both highly environmentally disruptive, polluting and energy intensive activities. Manufacturing products that incorporate recycled content requires less energy and water than making products solely from virgin materials. Recycling reduces the need for new landfills and also reduces the generation of the greenhouse gas, methane, from decomposing materials in these landfills. Reuse and repair activities are the most energy conserving activities, since new products do not have to be manufactured at all. Composting can even increase the soil’s ability to sequester carbon.

The recycling industry is a promising job creator in Massachusetts, with activities encompassing collection, processing, remanufacturing, manufacturing, reuse, organics management, and deconstruction. A 2009 study of the Economic Impacts of the Recycling Industry by the Northeast Recycling Council, Inc. (NERC) found that, in Massachusetts, this sector comprises over 2,000 establishments that employ close to 14,000 people, with a payroll approaching \$500 million annually. Companies vary in size from very small to very large.

Until now, there has been a lack of detailed data about the industry’s structure and employment needs that professionals at workforce and economic development agencies can use to do their work and assist job seekers.

The Environmental Business Council (EBC) and MassRecycle joined together to conduct a study of the existing and anticipated workforce needs of the recycling industry in Massachusetts. This study creates a detailed picture of current and anticipated recycling employment in Massachusetts.

The study employed a three part methodology: 1) a survey of private and public sector recycling organizations to identify where growth or contraction is expected, and what sorts of issues employers face in finding qualified employees; 2) interviews with private sector employers to gain an understanding of their organizational structure and issues finding qualified workers; and 3) interviews with employees of representative industries to learn more about their job experience. These three components help paint a picture of the recycling industry in Massachusetts and its workforce needs. An explanation of the survey methodology is in Appendix 1.

For the purposes of this study, recycling employees are defined as full-time or part-time permanent workers that spend at least half of their time on work related to recycling or recycled materials.



The recycling industry is a promising job creator in Massachusetts, with activities encompassing collection, processing, remanufacturing, manufacturing, reuse, organics management, and deconstruction.

III. What is the Recycling Industry?

There is no one 'recycling industry,' Rather, recycling consists of a series of activities that cross standard business industry classifications. The NERC study identified 26 distinct activities that comprise the recycling industry which fall in to three general categories (descriptions of these activities can be found in Appendix 2):

A. Recycling Industries

These are industries that collect, sort, and market recyclable materials and sell them to others who turn them into new products. It is also referred to as the 'supply' side of the recycling loop. Recycling Industries activities are:

1. government staffed residential collection
2. private staffed recycling collection
3. compost/organics processor
4. materials recovery facilities
5. recyclables materials wholesalers
6. plastics reclaimers

B. Recycling Reliant Industries

These are industries that take materials from recycling industries and, through pulping, crushing, melting, and other activities, including combining them with other materials, manufacture them into new products. These companies are also referred to as the 'demand' side of the recycling loop. Recycling Reliant Industry activities are:

7. glass container manufacturing plants
8. glass product producers
9. nonferrous secondary smelting and refining mills
10. nonferrous product producers
11. nonferrous foundries
12. paper and paperboard mills/deinked market pulp producers
13. paper-based product manufacturers
14. pavement mix producers (asphalt and aggregate)
15. plastics product manufacturers
16. rubber product manufacturers
17. steel mills
18. iron and steel foundries
19. other recycling processors/manufacturers

C. Reuse and Remanufacturing Industries

Reuse and Remanufacturing industries clean, upgrade, and sell products in their same or similar state. Reuse and Remanufacturing activities are:

20. computer and electronic appliance demanufacturers
21. motor vehicle parts (used)
22. retail used merchandise sales
23. tire retreaders
24. wood reuse
25. materials exchange services
26. other reuse

This study added a 27th activity, 'government recycling staff,' to the list. This includes recycling coordinators and other workers who develop and implement recycling policies and programs in cities, towns, state offices and parks, public colleges, and other institutions. This is distinct from government operations-related activities, such as operating a recycling drop-off center or compost site. Government Recycling Staff was approached as a standalone activity and was not included in any of the three recycling categories listed above.

In reality, recycling industries do not fit neatly into these three categories or just one activity. For example, an electronics recycling company may collect old computers (*collection*), take apart those that are no longer usable (*demanufacture*), sell the metals and plastics to other recyclers (*broker*), and upgrade and resell those that can be reused (*reuse/ remanufacture*). A demolition company may deconstruct a building and broker the metal and steel, sell windows or other products in the reuse marketplace, and manufacture mulch out of the wood. And a hauling company may collect recyclables at the curbside or recycling center, sort them at a processing facility to separate the materials for market, and then broker them to other processors or manufacturers. For the survey part of this study, companies were asked to classify themselves into the three categories and then asked which activities they performed within those categories—the answers showed that even companies in the recycling industries had a hard time classifying themselves into one activity, and not all use the activity names that the NERC study used.

Because some companies classified themselves into more than one category, in addition to small sample sizes in some categories, and respondents not answering every question, it was impossible for the survey results to be broken down by business activity or even the three overarching categories. Rather, public and private sectors employers were surveyed separately and results shown by sector. In addition, the small number of employers interviewed and profiled for this study only allows for anecdotal information; assumptions about the whole industry cannot be drawn.



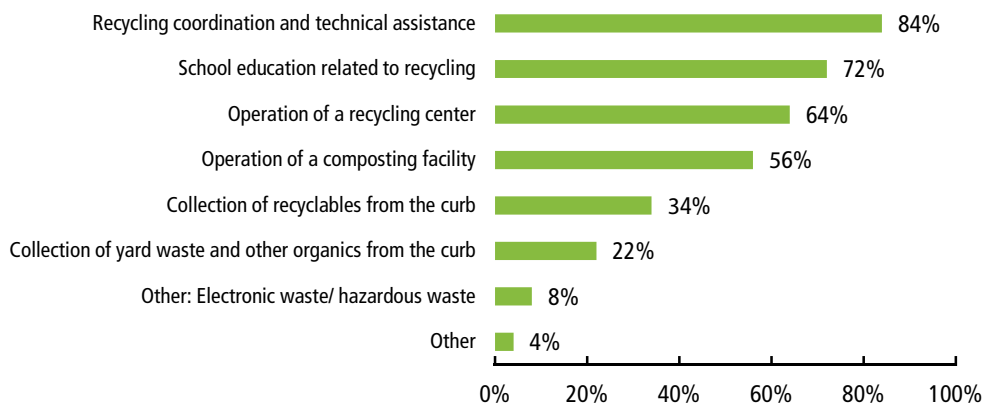
In reality, recycling industries do not fit neatly into these three categories or just one activity.

Figure 1 shows the breakdown of private sector firms surveyed for this study by self-reported recycling activity. Public sector recycling employers (both in policy and operations) were surveyed separately; their activities are reflected in Figure 2. NERC's breakdown of Massachusetts' recycling industry by number of establishments, number of employees, payroll, receipts, and tons recycled, can be found in Appendix 3.

Figure 1: Percent of surveyed firms by recycling activity



Figure 2: Recycling services provided by public employees





One area of activity which was not part of the scope of this study but which deserves consideration in future studies of the industry is custodial workers. Over seventy five thousand workers are employed in the janitorial services in Massachusetts²—this includes those working for private companies as well as those directly employed by institutions. Part of the job for some of these workers involves managing recyclable wastes. While their occupations are part of the recycling industry, their employers are not technically recycling companies. To collect survey data on this occupation would require sampling of all facilities in the Commonwealth.

² Source: EMSI Complete Employment - 2011.3

IV. The Recycling Industry in Massachusetts is Growing

According to the Massachusetts Department of Environmental Protection³, in 2009, Massachusetts' residents, businesses and institutions produced 10.7 million tons of municipal solid waste (MSW), construction and demolition (C&D) debris, and other wastes, or about nine pounds of waste per person per day. As large an amount as this sounds, this was a 13% decrease in waste generation from 2006. This trend is true on a national level as well, where waste generation has decreased since 2007. Waste generation historically trends with the economy; from 2000-2006 there was a consistent (although slowing) increase in solid waste generation.

Recycling numbers also dropped—both in absolute tons and as a percentage of waste generated.

Table 1: Solid waste management in Massachusetts, 2000-2009⁴

Source	2000	2009	Change
Tons Generated	12,660,000	10,680,000	-16%
Tons Diverted*	6,200,000	4,880,000	-21%
Percentage of Waste Diverted	49%	46%	-3%
Tons Disposed	6,460,000	5,800,000	-10%
Percentage of Waste Disposed	51%	54%	+3%

*Includes discarded materials that are reused and recycled, as well as wood burned in biomass energy facilities and C&D residuals used for daily cover and grading/shaping material at landfills.

Despite the slow economy and the decrease in recyclable materials recovered in recent years, there is optimism about the industry's continued growth over the next two years.

Figure 3 shows that almost one-third of the private sector firms and twelve percent of public sector offices surveyed are expecting to hire new, permanent recycling employees. Over half of the public sector firms and 80% of the public sector offices are expecting their work force to remain the same, and less than two percent are expecting to decrease their workforce.

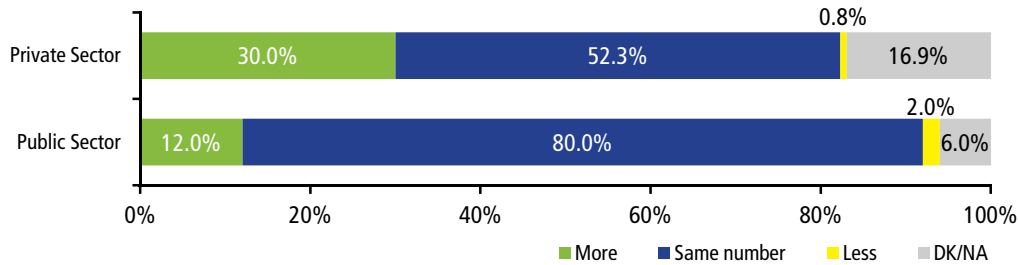


Despite the slow economy and the decrease in recyclable materials recovered in recent years, there is optimism about the industry's continued growth over the next two years.

