

Directory, Market Analysis, and Employment Opportunities in the Twin Cities Green Marketplace

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the Minneapolis Saint Paul Mayors' Green
Manufacturing Initiative and the
Minnesota Department of Commerce



BLUEGREEN
A L L I A N C E

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Table of Contents

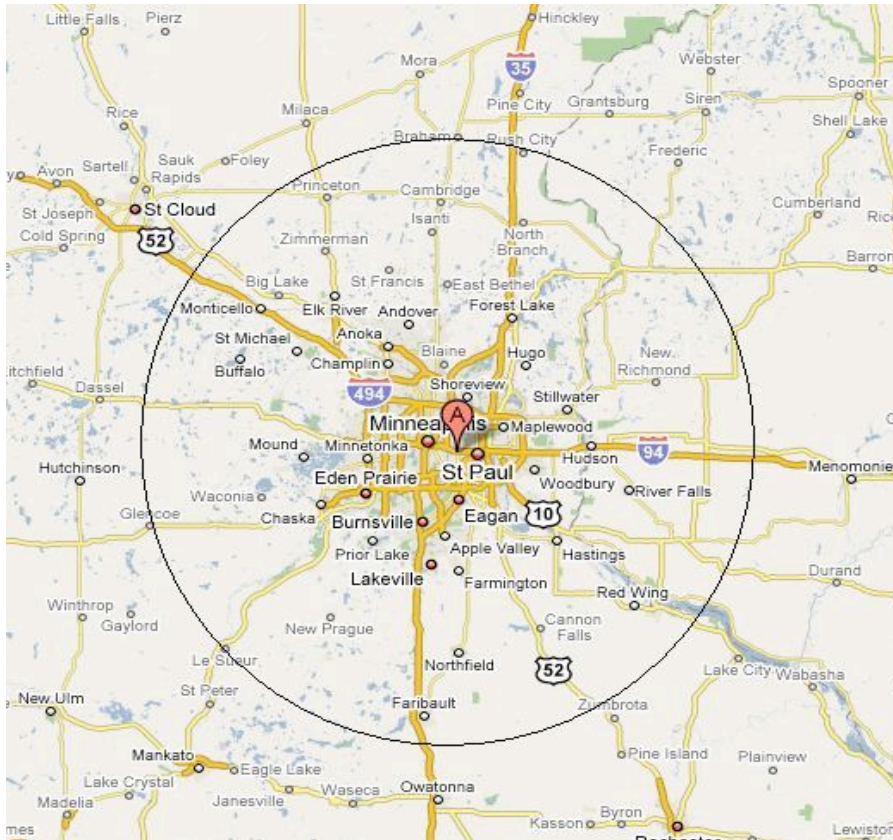
Executive Summary	4
Green Product and Service Directory	6
Table 1 – Sector Classification 2.0	8
Market Analysis	12
Table 2 – Survey Certification Data	13
Table 3 – Likert Conversion	14
Other Reports	23
Table 4 – Minnesota Clean Economy Employees	23
Employment Opportunities	24
Conclusion and Next Steps	27
Appendix –<i>Making It Green</i> Sector Classification 1.0	28
References/Endnotes	29

Executive Summary

This report is a continuation of the *Making It Green* report, an initiative of Mayor R.T. Rybak in Minneapolis, Mayor Christopher B. Coleman in Saint Paul, and the Blue Green Alliance, a national partnership of the Sierra Club and the United Steel Workers. *Making It Green* was based in the belief that investments in solving critical environmental challenges represented strategic economic opportunities. *Making It Green* provided a starting point in a multi-phased process to identify the green marketplace, the Twin Cities' strengths in this marketplace, and approaches to support the growth of the Twin Cities in this marketplace. In support of the effort the *Making It Green* report initiated, we have:

- (i) Compiled a directory of Twin Cities green businesses,
- (ii) Carried out a market analysis based on a survey of some of these businesses, and
- (iii) Provided recommendations to develop and improve green employment opportunities in the Twin Cities.