³ <http://www.mass.gov/dep/recycle/index.htm>

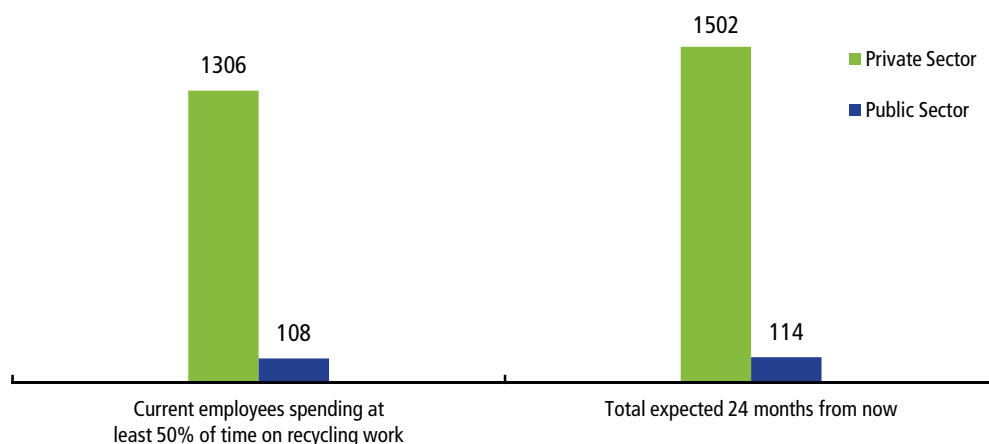
⁴ <http://www.mass.gov/dep/recycle/swgo.htm>

Figure 3: Percentage change in recycling employment expected over next two years



Of the 102 private companies surveyed for this study, the companies that do plan to add employees are looking to add a total of 196 positions that focus on recycling at least 50% of the time in the next two years, a 15% growth from current recycling employment. Based on NERC’s analysis of the overall size of the recycling industry, if this growth expectation is realized it will yield over 1,200 new positions that spend at least 50% of their time on recycling activities.⁵ Public sector employers are expecting a smaller growth of 5%. Private sector recycling job growth rivals the projected annual growth of the clean energy industry (15% per year), and both public and private sector growth outpace the economic growth of the country, projected to grow at 1.4% over the next twelve months.

Figure 4: Number of recycling employees anticipated to be hired in the next 24 months



⁵ NERC estimates 14,000 recycling workers at the establishments that are included in the survey sample. Survey results indicate that 57.9% of these workers spend at least 50% of their time on recycling activities. 15% growth of these workers yields 1,216 positions over two years.

All three categories of the recycling industry in Massachusetts are expecting to hire more people, although at different rates. Table 2 shows that the reuse and remanufacturing category is expecting the greatest rate of growth, at 30%. This is followed by an anticipated 14.3% growth in supply side industries. Manufacturers who turn recyclables into new products are anticipating the smallest growth, at just under 7%.

Table 2: Recycling employment and expected growth by three industry categories

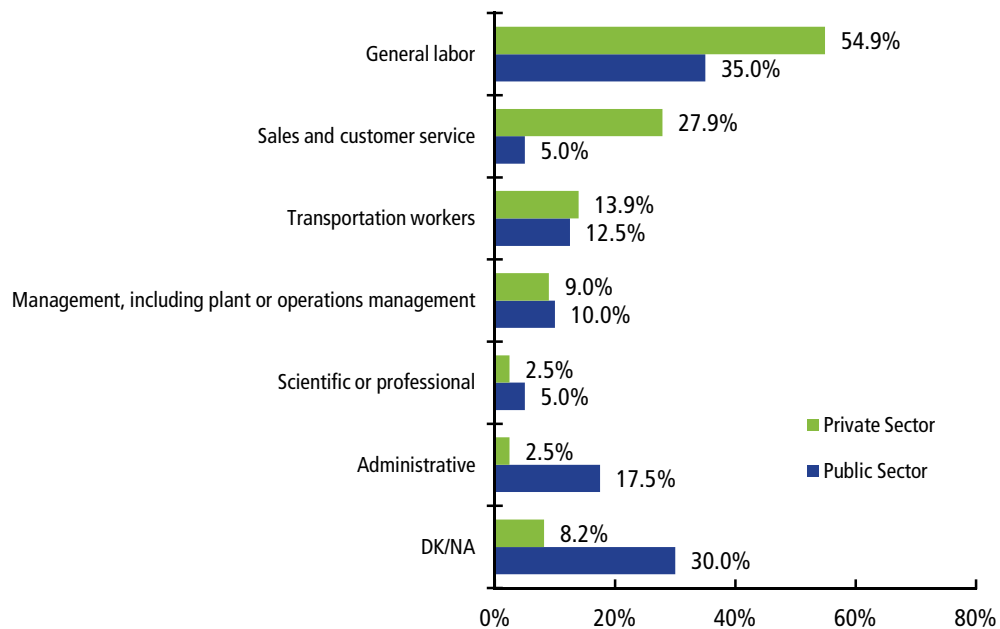
	Number of Firms Surveyed	Number of Recycling Employees at Surveyed Firms	Average Number of Recycling Employees	Expected Change in Recycling Employees: Next Two Years
Supply recyclables to another company (i.e., broker, manufacturer, retailer)	60	1,198	20.66	14.3%
Turn recyclables into new products	25	440	18.33	6.9%
Reuse or remanufacture old products	53	399	8.14	29.8%

General labor is by far the occupational category where the most recycling employee growth is expected in the next two years in both the public and private sectors. General labor involves a wide variety of non-skilled tasks such as cleaning, sweeping, lifting and moving. General labor is performed with basic tools that do not require training. This category had about twice the expected growth as the second ranked category for both sectors. Transportation workers ranked third in both public and private sector anticipated growth, with management ranking fourth. Interestingly, management growth was expected to be about ten percent in both sectors. Where the public and private sectors diverged was in the sales and customer service categories—this ranked second for the private sector, and fifth for the public sector. The public sector ranked administrative jobs as the second area of growth; this was the lowest expected category in the private sector. Scientific or professional jobs ranked near the bottom of both lists. Figure 5 compares the anticipated growth for different occupational categories in the public and private sectors.



General labor is by far the occupational category where the most recycling employee growth is expected in the next two years in both the public and private sectors

Figure 5: Fastest growing occupational categories over the next 24 months



V. The Size and Shape of Recycling Industries

Some of the companies surveyed are involved in non-recycling activities as well as recycling activities—for example, a collection company may collect garbage as well as recyclables, or a manufacturer may have separate lines for recycled products and non-recycled products. However, Figure 6 shows that almost half of the surveyed companies have over 75% of their employees spending at least half of their time on work related to recycling or recycled materials, and almost 70% have over half of their employees doing so.

Figure 6: Percentage of private sector employees spending at least half of their time on recycling activities

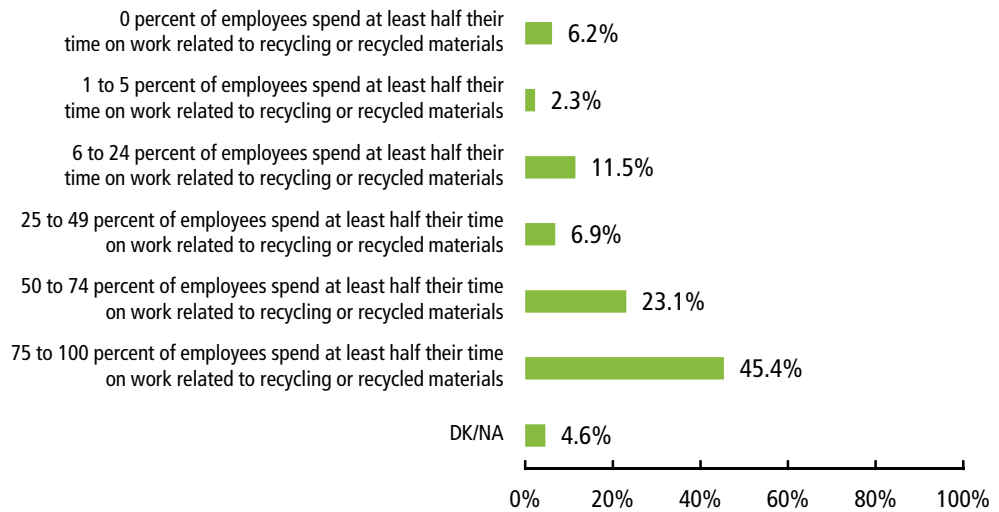
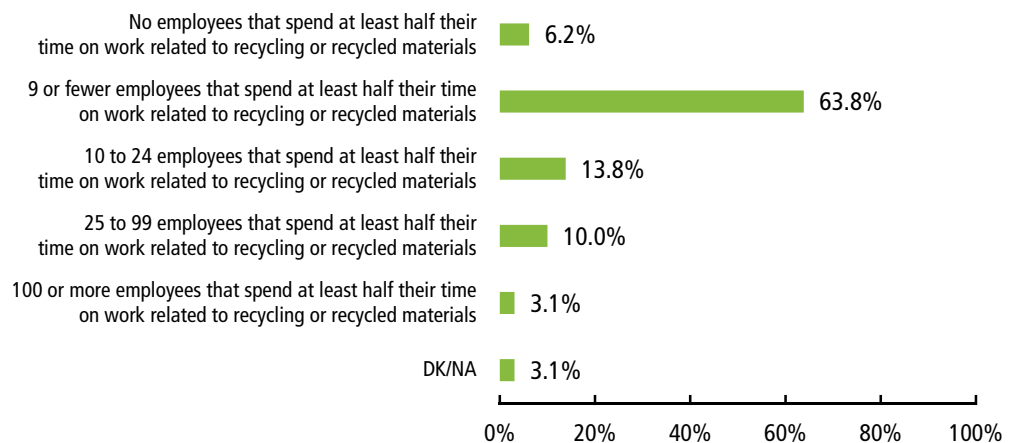


Figure 7 illustrates that the majority of private sector recycling employers are small, with 64% having ten employees or less working on the recycling aspect of their business, and only 3.1% having 100 people or more engaged in work related to recycling.

Figure 7: Number of private sector employees spending at least half of their time on recycling activities



Costello Dismantling Co., Inc.

Costello Dismantling Company, Inc, based in Middleboro, MA provides state of the art demolition services as well as equipment removal and salvage. CDCI provides three basic services—building deconstruction or dismantling, building demolition and re-sale of salvaged materials to processing, recycling and end-user facilities. CDCI separates and recycles nearly all components of a building, minimizing the waste sent to landfills and dramatically reducing the project’s environmental impact. CDCI also removes old equipment including generators, conveyors, pumps, pipes and other machinery. The company routinely achieves 90% materials recycling in projects, and is constantly looking to improve on that percentage. By doing so, CDCI is able to incorporate the residual value of that material into its projects, making its pricing more competitive. CDCI also works closely with developers seeking LEED™ accreditation for their project to ensure the most environmentally conscious deconstruction methods are used. CDCI uses the same materials tracking system in its other projects that it uses in its LEED™ projects. CDCI’s client list includes hundreds of major manufacturers, oil companies, chemical and pharmaceutical producers, utilities, developers and municipalities.

Costello Dismantling places a high premium on safety, and is recognized in the industry for its commitment to safety and environmentally sound deconstruction practices. The company is committed to reducing any risk to our workers and their surroundings. Each crew has a safety meeting before work begins that day, and safety issues are constantly evaluated as situations arise on the job. By using and maximizing the proper equipment, CDC either eliminates or substantially reduces human exposure to potentially hazardous situations.

Costello Dismantling is a Massachusetts corporation, established in 1985 by owner Dan Costello. CDCI maintains a workforce that averages 50 people, consisting primarily of laborers and equipment operators. Because of the company’s high standards, CDCI is very is very selective in its hiring. Background checks and drug testing are routinely performed. The company prefers to source employees from local branches of Laborers International Union of North America (LIUNA), which covers building wrecking and environmental workers or the International Union of Operating Engineers, which operates a heavy equipment operator training school. The company provides on-the-job training to upgrade employees recycling skills, which contributes to higher efficiency and recycling rates. However, many workers are deficient in basic arithmetic and applied math, i.e. how to figure out square footage, tonnage, and rates of speed. Dan Costello believes that there is certainly a market for training in the recycling of deconstruction materials, similar to a course that he teaches at Purdue University’s School of Construction Management, and would like to see it brought to Massachusetts.