The sponsors of our work include the city mayors of Minneapolis and St. Paul, the Blue Green Alliance, and the MN Department of Commerce. This report covers the Minnesota-based Twin Cities metropolitan region and not the entire state of Minnesota (see below).



Source: Google Maps (<http://maps.google.com>)

For the purposes of this study, the Twin Cities metropolitan region was defined as a 50-mile radius with a central point chosen along the I-94 corridor between the two cities in zip code 55104. Wisconsin counties in the larger Twin Cities metropolitan region were not included, but might become part of a future report.

The Directory of Twin Cities Green Businesses

We identified 467 Twin Cities businesses that belong to the green products marketplace. The online version of the directory can be found at www.mngreendirectory.org. These businesses either provided their own green product and service descriptions or the data was obtained from the business' website. This directory is an initial attempt to identify metropolitan green product and service businesses. It is expected that it will grow and change over time. The intention is for the directory to be regularly updated.

The Market Analysis

In addition to the full directory, a survey was carried out of sample of the businesses. The respondents tended to be smaller businesses with an average of 16.1 employees. The respondents indicated that their businesses would rapidly expand green product and service lines within the next three years. The average respondent expects a 203% growth in employees and a 297% increase in revenues. Several smaller businesses were expecting even greater growth, which may be overly optimistic, but which reflects an overall bullish attitude. Most also expressed the view that potential employees with appropriate skill sets already exist. Due to the recent recession, this may be true, but more highly skilled employees could be less available. These results, while intriguing, require further testing in the ongoing work of the Mayors of Minneapolis and St. Paul, the Blue Green Alliance, and the MN Department of Commerce.

Employment Opportunities

Using the directory structure, survey results, and external documentation, several recommendations are offered about increasing employment opportunities for green businesses in the Twin Cities. We call for an aggressive campaign and comprehensive series of programs that will make the Twin Cities a center for the following activities: building retrofits, lean manufacturing, energy infrastructure development, energy audits, carbon footprints, and environmental management/reduction. Some efforts have commenced but they require additional R&D, business incentives, and marketing. These steps are needed if the Twin Cities wishes to keep green businesses in the region and attract new ones.

Conclusion and Next Steps

We propose reviewing workforce development program options with the Blue Green Alliance steering committee to incorporate our recommendations into an implementation roadmap. Then, GreenMark will implement a strategy and marketing plan.

Green Product and Service Directory

As many organizations have discovered, creating simple, yet comprehensive “green” definitions is a difficult and time consuming process. Stakeholders have differing opinions about the term “green” and “green” attributes. Definitions often rely on all or some of the following attributes: reuse, recycling, reduced landfill use, air quality improvement, SOx and NOx reduction, greenhouse gas reduction, renewable energy production, water reduction, water quality improvement, less production of hazardous waste, mercury emission reduction, more support for local and/or organic foods, and more selling and buying of fair-trade products. We use a broad definition of green products and services -- a definition that the City of Minneapolis also relies upon: “Green means anything that reduces human impact on the environment.”ⁱⁱ This definition is consistent with goals of the directory, which are to:

- Foster and encourage the growth of new and updated green products;
- Improve green attributes of products & services with questionable green attributes; and
- Create permanent, sustainable jobs.

In support of job creation, we searched for both businesses that manufacture green products such as wind turbines and solar panels and businesses that develop and carry out projects. The project developer drives projects and creates workforce demand. For example, architectural design firms or wind farm “developers” do not only create jobs within their own firms. They also hire building contractors, cement/aggregate contractors, and others to install these products. Businesses that have services that contribute to green product growth and development also are found in the directory. These services include: energy audits, (such as greenhouse gas audits or carbon foot printing), water audits, and other consulting services that provide measurement and knowledge and affect goal-setting and installation. Other services found in the directory are research, development and product design that improve innovative green attributes. Some businesses provided they had very strong green claims, even if not manufacturers, developers, or services, also are found in the directory.