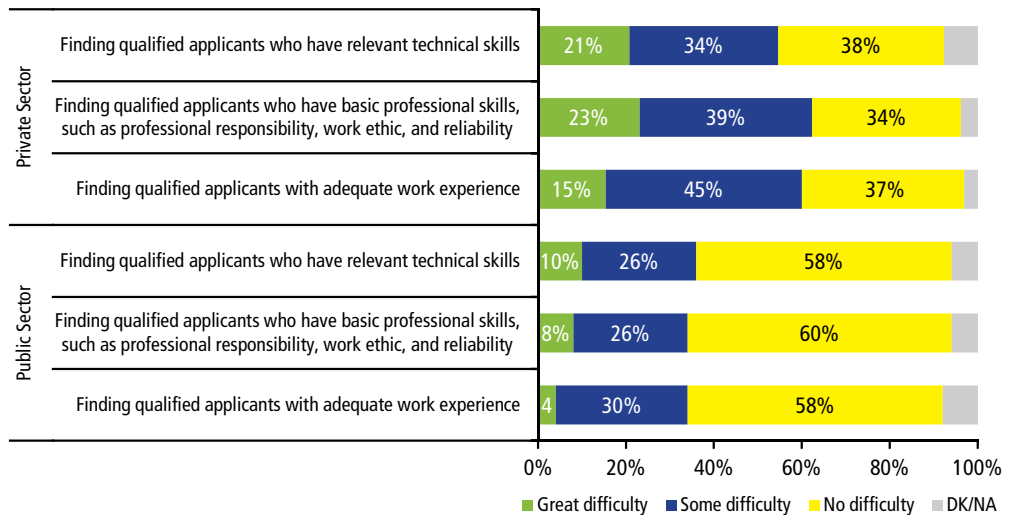


Costello Dismantling Company, Inc. provides state of the art demolition services as well as equipment removal and salvage.

VI. Workforce Development and Training Needs

Employers reported varying levels of difficulty finding qualified workers with basic professional skills, work experience, and technical skills. Technical Skills are those skills associated with industry- or occupation-specific technology, tools, knowledge, or abilities. They are different from so-called soft-skills or work-readiness skills that are more general in nature. Figure 8 compares the range of difficulty for the public and private sectors in finding qualified applicants. The private sector has a harder time finding qualified workers, with 60-64% of private sector respondents reported having some or great difficulty finding applicants with adequate skills and experience, versus 32-34% in the public sector.

Figure 8: Difficulty in finding qualified applicants



Morgan Memorial Goodwill Industries

Morgan Memorial Goodwill Industries, a non-profit 501(c)(3) corporation, was founded in 1895 in Boston's South End to provide residents with jobs and to furnish the community with low-cost goods. It was the first in what is now a worldwide network of 175 independent affiliates.

The Goodwill® trademark has been associated with entrepreneurial leadership, environmental pioneering and social innovation in “reduce-reuse-repurpose” practices for more than 100 years. Goodwill collects unwanted clothing and household goods, and diverts them from going to landfills by reselling them in their retail stores, or with items that are not reusable, such as electronics, to third party recyclers. Its mission, however, is to provide exemplary job training and related services to help individuals with disabilities and other barriers to self-sufficiency to achieve independence and dignity through work; their motto is “Not charity, but a chance.” As such, Goodwill is a major employer of individuals with disabilities in the social enterprises it operates in retail, housekeeping, and maintenance, food service and light assembly.

Proceeds from goods resold through the organization's 11 retail thrift stores help support Goodwill training and youth programs. In addition, a variety of work-appropriate clothing is offered through Goodwill's Clothing Collaborative for Job Trainees, and supplied through an annual Put Your Clothes to Work clothing drive hosted by local corporations and organizations throughout the year. The Clothing Collaborative for Job Trainees makes available business clothing to male and female job seekers who participate in Boston-based job training and placement programs to assist them in their efforts to obtain and retain meaningful employment. Clothing is provided free of charge. Morgan Memorial Goodwill has the added advantage of its co-location with one of Boston's three One-Stop-Career Centers, Career Link, which is also operated by the organization.

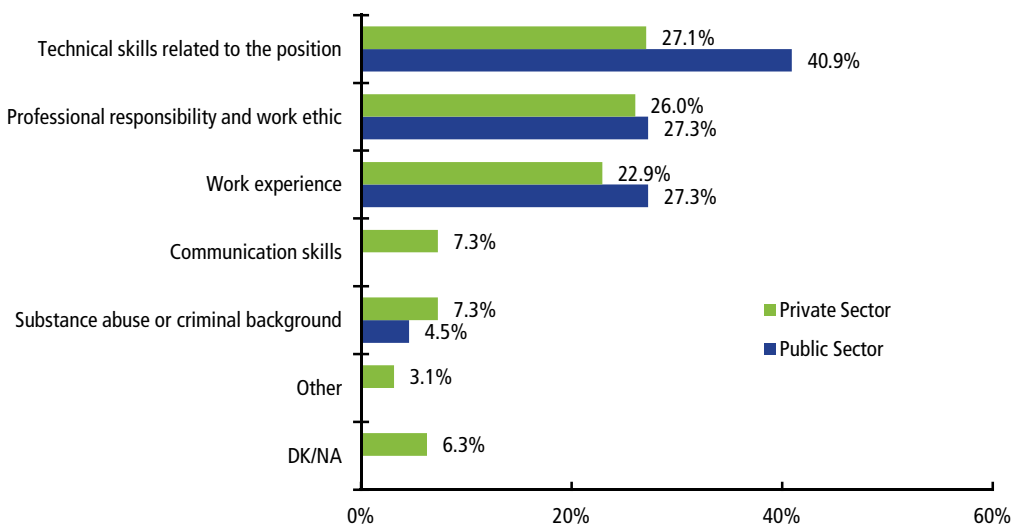
Morgan Memorial Goodwill employs 300 across the enterprise. Job functions include materials handlers/sorters, donation center attendants, and retail sales people. The most important skills required are attention to detail and brand awareness for the handlers/sorters, and customer service skills for the center attendants and retail sales. The biggest expected growth is in the retail business. The organization has a 10-year growth plan to open 2 donation centers and 2 stores each year.



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Figure 9 illustrates the skills that were the hardest for both public and private sector employers to find when searching for new hires. The three biggest issues that both sectors had were: 1) finding workers with technical skills related to the position; 2) finding workers who possessed a sense of professional responsibility and work ethic; and 3) finding workers with the right experience. Communication skills are important to about 7 percent of private sector employers, but not to public sector ones. Problems with substance abuse or criminal backgrounds are also problems for employers, although not significant: about 7 percent of private sector employers and 4.5 percent of public sector ones said these were a problem for them in hiring. Separate interviews with employers confirmed substance abuse as a potential issue. However, given the small number of survey respondents reporting it as a concern, plus 'substance abuse' being part of the answer, and a +/- 6.9% margin of error for the survey, this does not seem to be an issue for the industry; it could, though, be one for individual businesses. One employer mentioned they had a hard time finding qualified workers because they have to turn away applicants who may be undocumented residents.

Figure 9: Issues most closely related to difficulty finding qualified workers



Roxbury Technology, Inc.

Roxbury Technology Corporation (RTC) is a re-manufacturer of toner cartridges for inkjet and laser printers, fax machines, copiers, and postage machines. The company collects empty toner cartridges, disassembles, cleans, replaces components, refills, repackages, and redistributes them to partner re-sellers, such as Staples, Office Max and regional suppliers. RTC has over 600 remanufactured products in its portfolio compatible with brand name printers from Brother, Canon and more. In addition to its “round trip” product cycle, RTC is also committed to maintaining sustainable business practices. All used packaging materials are recycled, and components that do not meet the company’s standards are shipped to a recycler.

Founded by the late Archie Williams in 1994, it was his dream and mission to provide jobs and economic development in the inner city. Due to his untimely death in 2002, Archie Williams did not see that dream come to fruition. Elizabeth Williams took over the company in 2003, and is the current owner, President and CEO of Roxbury Technology.

RTC is a Minority and Women Owned business, with a goal to continue Archie’s legacy “to create jobs and build our community while making top quality, earth-friendly products.” RTC’s business model is “good for the environment, creates jobs, helps the local economy, and gives those individuals who are often overlooked in the job market a chance—sometimes a second chance,” said Williams [in a 2010 interview.]

Business is growing. Sales have doubled in the past six years from \$8 Million to \$16 Million, and so has the workforce. Having outgrown its Jamaica Plain manufacturing plant, RTC recently moved to a new 300,000 square foot facility in Hyde Park along the newly developed Readville transit line.

RTC currently employs a staff of 65, and prides itself on its outreach to the Roxbury, Dorchester and Jamaica Plain communities through strategic partnerships with local churches and community-based organizations. A culture of teamwork is fostered throughout the company, which contributes to high productivity and a superior product that customers demand. All employees receive fringe benefit packages and on-the-job training. There are internal opportunities for growth. Job categories include sales, marketing, manufacturing distribution and customer service.



Job categories include sales, marketing, manufacturing distribution and customer service.

Figure 10: General skills that recent entry- or mid-level hires tend to be most deficient in

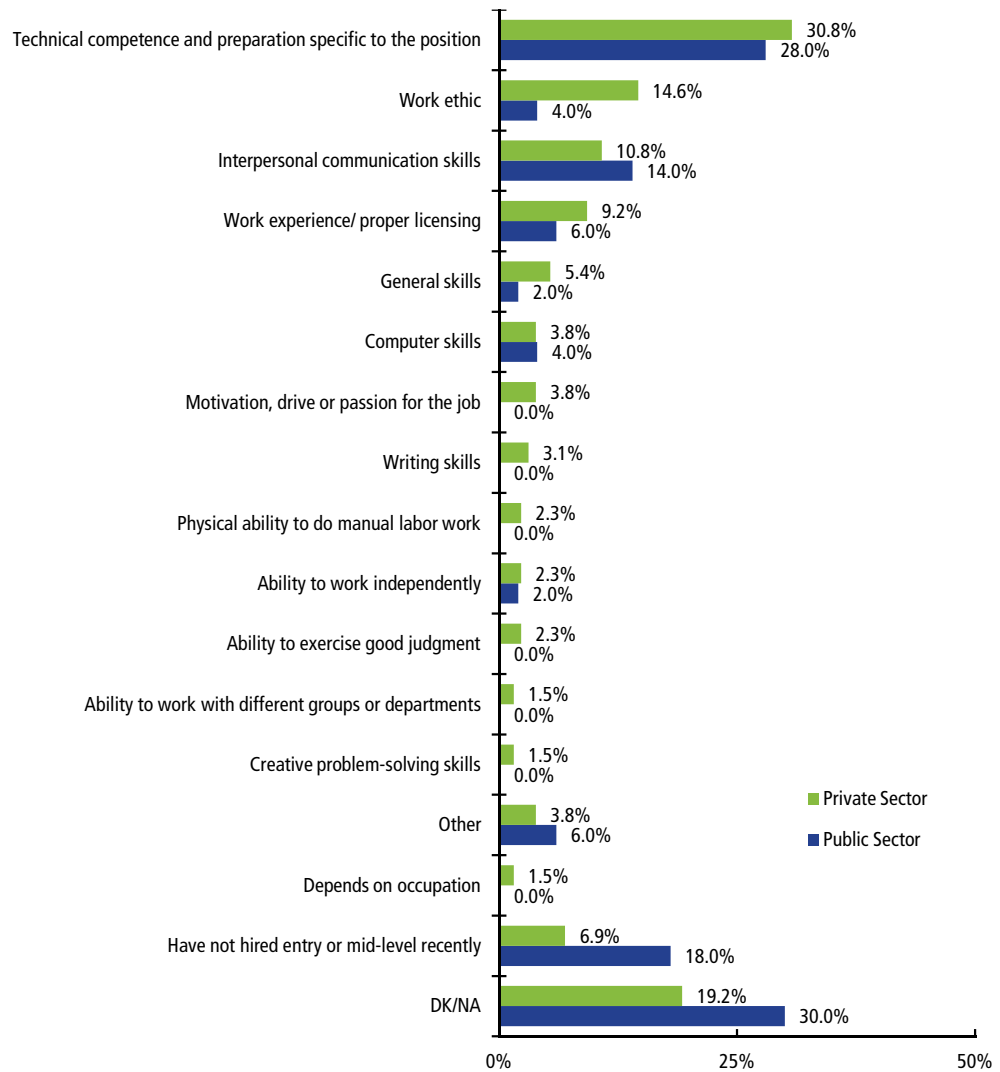


Figure 10 shows more specific information about skills deficiencies. Again, technical competence was at the top for both sectors. The survey did not ask for specific examples of technical or other deficiencies; given the diversity of the industry, it would likely vary from job to job. Math skills, however, were one example of a technical deficiency cited by Costello Dismantling, a construction and demolition debris recycling company. Work ethic is a bigger issue for the private sector than the public sector. Landscape Express, a composting business, reported that they are looking for “good, honest people that will show up.” Interpersonal communication skills were reported as lacking by both private and public sector employers. This was backed up

in interviews, which mentioned lack of maturity, attention to detail, and problem solving skills as concerns. Survey results show transportation firms in particular ranked communication skills as a big deficiency. Work experience and licensing were bigger issues for the private than public sector. Details were not asked about specific deficiencies, such as licenses, although one employer interviewed gave lack of commercial drivers license as an example of a license deficiency.

The survey did not ask employers how they sourced their entry-level employees, but it was asked in both pre and post survey interviews, and in the employee focus group described in section VIII. Because labor unions came up more than once, it is worth mentioning here. Labor unions, as both a source of labor and as trainers, are a topic that might warrant further study, although the recycling industries in MA are not as unionized as in other states. A City of Boston recycling program job listing cites the American Federation of State, County and Municipal Employees (AFSCME) membership (see Appendix 4) as part of the job. Laborers International Union of North America (LIUNA), and the Union of Operating Engineers were specifically mentioned as labor sources for the deconstruction industry (see Costello Dismantling Co, Inc. case study). The LIUNA Apprenticeship Training Center in Hopkinton provides training courses in environmental and construction safety. The International Union of Operating Engineers has an Operating Engineers Certification Program, which offers Heavy Equipment Operators training to its members.

On the employee front, the small sample of employees interviewed described finding their jobs through craigslist and word of mouth. They also reported using a range of skills in their jobs. One works in the company office, helps with an on-line presence, drives a truck, and does heavy lifting. Another manages employees and helps with material sorting. And another works in sales, drives a truck or forklift, and does scheduling.

These employees also reported little formal training. Rather, their training tended to be on the job, learning from others.

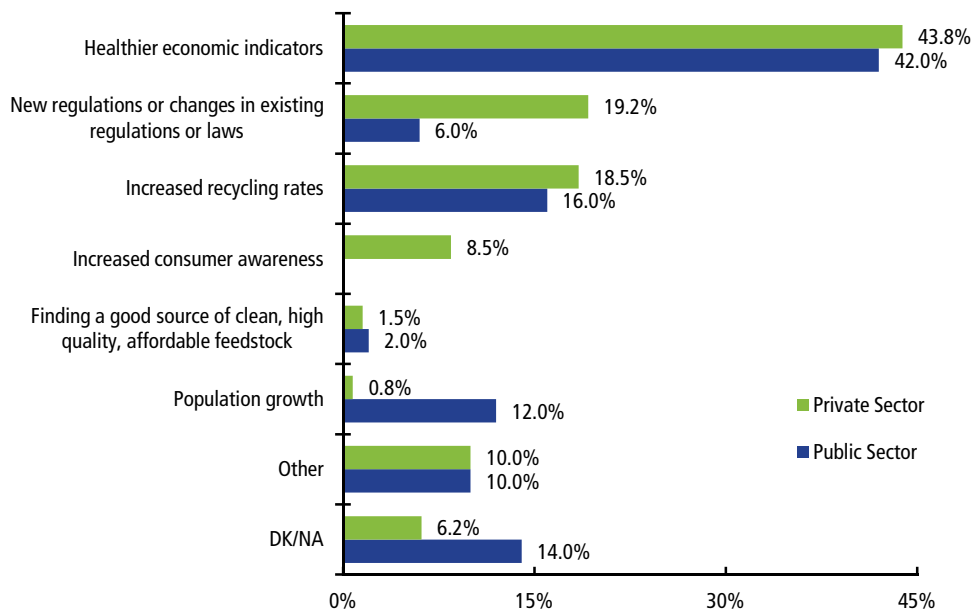


These employees also reported little formal training. Rather, their training tended to be on the job, learning from others.

VII. Drivers of Job Growth or Contraction

Over 40% of both the public and private sector respondents reported that healthier economic indicators would drive job growth in their organizations. This is notable since job growth is expected even in this down economy. It's also interesting that increased recycling rates were not seen as significant drivers of growth in either sector, although the response rate in the public sector increases when combined with the 'increased consumer awareness' response. Presumably increased education would be aimed at least in part in increasing participation. Regulations were viewed as bigger drivers in the private than public sector, although these were reported as factors that could lead to increased layoffs by the private sector as well. The survey did not specify types of regulations, nor did it allow for answers that might describe regulatory drivers in either direction. This might be a further area of follow up.

Figure 11: Factors that could drive job growth



The public and private sectors cited different reasons for potential layoffs or decreased hiring. Lack of economic growth was the biggest factor in the private sector. In the public sector, budget cuts would be the major factor, although when combined with the second-highest ranked factor, bad economy/no funding, budget-related issues ranked higher than the private sector's response about lack of economic growth.

Shrinking customer contacts and lack of quality feedstock or raw materials were cited as smaller concerns for job contraction in the private sector, along with higher energy costs and increased mechanization.

Landscape Express



Landscape Express is a 22 year old business that collects leaves and yard debris and recycles it into organic bark and hardwood mulch and soil. Their main facility is located in Woburn MA with a small satellite facility in Mashpee MA. Income is derived from a combination of tipping fees from yard waste and the sale of manufactured soil and mulch to the landscape community.

Total Number of Employees: 10

Job Categories

Clerical - 2

Operations (equipment drivers) - 4

Sales - 1

Management - 3

Salary and Benefits

Operations Salary Range: \$15 - \$25/hr depending of experience. 40 hrs/week plus overtime during peak season and time off if desired during slow seasons.

Benefits: Health insurance paid at 60%, vacation 1 week after 1 year, 2 weeks after 3 years, 3 weeks after 5 years. 6 holidays.

Workforce

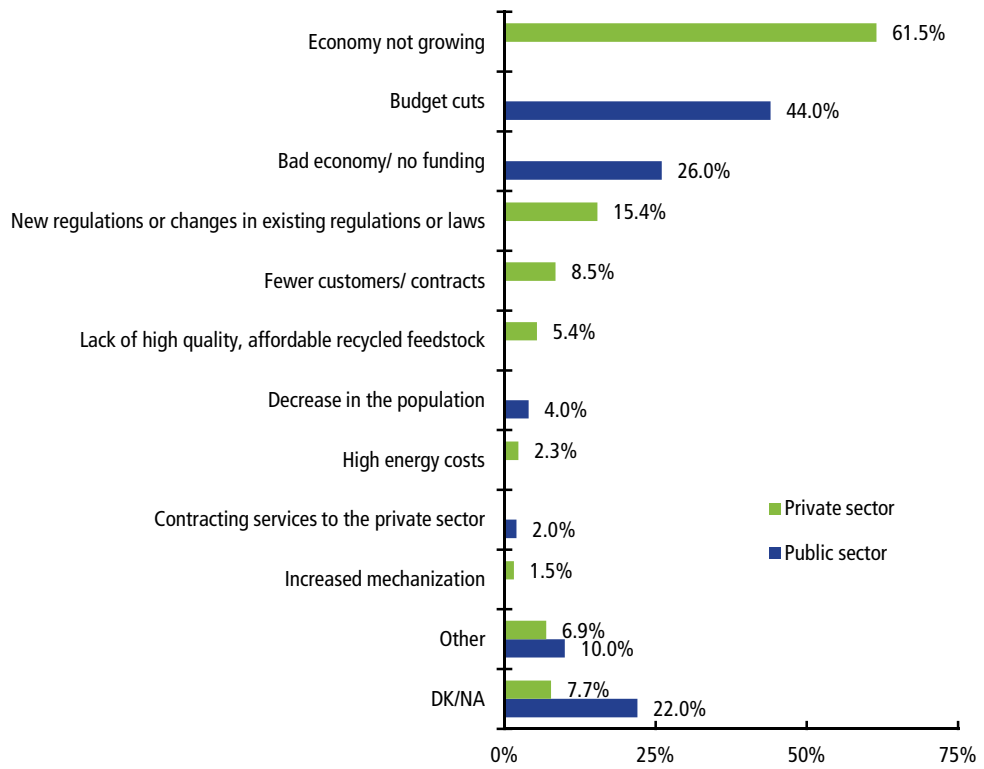
Clerical: Entry level position with minimal turnover, no particular skill set required. Basic counter help preparing invoices, etc. Skill set desired: Basically looking for good honest people who will show up.

Operations: Minimum requirement: Experienced equipment operators with at least two years experience. Employees are expected to drive a variety of vehicles and run equipment with minimal supervision. Equipment includes front loaders, tub grinders, dump trucks, etc.

How do they find employees? Word of mouth. Landscape Express has tried posting ads but received too many applicants that were not serious. Reviewing large number of applications takes too much time. They have found that the best way to find good employees is to put the word out through people they know.