Though a large group of service businesses are included, some services are emphasized, for example, legal firms with dedicated sustainability practices, which are integral to projects, but are under the direction of the project developer. Under the Blue Green Alliance’s guidance, the directory’s focus is on project developers who are closer to job creation. Some consulting services similarly have been excluded. They have been excluded if they do not provide direct expertise in energy data measurement, water usage, or in other ways contribute to green product goals. In addition, this director does not emphasize retail businesses. If readers are interested in green retail stores and restaurants, they may consult the “Do It Green” Minnesota directory at www.doitgreen.org or the Green Routes directory at www.greenroutes.org. The intent for this green product and service directory is for it to be a living document. That means that additional businesses may be added over time while others, with questionable green claims, will be removed.

In putting together the directory, we have observed that green products and services are closely intertwined. For example, while a platinum-level LEED certified building is the end product and

green building materials are subcomponents of the building, the building is also dependent on primary services which include: research and development to innovate and develop the building materials (like insulation materials and energy efficient products); architectural design which incorporates the building materials and design elements into the full building design; and installation/construction services that are active in the construction and installation of green products. Another example is renewable wind-based electricity where wind turbines are the product, while the wind electricity provider offers a green service. According to the Blue Green Alliance, any assembly and sub-assembly product, including screws, nuts and bolts specifically used to help create renewable energy, are green products, but to be viewed as green products, the screws, nuts and bolts must be required for renewable energy creation and installed in the end product.ⁱⁱ

Sector Classification

Making It Green divided green products and services into three primary sectors and 29 sub-sectors (See Appendix A –Classification of Sectors and sub-Sectors under the *Making It Green* report). An alternative organization of green product opportunities is proposed here. The new classification is more similar to work performed by other organizations charged with creating green directories such as the Northwest Environmental Business Council at www.nebc.org and the New England Environmental Business Council at www.ebcne.org. The new classification consists of five major sectors: (1) Manufacturing/Products, (2) Business/Professional Services, (3) Renewable Energy/Utilities, (4) Conservation/Efficiency/Reuse, and (5) Water Processing.

Category Description

1. **Manufacturing/Products** encompass those companies that produce physical products. The focus is on products that are either manufactured in a sustainable way or improve sustainability in their usage.
2. **Business/Professional Services** encompasses companies delivering professional services, including; architects, engineers, construction workers, and installation workers.
3. **Renewable Energy/Utilities** consists of companies that produce energy, energy products, or energy transport.
4. **Conservation/Efficiency/Reuse** consists of companies that recycle goods, improve process efficiency, create reusable solutions, or reduce energy consumption. Excluded are companies that focus on water efficiencies.
5. **Water Processing** consists of companies that focus on water quality, water conservation, and waste water processing.

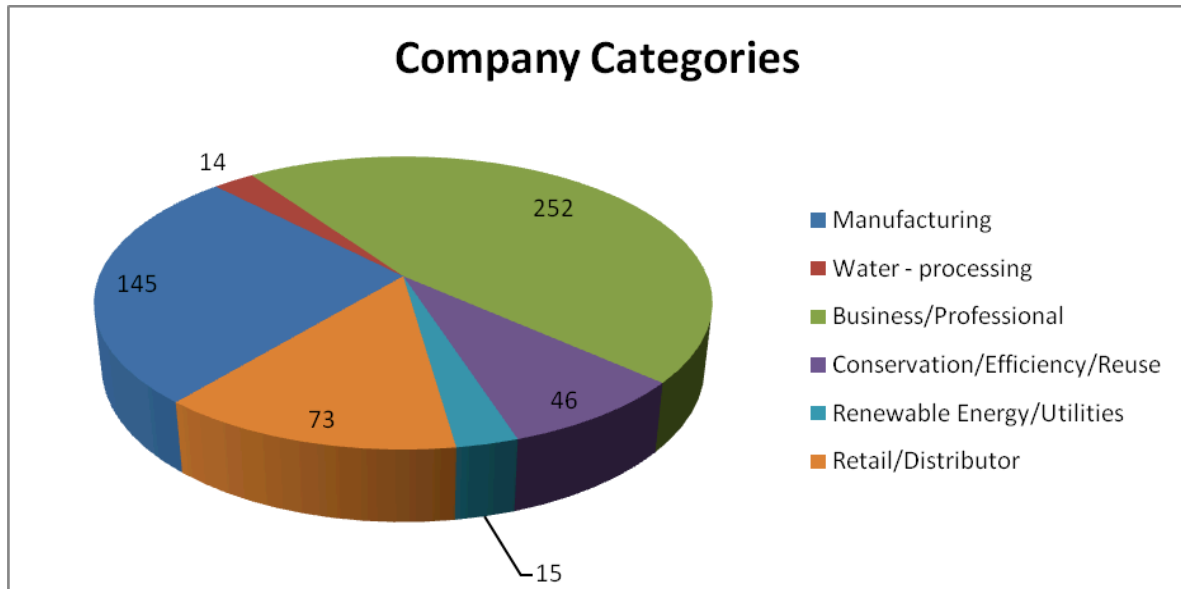
Four new sub-sectors have been added to the 29 in the *Making It Green* report: Green biochemistry or bio-based products (excluding bio-fuels which were already included), filtration, water purification, and water use reduction products and systems. The new classification with examples is shown as Table 1 on the next page.

Table 1 – Sector Classification 2.0

Category	Product Examples
Manufacturing/Products	<ul style="list-style-type: none"> • Insulation • Windows & doors • Glass/films • HVAC (heating, ventilation and air conditioning) systems and controls • Lighting • Wood products (FSC- Forest Stewardship Council) - Certified • Alternative materials • Site and landscape materials • Adhesives • Testing kits • Neighborhood electric vehicles (NEV) • Bio-fuels engine systems (parts) • Hybrid buses • Fuel cells • Batteries • Wind turbine OEM suppliers - blades, gear boxes, other • Green/biochemistry, bio-based products
Business/Professional Services	<ul style="list-style-type: none"> • Architecture – LEED design • Urban planning • Engineering • Legal – policy, intellectual property • Installation (Wind/solar) • Construction • Energy Services (Non-Utility)
Renewable Energy/Utilities	<ul style="list-style-type: none"> • Bio-fuels systems - ethanol, biodiesel, cellulosic possibilities • Solar/PV generation • Wind generation • Pelletization systems • Distributed power systems • Power distribution
Conservation/Efficiency/Reuse	<ul style="list-style-type: none"> • Geothermal - pumps • Energy efficient products • Lean manufacturing and process improvements • Solar-powered hot water heaters • Energy management systems • Sensors & diagnostic devices • Waste Recovery/Reuse
Water Processing	<ul style="list-style-type: none"> • Filtration • Water use reduction • Water purification