Hiring difficulties? Landscape Express reports a difficult time locating good employees with a strong work ethic. Two common problems in hiring are the absence of working papers and the inability to pass mandatory drug test. Substance abuse is also a common problem.

Figure 12: Factors that could result in layoffs or decreased hiring



VIII. Voices from the Field: Recycling Workers Talk About Their Jobs

Devin McGuire is a worm. It's not an insult. "Worm" is her job title as a truck driver's helper at Earthworm, a Somerville-based recycling company serving greater Boston since 1970. McGuire was one of five recycling workers who gathered at the offices of JFYNetWorks in Boston on an October night in 2011 for a roundtable discussion about recycling jobs. She was joined by Brian Marsh and Ebony "Mystique" Floyd from Roxbury Technologies, Rogers Lockhart from Goodwill Industries, and Paul Kiefer from Boston Building Materials Reuse Center.

The five workers shared stories about their daily duties, how they were hired, the training required to do their jobs, prospects for career advancement, and other aspects of work in the Massachusetts recycling industry. The brief profiles below capture some of what they had to say. Their stories provide some insight into workers' experiences, but, given the diverse nature of the jobs, job titles, and job functions in the recycling field, are not necessarily representative of the whole industry. Appendix 4 includes three Massachusetts-based recycling job descriptions, and Appendix 5 includes a link to several recycling job descriptions on O*Net, the Occupational Information Network, a national database of occupational information.

Rogers Lockhart, Goodwill Industries

Rogers Lockhart had been laid off for 2 ½ months when he saw a job listing on craigslist for a position as Team Leader of Textiles and Production at the large Goodwill center on Harrison Avenue in Boston. The position called for warehouse experience matching his previous work. He applied and won the job, beginning work at Goodwill in late February, 2011.

Lockhart supports eleven stations at the Goodwill warehouse where clothes arrive "all day long." Goodwill workers receive clothes on the facility's loading dock and put them into bins, which Lockhart transfers to the sorters at each station. He assists the sorters in their work and assures that a high level of quality control and assurance is met. Information about the clothes arriving at the warehouse is input into a spreadsheet as part of the intake, sorting and record-keeping process.

Meeting stringent rules about children's clothing is especially important at Goodwill. Lockhart suggests that Goodwill's sorting requirements regarding safety issues, clasps, presence of lead and other issues are more demanding than many department stores. "If stores had our stringent rules, there'd be no department stores selling children clothing," he says—only half joking.

Lockhart's job is demanding, especially at times when the volume is extremely high, since he is often the only person assisting the sorters at all eleven stations, each of which contains up to sixteen racks for hanging clothes. Although Thursdays and



Five recycling workers gathered at the offices of JFYNetWorks in Boston on an October night in 2011 to discuss recycling jobs.

Fridays tend to be a bit slower, and January through March sees less activity than the rest of year, the Goodwill operation is generally a high volume operation.

Asked about training, Lockhart reports that it is mostly “on-the-job,” with team members teaching skills to each other and educating by example. He believes that this is an important part of his own work, and notes that promoting teamwork and helping co-workers get along with each other is a responsibility he takes very seriously. “I make everything about the team,” he says, “I don’t like to blame one person or another but work as a team so that we all pull together.”

Some additional training would be very helpful, however, according to Lockhart. In his previous job at the Christian Science Monitor Warehouse, he enjoyed training in teamwork and other subjects, and he believes that everyone can profit from training, especially in how to work with different personalities.

Lockhart says that he would definitely recommend Goodwill to other people looking for a job. Like several of the other recycling workers at the roundtable, however, he notes that the job is not for everyone and that a willingness to work hard is essential. As for himself, he is clear on his goal of becoming a manager, an objective he expressed in his first interview for the Team Leader job he holds now.

Devin McGuire, Earthworm

When the recycling worker roundtable met in late October, Devin McGuire had been a “Worm” at Earthworm for all of one month. “I saw a posting on craigslist for an ‘environmentalist truck driver’ which I thought was pretty cool,” she remembers. “I sent them an email, and I’m now a truck helper and training to be a driver.”

McGuire works both in the office and from Earthworm’s trucks in the field. On field days, she works a scheduled route, picking up recycled materials at client businesses and dropping them off at the collection facilities of Casella. In the office, she processes invoices, prints out sheets for drivers, and helps them stay moving and busy. When needed, she’ll help out in the Earthworm warehouse. Finally, she uses some of the social media skills she learned in a previous job at Ticketmaster to help Earthworm update the company’s website and Facebook page.

McGuire describes the training she received as “watching, asking and learning” from her Earthworm co-workers. With a very small staff, it’s important for everybody to master a variety of tasks, both basic and complex. She’s learned that there are lots of tricks of the trade. “You don’t have to be super strong to deal with the heavy barrels,” she says by way of example. “You do have to know how to set things up right, and how to use your body correctly.”



With a very small staff, it's important for everybody to master a variety of tasks, both basic and complex.

Asked about her own future and whether she would recommend Earthworm to others, McGuire quickly answers “yes” to the second question, before pausing to elaborate. Earthworm strikes her as a unique workplace and the job fits her own personality type, since she likes both being in the office and driving a truck. The job is a good one for someone who can only stand an office for a few days a week but also likes being outside.

Since her job as a “Worm” is her first “career oriented” position, McGuire is still working to establish herself. Beyond that, she would like to learn and evolve with the company, and with a recycling industry that she describes as “always evolving to face new challenges”.

Paul Kiefer, Reuse Center at Boston Building Resources

Boston Building Resources (BBR) has been serving the greater Boston area for thirty years under a variety of names and structures. As Paul Kiefer describes it, the organization that is now BBR once provided weatherization services. As it grew, it expanded into other services, including selling windows and cabinets, and creating and spinning off a building materials reuse cooperative. The Reuse Center at BBR is now a company that sells a huge variety of materials to income eligible members at a discount, and to the general public.

An employee at BBR for five years, Kiefer began his current position as Donations Manager two years ago. In his years at the previous cooperative organization, Kiefer sold new products like weatherization materials, countertops, doors and windows while touting energy efficiency. He came to that job with a strong background in the building trades, as a contractor and skilled wood worker. He says that all of this experience is now incredibly useful in his ability to evaluate donations of building materials to the Reuse Center at BBR.

“As Donations Manager, I sort of control the flow of stuff coming in; coordinating the trucks going out and getting materials into the receiving area when the trucks come back,” Kiefer says. “There is a constant flood of people making offers, and I’m always screening calls and scheduling pick ups. This job is incredibly varied, and although I’m often working in the office alone for scheduling, I’ll also help on the sales floor, drive a truck, and sometimes uses a forklift.”

Kiefer says that there was no formal training for his job and that most of the people that he’s aware of received their training from other workers in a loose “apprentice” style culture where new people learn how to perform their jobs from those already there. He notes that the Reuse Center at BBR has a very supportive environment and this may contribute to the effectiveness of more informal training.



The deeper mission of Roxbury Technologies is to create jobs and improve the health of the community.

Considering his own future, Kiefer says he is content in his job and that while he sees no particular path to moving up, he can imagine being at the Reuse Center for quite a while. He also reflected on some of the national trends affecting growth possibilities in the building materials recycling sector more generally, including a possible increase in materials reuse through the “deconstruction” of old homes.

“In the Midwest, where labor is much cheaper than in Massachusetts, there are tons of house coming down,” Kiefer says. “It’s my impression, though, that the organizations doing this on a significant scale are those that are getting lots of money through job training funds. They’re not trying to operate on a sustainable business model. We’re looking into deconstruction, and the day may come when landfill costs in Massachusetts get expensive enough to make it profitable, but it’s not just around the corner.”

Brian Marsh and Ebony “Mystique” Floyd, Roxbury Technologies Corporation

Mystique Floyd came to Roxbury Technologies two years ago, became an assistant line leader after only three months, and within six months was promoted to the line leader position she holds today. Mystique’s passion comes through clearly, and it’s easy to see why she is also often asked to lead tours of the factory.

Brian Marsh is on a similar upward path at the company. Marsh heard about Roxbury Technologies through word of mouth in early 2011, began as an assembly line worker on Mystique’s line, and was promoted to his current line leader position within ten months. Like Mystique, he talks about his work with pride, always referring to the company as “we,” a sign of the spirit of common mission that is a big part of the company’s success.

The manufacturing lines led by Floyd and Marsh produce remanufactured laser toner and ink jet printer cartridges that are sold at national retailers like Staples and WB Mason. As the company’s website proudly notes, however, the firm’s high quality remanufactured products are only “part of the story.” The deeper mission of Roxbury Technologies is to create jobs and improve the health of the community.

The two line leaders described the remanufacturing work which they oversee to the roundtable group, emphasizing the need for high quality and attention to detail from breakdown of used cartridges to production of a final product ready to be shipped to customers. The process involves multiple steps. Workers open arriving cartridges, split them in half, clean them out, put in new parts, refill them, seal them tightly, test for quality, seal them again, and then package them so that they are ready to sell. Some 11-13 people work on each line. (A video of the entire process is available on YouTube).



Reflecting on training, both Marsh and Floyd said that the training for their first positions was “on the job”, receiving the same education from a line leader which they provide to workers today. Marsh notes that it’s good to know how to do the detailed work from personal experience. Floyd reports receiving some limited supervisory training, but thinks more would be helpful. Both of the leaders had praise for recent training delivered to the firm’s workers and supervisors by educators from ABCD in Boston.

As they reflect on their career futures, Floyd and Marsh both say they want to be part of the growth at Roxbury Technologies and expect that growth to be strong, offering new opportunities. While they have no hesitation promoting the company’s jobs to others, they both note that remanufacturing is hard work that requires a strong desire to put out a high quality product. “That’s not for everyone,” Marsh says.

A Need for Health and Safety Training for Recycling Workers?

One of the questions discussed at the roundtable was whether or not formal health and safety training was offered at their companies, and whether the participants felt that it was needed. Each of the five workers said that health and safety training was generally handled relatively informally as part of “on the job” education. However, all five had no trouble quickly identifying work conditions which were potentially dangerous to the health and well-being of workers, and all felt that better training would be a good thing.

IX. Recommendations

This study found that recycling employers are having some degree of trouble finding well-trained and qualified workers, and that workers report the need for job training. The study, however, did not specifically ask employers if they are knowledgeable of or taking advantage of the state's workforce development and training system. Given the small sample of recycling employers and employees interviewed as part of this study, these recommendations are provided as topics for additional investigation.

Recycling is, and will continue to be, an important part of Massachusetts' green economy. The state's recycling industry ranges from older, well-established companies to newer ones. Additional companies will likely be added and other companies will expand or modify their recycling activities as recycling rates increase and as the economy improves. As this happens, the need for job training will be even more critical.

A. Recycling industry employer engagement with the workforce development community needs improvement

Recycling industry employers in Massachusetts may not be aware of the scope and scale of the state's workforce development and training system, and therefore unlikely to take advantage of offerings from community-based organizations and government workforce programs. There may be several reasons for this.