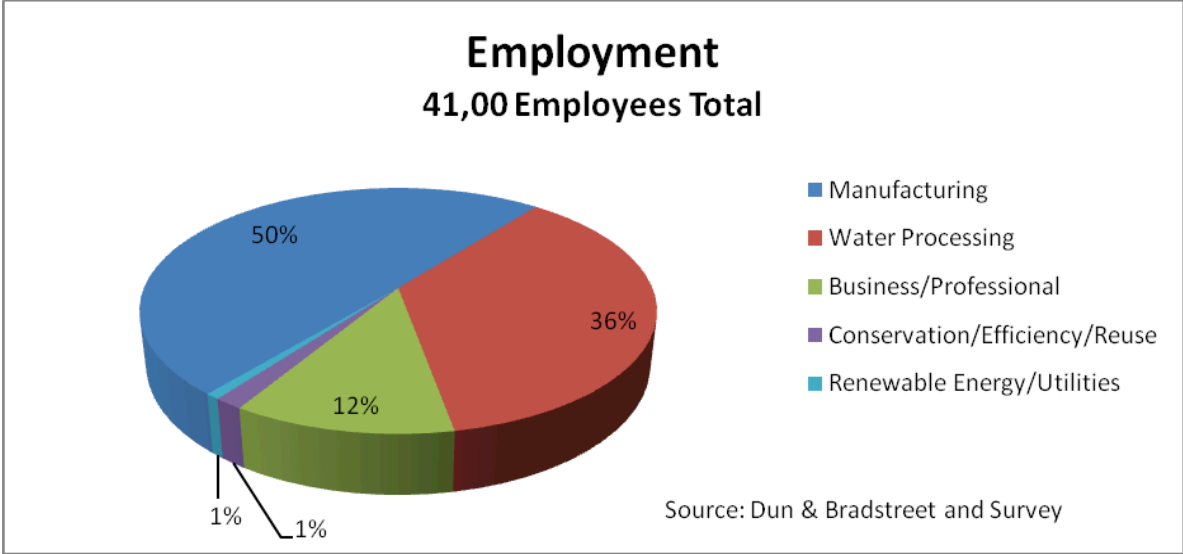
Classification Analysis

As can be seen from the table below, the company category with the largest number of firms is business/professional (252). The second most common category is manufacturing (145), followed by retail/distributor (73), conservation/efficiency (46), renewable energy (15), and water processing (14). Retail was not a focus of this report; however, in our process of collecting company information we found many retail companies focused on sustainable products and therefore included the numbers in the following chart.

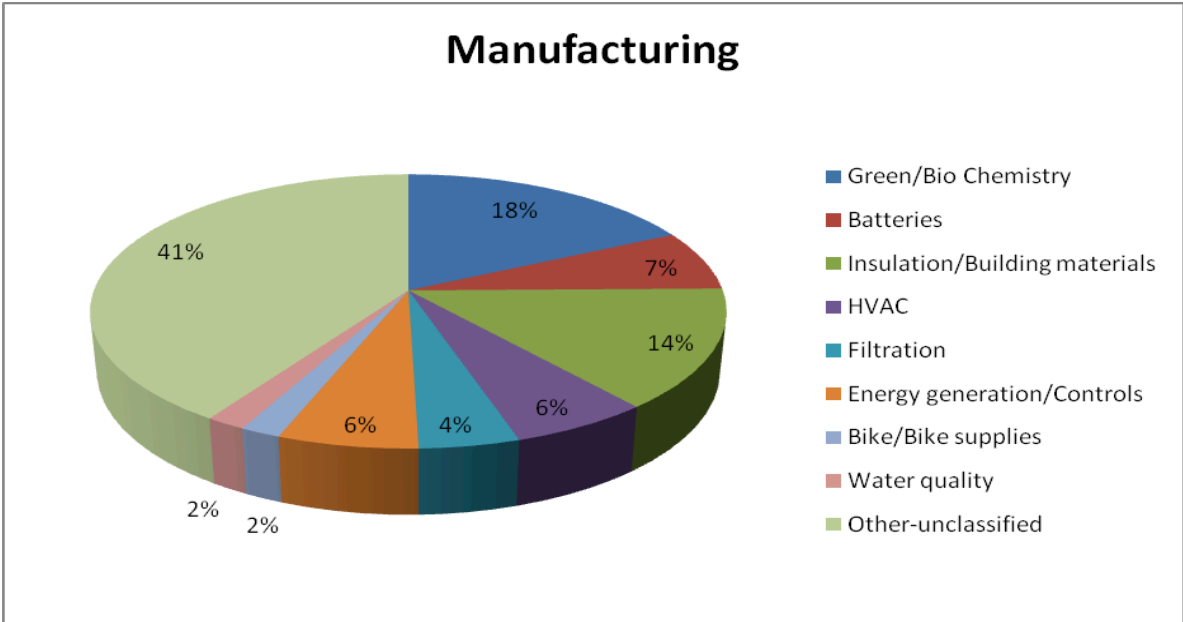


Dun & Bradstreet revenue and employee data were used to provide more detail; however, a few factors must be considered when using this data. First, many small, startup, or private firms are not included in the database. Second, there is no simple way to distinguish the revenue and employee data from a firm's green product and service divisions and its non-green product and service divisions. Third, it was difficult to separate uniquely Minnesota revenue for some companies. Finally, some companies overlap multiple sectors and so they are represented many times. For example, 3M Filtration and Donaldson have businesses in both the Manufacturing and Water Processing categories.