First, the industry is relatively small and unknown, so it has not attracted the attention of training programs, funders and Workforce Investment Boards. Second, recycling employers tend to do their hiring through existing networks, word-of-mouth, and free services like craigslist. Third, many of the industry's jobs are relatively low skilled, leading to a perception that training is relatively unnecessary. Fourth, the industry in Massachusetts does not seem to have a culture of significant incumbent employer training, even in basic categories like orientation, basic skills training, and health and safety procedures. Existing training is "learn while you do it," and employers may be reluctant in the extreme to have workers take any time out of their work day, even if it will improve productivity over the medium and long term. Fifth, recycling industries are lean, and many are concerned about avoiding all "unnecessary" expenses. As well, executive level managers may not have the time to investigate training programs. And, finally, old, established recycling industries have a culture of keeping their heads low and not partnering with outside groups, even when there are outside programs that can be of help. It takes time to develop trust with these companies and get them to accept assistance.

This doesn't mean, however, that owners and managers of recycling businesses would not be well-served by greater engagement with the workforce development and training community in the Commonwealth. In fact, with proper education and investment of time to develop relationships of trust, the recycling industry should find the existing workforce and training services to be exceptionally well designed for their needs.

For example, industry employers sometimes reported (see Figures 11 and 12) that employees were not completely “workforce ready” in terms of understanding basic workplace norms regarding punctuality, regular attendance, following instructions, performing tasks at a high standard, interacting effectively with customers, managers and co-workers, reporting mistakes or concerns, identifying and solving problems, and drug use.

Clearly, there are many outstanding programs in the Massachusetts workforce system where these skills are taught to both new and incumbent workers. With effective employer engagement strategies, recycling owners and managers could gain a greater understanding about the advantages of these initiatives and increase their participation. Subsidized On the Job Training programs seem like an especially good fit for the industry, if appropriate employer engagement tactics and small pilots were employed so that managers could quickly see the advantages of participating.

However, even high quality training programs well matched to employer needs are likely to go unused without a deep commitment to personalized employer engagement outreach. Given the nature of the industry, this probably won’t result in positive outcomes on the first round of visits. Creating lasting partnerships between workforce programs and recycling employers is likely to proceed slowly based on small, successful experiments and many return “listening post” visits, as well as getting businesses to share positive results with their peers.

B. The recycling industry needs a regional approach.

While it may seem intuitive that large metropolitan areas like Boston would have a proportionately large recycling industry job-base based on the simple arithmetic of more people generating more recyclables, this is not the case. Recyclables move around the state and even out of (and into) the state and country for processing and to be turned in to new products. Land and facility prices, access to shipping routes, current or past proximity to supply chains, and other reasons drive this. In addition, while there are some commonalities in recycling activities across regions of the state (e.g., collection companies, redemption centers), different parts of the recycling industry are in different parts of the state. Any training program will have to look regionally at what recycling companies are there, and at what their specific needs are. The Massachusetts DEP has Municipal Assistance Coordinators working regionally who can be of help (<http://www.mass.gov/dep/recycle/reduce/macmap.htm>). And MassRecycle and the Environmental Business Council of New England can help connect workforce developers with municipal recycling coordinators and businesses in different parts of the state. Information about these organizations can be found in Appendix 5.



Even high quality training programs are likely to go unused without a deep commitment to personalized employer engagement outreach.



C. The recycling industry in Massachusetts needs an economic development strategy at least as much as a workforce strategy.

The current Massachusetts recycling industry does not seem to be a big generator of well-paying jobs with identified career ladders leading to upward mobility. Instead, it is relatively small and steady and expecting significant growth over the next two years (15%), and is capable of even more growth if the right government policies, institutional practices, market drivers, and direct incentives were in place at both the state and local levels.

There is significant literature in the recycling community about which policies, programs, and incentives increase material reuse, recycling rates, prices for recycled material, the relative number of recyclables which are actually recycled (as opposed to merely collected and then landfilled or incinerated), and so forth. While it's possible to imagine an economic development strategy based on increasing the amount of processing or manufacturing done locally (using local recyclables as material), this is not primarily how the industry is now structured and it's hard to see how this would significantly change without advocates and support. But exploring what a job creation-focused economic development strategy for the Commonwealth might look like was not part of this study.

It does seem clear, however, that those interested in the job creation potential of the recycling industry for low-income, lower-skilled individuals must invest time in advocating for well understood policies, programs and incentives which increase material reuse and recycling and create jobs. Although it's not certain that boosting

recycling will result in hiring people from target audiences, it's definitely clear that existing drivers are not sufficient to make the recycling industry as vibrant a source of jobs as it could be. The workforce training and development community in Massachusetts should develop a relationship with the Massachusetts Department of Environmental Protection and MassRecycle, as well as economic development and finance agencies, to support the economic development side of recycling, as well as to develop relationships with local employers and drive awareness of training programs.

D. Incumbent workers in the Massachusetts recycling industry want and need high quality training.

While there are some significant barriers to opening up the recycling industry to greater involvement with the existing workforce development and job training system in the state, this does not mean that workers in the industry are not hungry for training, education and opportunities for reliable career paths and upward mobility. Actually, the reality is quite the opposite—workers are interested in training.

Industry employers who invest in a little bit of additional time, energy and money in incumbent training could earn a reputation for worker concern that could be a significant competitive advantage in recruitment and (especially) in retention. Specifically, employers who partner with training programs like those funded by SkillWorks or the state's Workforce Training Fund could see visible improvements in productivity. There is a need to explore more in depth the skills deficiencies in job profiles and the types of training that can address them. But training areas of particular value to incumbent workers themselves include remedial math and language, workforce readiness "soft skills," first-time supervisor and leadership education, skills related to workplace machinery and truck driving, and essential health and safety training.

E. Promoting recycling jobs as "green" may not be effective as a recruitment tool in some categories, but greater eco-awareness comes from recycling work.

Although it is a largely anecdotal conclusion, several new recycling industry employees were drawn to the job simply because it was a way to earn a paycheck. Some specifically noted that they did not themselves recycle beyond dropping some materials in their blue recycling bins. It is likely that many of the people in some of SkillWorks prime target audiences would not be drawn to job training programs for the recycling industry which are primarily advertised as a career opportunity to "go green." Job seekers and potential job trainees were more likely to be drawn by such customary concerns as the job's location, salary, benefits, hours, job description, and training and growth opportunities.

However, several of these same workers expressed a higher awareness of the importance of recycling and of environmentally friendly practices in general by virtue of securing a job in the recycling industry, and a "green" job presumably might be a selling point for them in their next job.

Appendix 1: Study Methodology

A quantitative telephone survey of 180 Massachusetts organizations that provide recycling-related services—130 private companies and 50 public sector employers—was conducted. The Figure below provides a brief overview of the methodology utilized for the project.

Method	Telephone Survey of Firms that Provide Recycling-Related Services
Number of Participants	180 Organizations Completed a Survey (130 Private Firms and 50 Public Sector Employers)
Field Dates	August 22 – September 13, 2011
Survey Universe	1,567 Database Records (1,065 Private Sector and 502 Public Sector)
Survey Margin of Error	The maximum margin of error for questions answered by all 180 respondents is +/- 6.9% at the 95% level of confidence

Survey Design

- Through an iterative process, BW Research Partnership, Inc. (BW Research) worked closely with the Environmental Business Council of New England and the project consultants to develop a survey instrument that met all the research objectives of the study. In developing the survey instrument, BW Research utilized techniques to overcome known biases in survey research and minimize potential sources of measurement error within the survey.
- Screener questions were utilized to ensure that the organizations surveyed had at least one Massachusetts location and were either a municipality or other public sector employer or a private company that offers recycling-related services.

Sampling Method

A database was compiled for the survey utilizing databases from MassRecycle, the Massachusetts Department of Environmental Protection, New York State Recycling Markets database, Perlmutter Associates, and other sources. Additional names in key NAICs were purchased from InfoUSA. These names were sorted into industry activities where easily recognizable. Prior to fielding, BW Research cleaned the database and removed duplicate records, resulting in 1,065 records for the private sector database and 502 records in the public sector database.

Data Collection

Prior to beginning data collection, BW Research conducted interviewer training and also pre-tested the survey instrument to ensure that all the words and questions were easily understood by respondents. Telephone interviews were generally conducted from 9:00 am to 4:00 pm Monday through Friday.

The survey averaged 12 minutes in length and firms were called up to six times to request their participation. The data collection period was August 22 through September 13, 2011.

A Note about Margin of Error and Analysis of Sub-Groups

The overall margin of error for the survey, at the 95 percent level of confidence, is between +/- 4.1 percent and +/- 6.9 percent (depending on the distribution of each question) for questions answered by all 180 respondents.

Given the very different nature of private and public organizations, the results were reported separately for the two groups. As such, the margin of error is between +/- 4.8 percent and +/- 8.1 percent for the data from the 130 private companies and is between +/- 7.9 percent and +/- 13.2 percent for the data reported from the 50 public sector employers (at the 95 percent level of confidence).

It is also important to note that questions asked of sub-groups of respondents within each of those two groups (such as the question that was only asked of respondents that reported difficulty finding qualified workers) will have a margin of error greater than those described above, with the exact margin of error dependent on the number of respondents in each sub-group.

Appendix 2: Recycling Category Description¹

Recycling Industries	government staffed residential collection	publicly staffed curbside or drop off
	private staffed recycling collection	privately staffed curbside or drop off, also beverage container redemption
	compost/organics processor	public and private sector, produces compost, mulch, bark, and other soil amendments
	materials recovery facilities	processing facilities that handle mixed and separated recycled materials and have the capacity to physically and mechanically sort as well as process materials for sale to end markets
	recyclables materials wholesalers	wholesalers [brokers] and distributors of scrap metals, paper, textiles, glass, plastic, rubber, and oil. May also consolidate loads and process to clean. Includes glass beneficiation, establishments that are strictly engaged in the recovery of the recyclable metals and plastics from e-waste
	plastics reclaimers	process post-industrial and post-consumer plastics to prepare them for manufacturing. Different from brokers, or those that sort, bale, or manufacture.