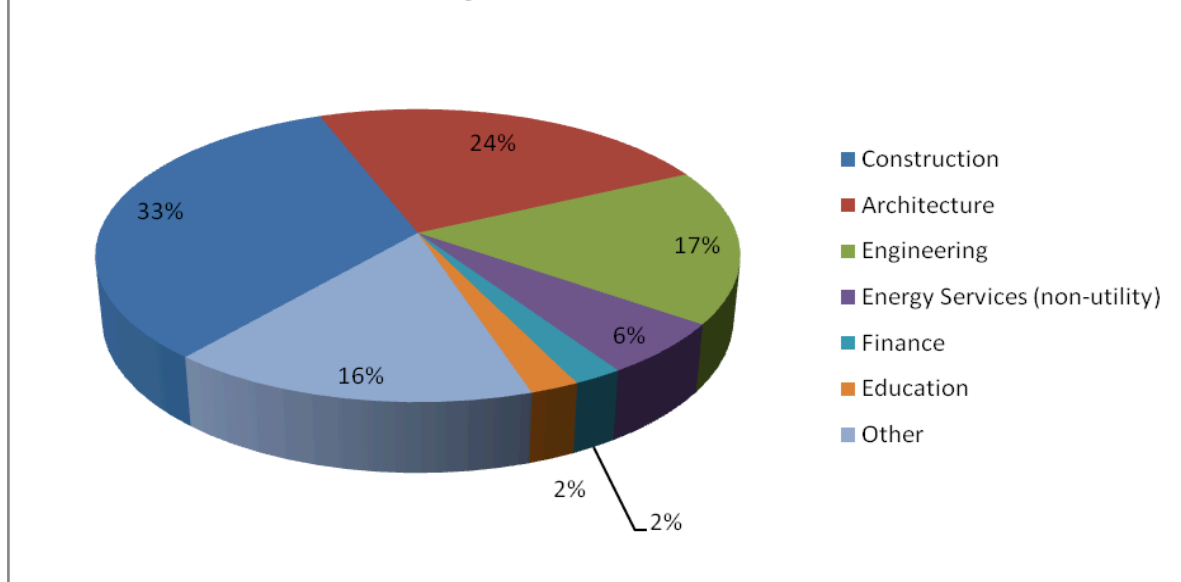
With these limitations in mind we researched our green directory firms in Dun & Bradstreet resources and found that the 105 companies with publicly-available data collectively generated more than \$33 billion in revenue in 2008. Manufacturing ranked first in revenues, followed by water processing, business/professional services, renewable energy/utilities, and conservation. Employment data revealed a similar pattern as the revenue stream. Estimated employment levels were highest in manufacturing, while water processing and business/professional services were second. The Dun & Bradstreet data suggest that while the number of water processing firms is few, they contribute disproportionately to revenue and employment. The number of business/ professional firms is greater but they contribute less to revenue and employment.



For further analysis we focused on: manufacturing and business/professional services. Among manufacturers, subsector percentages were: insulation/building materials (41%), bio-based products (18%), other-unclassified (14%), batteries (7%), HVAC systems (6%), and filtration systems and supplies (4%). Subsector percentages for business/professional services were construction (33%), architecture (24%), engineering (17%), other (16%), energy services (6%), finance (2%), and education (2%)



Business/Professional Services



Some of the large established companies in the manufacturing sector include: 3M, Cargill, Mosaic, Ecolab, Donaldson, and Siemens. Insulation and building materials have a strong foundation within Minnesota with some large players like 3M, BASF, Cardinal Glass, and Anderson windows along with smaller companies like Gempak, Styrotech, and Xerxes. These companies produce a range of products from windows and window coatings that improve efficiency to insulation products and roofing systems.