¹ http://nerc.org/projects/completed_projects.html#reiupdate

Recycling Reliant Industries	glass container manufacturing plants	companies that manufacture glass containers for beverages, etc.
	glass product producers	including fiberglass, sandblasting materials, industrial beads, countertops, specialty glass, artisans
	nonferrous secondary smelting and refining mills	aluminum, copper, lead, zinc-- smelting, refining, blending
	nonferrous product producers	manufacturers that produce primary products or shapes from nonferrous scrap, including bar plate, sheet, strip, and tube.
	nonferrous foundries	melting and casting metals into specific shapes that are used in automobiles, plumbing fixtures, trains, airplanes, and other equipment.
	paper and paperboard mills/deinked market pulp producers	the mill where a roll of paper is made, excludes any conversion of paper to products such as containers or envelopes
	paper-based product manufacturers	manufacturers that use recycled paper to produce a product: cellulose insulation, hydro-seeding mulch, pressed paperboard and molded fiber (e.g. food service trays, egg cartons, Figureware, berry baskets), construction paperboard (e.g. for poured concrete spacers), and masking tape backing
	pavement mix producers	recycled asphalt and aggregate
	plastics product manufacturers	use recycled plastic flake, granulate, and/or pellets for use in products
	rubber product manufacturers	flooring and surface applications, rubber blocks, pavers and mats for landscaping, rubber mulches, specialized molded rubber. Excludes grinding, reprocessing, and reclaiming for fuel and civil engineering uses, and collectors/distributors/brokers
	iron and steel mills	None in Massachusetts
	iron and steel foundries	melting and casting metals into specific shapes that are used in automobiles, plumbing fixtures, trains, airplanes, and other equipment
	other recycling processors/manufacturers	Catch-all, includes fluorescent lamp and mercury recyclers, gypsum drywall recycling, carpet recyclers, waste oil recycling, textile (rags) recycling

Reuse and Remanufacturing	computer and electronic appliance demanufacturers	demanufacture, remanufacture, and/or reuse of computers and electronics as primary focus of business, with meaningful portion of business being remanufacture/asset recovery
	motor vehicle parts (used)	establishments primarily engaged in the merchant wholesale distribution of used motor vehicle parts (except used tires and tubes) and establishments primarily engaged in dismantling motor vehicles for the purpose of selling the parts
	retail used merchandise sales	establishments primarily engaged in retailing used merchandise, antiques, and secondhand goods: antique stores (and historic documents), used apparel, used clothing, used book dealers, used appliance stores, thrift stores and used sporting good stores, brick dealers, bldg materials, flea markets, used furniture stores, salvage stores, secondhand stores, etc
	tire retreaders	establishments that replace worn treads with new ones
	wood reuse	establishments that accept clean wood, primarily pallets and possibly some dimensional lumber, and either remanufacture pallets and/or chip clean wood to create a saleable product other than wood chips for fuel
	materials exchange services	any business or entity that provides either a physical or virtual market where generators of used materials (industrial, construction-related, residential durable goods, etc.) and potential users of such products could facilitate a transaction to reuse otherwise end-of-life materials
	other reuse	all businesses that either purchase or otherwise obtain used materials, equipment, or merchandise for repairing, cleaning, or otherwise putting back into use

Appendix 3: Direct Economic Impacts of Massachusetts Recycling Industry

(Source: Northeast Recycling Council, 2009 Recycling Economic Information Study⁶)

Business Category	Data Type	Estimates of Total Recycling
Recycling and Recycling Reliant Industries		
Municipal Residential Curbside and Drop Off Collection	Establishments (#)	334
	Employment (#)	431
	Annual Payroll (\$1,000)	21,162
	Receipts (\$1,000)	54,542
	Throughput (1,000 tons)	276
Private Residential and Commercial Collection	Establishments (#)	597
	Employment (#)	1,284
	Annual Payroll (\$1,000)	36,139
	Receipts (\$1,000)	81,442
	Throughput (1,000 tons)	908
Organics and Misc Organics Producers	Establishments (#)	267
	Employment (#)	1,408
	Annual Payroll (\$1,000)	39,776
	Receipts (\$1,000)	111,906
	Throughput (1,000 tons)	1,376
Materials Recovery Facilities	Establishments (#)	10
	Employment (#)	286
	Annual Payroll (\$1,000)	11,497
	Receipts (\$1,000)	33,221
	Throughput (1,000 tons)	604
Recyclable Materials Wholesalers	Establishments (#)	154
	Employment (#)	1,753
	Annual Payroll (\$1,000)	66,161
	Receipts (\$1,000)	874,083
	Throughput (1,000 tons)	--
Glass Container Manufacturing Plants	Establishments (#)	1
	Employment (#)	(D)
	Annual Payroll (\$1,000)	(D)
	Receipts (\$1,000)	(D)
	Throughput (1,000 tons)	(D)
Glass Product Producers (other recycled uses)	Establishments (#)	2

⁶ http://nerc.org/projects/completed_projects.html#reiuupdate

	Employment (#)	11
	Annual Payroll (\$1,000)	525
	Receipts (\$1,000)	525
	Throughput (1,000 tons)	66
Nonferrous Secondary Smelting and Refining Mills	Establishments (#)	9
	Employment (#)	554
	Annual Payroll (\$1,000)	30,419
	Receipts (\$1,000)	186,106
	Throughput (1,000 tons)	--
Nonferrous Product Producers	Establishments (#)	11
	Employment (#)	433
	Annual Payroll (\$1,000)	15,672
	Receipts (\$1,000)	260,500
	Throughput (1,000 tons)	--
Nonferrous Foundries	Establishments (#)	37
	Employment (#)	612
	Annual Payroll (\$1,000)	22,990
	Receipts (\$1,000)	89,110
	Throughput (1,000 tons)	--
Paper and Paperboard Mills/ Deinked Market Pulp Producers	Establishments (#)	15
	Employment (#)	2,089
	Annual Payroll (\$1,000)	106,018
	Receipts (\$1,000)	732,442
	Throughput (1,000 tons)	513
Paper-based Product Manufacturers	Establishments (#)	1
	Employment (#)	(D)
	Annual Payroll (\$1,000)	(D)
	Receipts (\$1,000)	(D)
	Throughput (1,000 tons)	(D)
Pavement Mix Producers (asphalt and aggregate)	Establishments (#)	44
	Employment (#)	210
	Annual Payroll (\$1,000)	9,473
	Receipts (\$1,000)	61,200
	Throughput (1,000 tons)	1,020
Plastics Reclaimers	Establishments (#)	19

	Employment (#)	290
	Annual Payroll (\$1,000)	14,237
	Receipts (\$1,000)	124,033
	Throughput (1,000 tons)	122
Plastic Product Manufacturers	Establishments (#)	27
	Employment (#)	620
	Annual Payroll (\$1,000)	19,371
	Receipts (\$1,000)	134,728
	Throughput (1,000 tons)	77
Rubber Product Manufacturers	Establishments (#)	13
	Employment (#)	151
	Annual Payroll (\$1,000)	4,581
	Receipts (\$1,000)	17,317
	Throughput (1,000 tons)	20
Steel Mills	No facilities	--
Iron and Steel Foundries	Establishments (#)	20
	Employment (#)	414
	Annual Payroll (\$1,000)	16,650
	Receipts (\$1,000)	56,430
	Throughput (1,000 tons)	--
Other Recycling Processors/Manufacturers	Establishments (#)	11
	Employment (#)	134
	Annual Payroll (\$1,000)	6,563
	Receipts (\$1,000)	22,969
	Throughput (1,000 tons)	--
Recycling Subtotals	Establishments (#)	1,572
	Employment (#)	10,703
	Annual Payroll (\$1,000)	422,721
	Receipts (\$1,000)	2,847,993
Reuse and Remanufacturing Industry		
Computer and Electronic Appliance Demanufacturers	Establishments (#)	9
	Employment (#)	121
	Annual Payroll (\$1,000)	1,884
	Receipts (\$1,000)	11,052
	Throughput (1,000 tons)	--
Motor Vehicle Parts (used)	Establishments (#)	117

	Employment (#)	894
	Annual Payroll (\$1,000)	26,357
	Receipts (\$1,000)	105,171
	Throughput (1,000 tons)	--
Retail Used Merchandise Sales	Establishments (#)	303
	Employment (#)	1,919
	Annual Payroll (\$1,000)	37,865
	Receipts (\$1,000)	155,099
	Throughput (1,000 tons)	--
Tire Retreaders	Establishments (#)	8
	Employment (#)	60
	Annual Payroll (\$1,000)	1,794
	Receipts (\$1,000)	28,259
	Throughput (1,000 tons)	--
Wood Reuse	Establishments (#)	7
	Employment (#)	204
	Annual Payroll (\$1,000)	6,848
	Receipts (\$1,000)	20,584
	Throughput (1,000 tons)	--
Materials Exchange Services	Establishments (#)	2
	Employment (#)	4
	Annual Payroll (\$1,000)	80
	Receipts (\$1,000)	150
	Throughput (1,000 tons)	--
Other Reuse	No establishments	--
Reuse and Remanufacturing Sub-totals	Establishments (#)	446
	Employment (#)	3,202
	Annual Payroll (\$1,000)	74,828
	Receipts (\$1,000)	320,315
Grand Totals- Recycling, Reuse, and Remanufacturing	Establishments (#)	2,018
	Employment (#)	13,905
	Annual Payroll (\$1,000)	497,549
	Receipts (\$1,000)	3,168,308

Note: (D) represents non-disclosure of date due to limited number of firms

Appendix 4: Sample Recycling Job Descriptions

I. Donor Relations Manager

Full Time – 40 hours/week

The Building Materials Resource Center (BMRC) is a nonprofit building supplies re-use operation. We accept donations of new and good quality used building materials and distribute them primarily to low and moderate-income homeowners and nonprofit organizations, for a modest handling fee. Our inventory includes all types of building materials: complete kitchens, vanities, doors, windows, flooring, electrical and plumbing fixtures, and more.

Job Description

The Donor Relations Manager's primary responsibility is the day-to-day management of incoming donations of building materials. This involves a great deal of phone time and multiple layers of tracking donations from the first phone conversation to the acknowledgement after the donation has been received.

Specific Responsibilities

- Handle all incoming donor calls and e-mails: explain program to prospective donors, initiate, or continue, the donation process with donors;
- Determine appropriateness of potential donations, communicate donation guidelines and pick-up fees, complete donor paperwork and file, mail donation guidelines packages;
- Write and send thank you cards and donor receipts in a timely manner;
- Make every donor's experience with BMRC a positive one. We strive to cultivate materials donors as eventual financial supporters; we are looking to build long term partnerships with our donor base;
- Work with Database Manager to ensure that donor information is entered properly;
- Work closely with BMRC Driver to discuss previous day's pick-ups, to review current day's pick-ups, and to discuss items that should/should not be accepted;
- Work closely with warehouse staff to determine items we are in need of and those which we should/should not be accepting;
- Organize weekly pick-up schedule in efficient and logical order;
- Send out BMRC Information Packages and Don't Throw It Away cards as requested;
- Work closely with BMRC Director and Grant Writer to communicate with those donors who may be interested in becoming financial supporters of the organization

Qualifications

- Excellent phone skills
- Excellent organizational skills
- Demonstrated history of reliability
- Ability to stay calm and focused when asked to do many tasks at once
- Construction background and/or building materials knowledge a plus

- Ability to communicate clearly
- Ability to sit in an office chair for long periods, to talk on the telephone, to work on a computer
- Bilingual in Spanish a plus

Salary & Benefits

Salary commensurate with experience. Benefits include: 10 paid holidays per year; 2 weeks paid vacation for first three years of service, 3 weeks per year after third year, and 4 weeks per year after six years; 3 paid personal days per year; up to 10 paid sick days per year; 50% contribution to the premium of an individual health insurance plan.

The Building Materials Resource Center is an equal opportunity employer.

II. Team Leader- Rack Department

Morgan Memorial Goodwill Industries, Inc.

EXEMPT:	No	SALARY LEVEL:
DIVISION:	Retail	DEPARTMENT: DC
LOCATION:	Boston	Date: 7/17/08
REPORTS TO:	Production Manager	

Summary

This position is responsible supervising, instructing and providing hands- on training to Textile Processing Agents within the Rack Department. Reports any department problems to the managers and acts as manager in manager's absence.

Essential duties and responsibilities include the following. Other duties may be assigned.

- Have advanced material and product knowledge and the ability to effectively train and communicate with staff on quality control.
- Support and motivate Textile Processing Agents to meet and often exceed daily/ weekly productivity goals.
- Communicate and problem solve with all levels of staff when issues arise on the production floor.
- Take directives from department manager and effectively complete them with little to no supervision.
- Works with and trains Pine Street Inn Processor on preparation of clothing and proper invoicing. Acts as back up Pine Street Inn Process when needed.
- Works with and trains Rack Shipper on preparation of racks and meeting daily allocation of clothing, shoes, and linen. Acts as back up Rack Shipper when needed.
- Monitors and tracks storage of seasonal items.
- Assists with Paid Trainee work evaluations as needed.

- Ensures that Textile Processing Agents keep a clean and neat work area at all times.
- Supports all special events involving the Rack Department (i.e. Clothing Collaborative, Storks Nest, etc.)

Qualification Requirements

To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. The requirements listed below are representative of the knowledge, skills and/or ability required. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions. Proficient in reading and writing the English language.

Education and experience

High School graduate/GED or equivalent experience. 1+ year of Retail experience required. Must show advanced material and product knowledge.

Physical Demands

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions

While performing the duties of this job, the employee is regularly required to stand, walk, use hands to finger, handle or feel objects, tools or controls, and talk or hear. The employee must be able to push/pull laundry hampers of up to 250 pounds.

The employee may be required to lift and/or move up to 50 pounds. Specific vision abilities required by this job include depth perception, peripheral vision, the ability to distinguish basic colors and the ability to adjust vision to bring objects into focus.

Position may require standing for long periods of time.

Work Environment

The work environment characteristics described here are representative of those an employee encounters while performing the essential duties of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

Normal warehouse environment. Exposure to the environmental conditions of dust, heat and cold.

III. Head Account Clerk (Waste Reduction Division), City of Boston

Job Description

Job Title: Head Account Clerk (Waste Reduction Division)
Job ID: 341772
Location: Public Works- Central Office
Full/Part Time: Full-Time
Regular/Temporary: Regular

OPEN: 12/5/2011
CLOSE: 12/16/2011

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Acctg/Budget/Finance/Purchase

This is a provisional appointment.

BRIEF JOB DESCRIPTION (essential functions of the job):

Under the direction of a person of higher classification, engages in the posting of a wide variety of solid waste, recycling and composting accounts, grant accounts, processing large payrolls, maintaining records of expenditures and budgetary control over same or performs such work independently; independently performs responsible and complex subprofessional accounting work and/or office clerical works. Answers routine correspondence. Works with the public via telephone and/or in person. Generates written reports and graphs; does verbal presentations. Purchases products and services by contracts and service orders; prepares payments for work performed by contractors or consultants. Maintains program records and documents. Is involved in matters related to recycling, composting and waste reduction, with special attention to the mandatory recycling ordinance for large residential building, and performs related work as required by the Waste Reduction Division. Required to work any emergency as directed by the Commissioner of Public Works.

MINIMUM ENTRANCE QUALIFICATIONS:

Applicants must have at least three (3) years of paid office experience in related work. The following are required: Ability to exercise good judgment and be able to focus on detail as required by the job; thorough knowledge of office practices and procedures; working knowledge of office appliances and their applications; working knowledge of office record keeping and reporting. Working knowledge of budgetary accounting principles and methods and related financial administrative procedures. Ability to develop effective office/work procedures. Ability to understand and follow complex oral and written instructions. Ability to maintain effective harmonious working relationships with other employees. Working knowledge of Word, Excel and Lagan Constituent Relationship Management Software preferred. Knowledge of municipal recycling and composting preferred.

Boston Residency Required

Terms:

Union/Salary Plan/Grade: AFSCME/RA-12

Hours per week: 35

Please refer to the Salary information section on the Boston Career Center site for more information on compensation. For each Salary Plan, salaries are listed by Grade and Step.

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Appendix 5: Additional Resources on Recycling and Jobs

Environmental Business Council of New England

<http://ebc-ne.org/>

The EBC is a nonprofit organization established in 1990 by environmental and energy company executives to exchange ideas and share experiences. The EBC's goal is to enhance business and job growth of both established and emerging environmental and energy businesses. The EBC is committed to supporting its members by:

- Providing member companies with an array of programs, activities, and information to enable them to stay on the cutting edge of environmental and energy technologies, management and regulatory developments.
- Creating networking opportunities in order that members can work together for mutual benefit and teaming.

The EBC works through committees. Recycling-related committees are Construction and Demolition, and Solid Waste Management.

MassRecycle

www.massrecycle.org

MassRecycle is a statewide coalition of individuals, governments, businesses, institutions and non-profit organizations dedicated to promoting and realizing the vital environmental, social and economic benefits created by reducing, reusing, and recycling waste materials, and by increasing the utilization of recycled products. MassRecycle holds regional and statewide meetings and conferences and tours.

Massachusetts Department of Environmental Protection

<http://www.mass.gov/dep/recycle/index.htm>

The Massachusetts DEP has information about recycling and waste generation in the state, recycling contacts, grant programs, as well as a host of information on material-specific topics and economic impacts of recycling in the state.

Economic Impacts of the Recycling Industry in the Northeast, Northeast Recycling Council

http://nerc.org/projects/completed_projects.html#reiupdate

In 2000, the Northeast Recycling Council (NERC) released the first Recycling Economic Information Study in the U.S. It focused on the 10 NERC member states. It was later followed by a national study prepared by the National Recycling Coalition, based on the methodology developed in the NERC study. In 2009, NERC published an updated version of the study that provides a new perspective on the economic vitality of the recycling and reuse industries. Delaware, Maine, Massachusetts, New York, and Pennsylvania participated in the updated study, which looks at the number of establishments, jobs, the annual payroll, receipts, and tonnage throughput broken down by 26 categories of recycling activities.

More Jobs, Less Pollution: Growing the Recycling Economy in the U.S., BlueGreen Alliance

http://www.bluegreenalliance.org/press_room/publications?id=0086

Released by the BlueGreen Alliance, Natural Resources Defense Council, Teamsters, SEIU, Recycling Works! and the Global Alliance for Incinerator Alternatives ahead of National Recycling Day, this study shows that a 75% national recycling rate would create nearly 1.5 million jobs while reducing pollution.

Putting Americans to Work, Institute of Scrap Recycling Industries

http://www.isri.org/iMIS15_Prod/ISRI/Home/Jobs_Industry/ISRI/Job_Industry.aspx?hkey=bc2e8f55-f751-4da1-bcc3-3ab5a86e53c5

The Institute of Scrap Recycling Industries (ISRI) published a series of three studies that show that the U.S. scrap recycling industry creates and supports hundreds of thousands jobs in the United States and generates billions in revenue for the federal government and state and local governments across the country. "The industry is a multi-billion-dollar "Made in America" manufacturing success story that also helps protect our environment and saves energy." The studies are The Economic Impacts of the US Scrap Recycling Industry (searchable by region), an examination of the jobs in the US Electronics Recycling Industry, and the Economic Impacts and Environmental Benefits of Plastics Recycling.

Careers in Recycling, Bureau of Labor Statistics

<http://www.bls.gov/green/recycling/>

This report describes how recycling works, and provides information on various career opportunities in the recycling industries. It also details a number of occupations involved in collecting and processing recyclables, including job duties, credentials required and information on wages for the US.

O*Net, The Occupational Information Network

<http://www.onetcenter.org/overview.html>

O*NET is the nation's primary source of occupational information. The O*NET database contains information on hundreds of standardized and occupation-specific descriptors. The database is continually updated by surveying a broad range of workers from each occupation. Information from this database forms O*NET OnLine, an interactive application for exploring and searching occupations. The database also provides the basis for Career Exploration Tools, a set of assessment instruments for workers and students looking to find or change careers. O*NET is developed under the sponsorship of the US Department of Labor/ Employment and Training Administration (USDOL/ETA). O*Net currently has information on the job titles of Recycling and Reclamation Workers, Recycling Coordinators, and Refuse and Recyclables Materials Collectors in their Green Economy Sector.

Union Training Programs

The Laborers International Union of North America's Apprenticeship Training Center in Hopkinton, MA., provides training courses in environmental and construction safety. <http://www.nelaborerstraining.com/>

The International Union of Operating Engineers, through its Operating Engineers Certification Program, offers Heavy Equipment Operators training to its members in Canton. <http://www.iuoe.org/Training/Local4HeavyEquipmentOperatorTrainingSchool/tabid/137/Default.aspx>

Deconstruction and Jobs Training Ladder

The Miami Valley Regional Planning Commission's (MVRPC) in Dayton, Ohio, has put together a packet of information to provide persons interested in entering the deconstruction field with a basic understanding of the types of certifications and trainings required, as well as job opportunities within the field. Because deconstruction is considered a newer green trade, there are no national training or job standards. Information is provided within each section to help persons outside of the Dayton area locate local training facilities. Information about the program in Dayton can be found at: <http://www.mvrpc.org/projects/pathways/pathways-green-jobs-training-grant>.

Institute for Local Self Reliance

<http://www.ilsr.org/recycling/recyclingmeansbusiness.html>

Information on the recycling industry and its environmental and economic impacts, and links to other resources. Some publications are dated.

Earth 911

<http://www.earth911.com>

Interactive site finds recycling outlets by zip code. Includes links to other resources, and a live Twitter feed.

US Environmental Protection Agency

U.S. EPA's Recycling Market Development Program, <http://www.epa.gov/waste/conservr/rrr/rmd/index.htm>, has a directory and links to a variety of recycling and reuse topics. EPA's Recycling Curriculum, <http://www.epa.gov/waste/education/index.htm> provides curriculum resources on recycling education for teaching recycling all age groups.

*Recycling and Jobs in Massachusetts:
A Study of Current and Future Workforce Needs*

The Study Team

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Alex Papali, Boston Recycling Coalition
Lynn Rubinstein, Northeast Recycling Council
Alex Risley Schroeder, Mass Workforce Alliance

SkillWorks

www.skill-works.org

SkillWorks, a public-private partnership, is addressing the needs of employers for more skilled workers and of workers for more and better access to jobs that pay a family-supporting wage.

SkillWorks Phase II Funders

The Barr Foundation
BNY Mellon
The Boston Foundation
Chorus Foundation
City of Boston's Neighborhood Jobs Trust
The Clowes Fund, Inc.
Commonwealth of Massachusetts
Garfield Foundation
Hyams Foundation
Mabel Louise Riley Foundation
National Fund for Workforce Solutions
The Nellie Mae Education Foundation
Perpetual Trust for Charitable Giving, Bank of America, N.A., Trustee
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United Way of Massachusetts Bay and Merrimack Valley
U.S. Department of Labor through Jobs for the Future

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