With regard to bio-based products and green chemistry, traditional agricultural-based companies like Cargill have interest because it increases the value of agricultural products. 3M has interest because it integrates nicely with the company's chemistry expertise. Ecolab has interest as demand rises for more eco-friendly chemical products. Aveda has interest because of its desire to sell more eco-friendly cosmetic products. There are also several young innovative companies like Segetis, Nature-tec, and BioCee in this sector.

Bio-fuels and renewable energy are also a big part of the Minnesota landscape. Minnesota has agricultural products useful for bio-fuels and a great resource in wind generation. There are many companies focused on bio-fuels; Global Ethanol, BioCee, and Argus Bio-Fuels to name a few. However, the headquarters of the Honeywell division focused on bio-fuels (www.uop.com) is out-of-state.

Filtration is well established yet has potential for growth. 3M, Donaldson, and Pentair are active. There are also several medical device companies not included on our list that have years of experience developing battery technologies.

Market Analysis

For the market analysis, we sent out 352 online surveys to an email address of firms likely to be selling green products or likely to be involved in green services. We received 115 survey responses for a 33% response rate. We sent the survey to the best contact address available. Often it was sent to the CEO or an environmental officer, but occasionally it went to a general email address listed on the company web page. Some responses were not complete and some of the data was deemed unusable. In the survey we asked respondents to choose a sector that best represents their firm. There is no one-to-one correlation between sector delineation used in the survey and sector delineation in the final green directory as the directory took shape after the survey was created. Answers provide a start for further analysis. In an effort to reduce confusion, we asked “How many employees work in your green product or service division(s)?” instead of “How many green jobs do you have?”

Survey Sample

Firms collectively reported that they have 1,351 employees, for an average of 16.1 employees per firm, working in green product and service areas. Please note that firms that provided survey responses are generally smaller than those in the full directory. Firms reported that 75% of their revenue came from green products and services, with smaller companies having a larger percentage of their revenue derived from green products and services.

A few of the findings of this survey stand out:

- *The respondents expected to grow employees in their green product and service areas by an average of 207%; this would yield a total of 756 new employees (weighted sum) within 3 years.*
- *The respondents anticipated that average revenue in their green product and service areas would increase 297% in 3 years.*

Certifications

Over 53 surveyed firms were involved with LEED certification or had LEED accredited staff who worked for them. Many firms were also involved with Energy Star (22) and the MN Green Star (14) programs. Table 2 on the next page shows survey certification data.

Table 2 - Survey Certification Data

Number of Companies	Certifications	Website
53	USGBC/LEED (US Green Building Council)	http://www.usgbc.org/
22	Energy Star from EPA/DOE	http://www.energystar.gov/
14	MN Greenstar	http://www.mngreenstar.org/
5	*NABCEP (North American Board of Certified Energy Practitioners)	http://www.nabcep.org/
4	ISO 14000 family certifications	http://www.iso.org/iso/iso_14000_essentials
3	Forest Stewardship Council (FSC)	http://www.fsc.org/
3	Green Seal	http://www.greenseal.org/
3	GREEN GUARD	http://www.greenguard.org/
3	Regreen Program	http://www.regreenprogram.org/
2	*AIA Committee on the Environment	http://www.aia.org/practicing/groups/kc/AIAS074686
2	Global Reporting Initiative (GRI) G3 Reporting	http://www.globalreporting.org/
2	Green Advantage	http://www.greenadvantage.org/
2	*Green Format	http://www.greenformat.com/
2	Green Label (from Carpet and Rug Institute)	http://www.carpet-rug.org/
2	*IGSHPA	http://www.igshpa.okstate.edu/
2	NAHB Green Building Program	http://www.nahbgreen.org/
1	1% for the Planet	http://www.onepercentfortheplanet.org/
1	*BPI Biodegradable Products Institute	http://www.bpiworld.org/
1	Building Performance Institute (BPI)	http://www.bpi.org/
1	*Designers Accord	http://www.designersaccord.org/
1	*Passive Haus	http://www.passivhaus.org.uk/
1	Universal Design Certified Remodeler (UDCR)	http://www.nari.org/news/article.asp?ARTICLE_ID=654
1	UPonGREEN	http://www.upongreen.com/
0	Design for the Environment (DfE) from EPA	http://www.epa.gov/dfe/
0	Environmentally Preferred Rating (EPR)	http://www.epraccredited.org/
0	Scientific Certification System (SCS)	http://www.scs-certified.com/
	Green Building Certifications	http://livegreenlivesmart.org/certified-professional/trainingindex.aspx
	LEED (See USGBC)	

*Not tested by survey, but added by respondent in "Other Certifications" field. Had we listed this certification on our survey, we may have received more responses for it.

Full Survey Results

In addition to documenting the certifications held by these companies, we asked respondents to provide us with answers to other questions using a Likert scale where the answers they chose corresponded to a value between one and five. The higher the value, the more strongly the respondents agreed with the statement. Below we summarize the results and provide commentary.

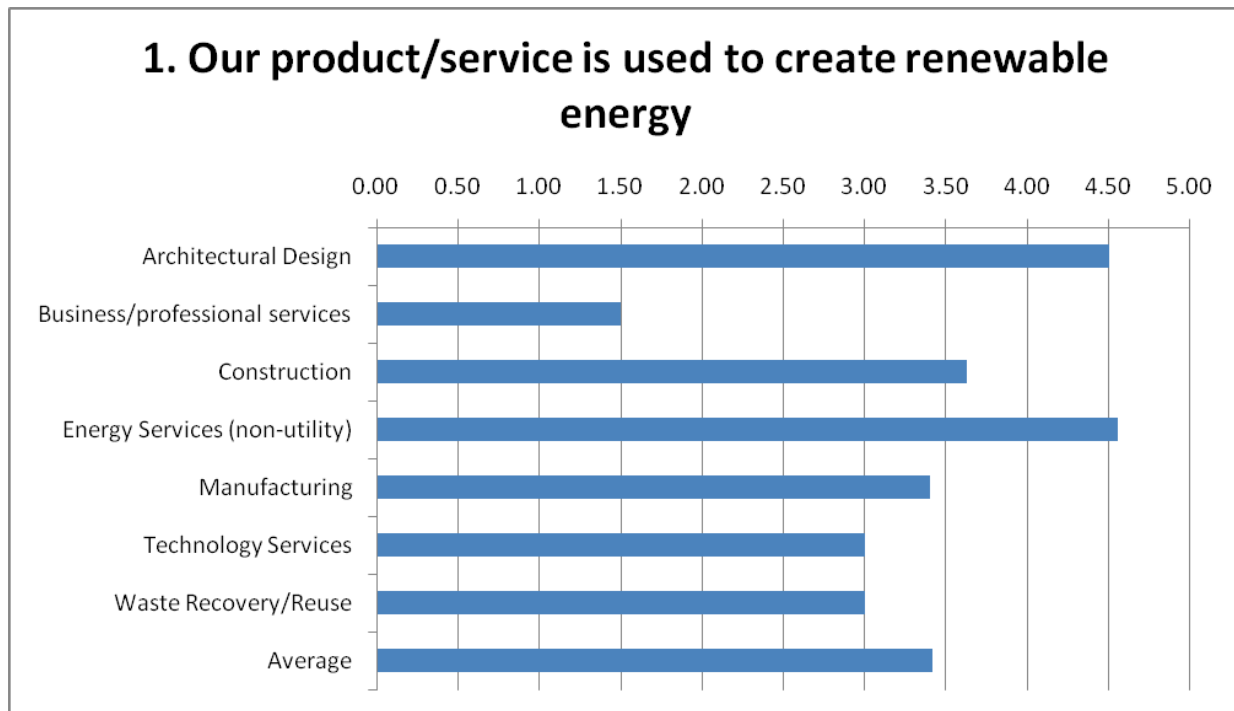
Table 3 - Likert Conversion

Option	Value
Strongly Disagree	1
Disagree	2
Neither Agree nor Disagree	3
Agree	4
Strongly Agree	5

1. *Our product/service is used to create renewable energy.*

Average Score: 3.42

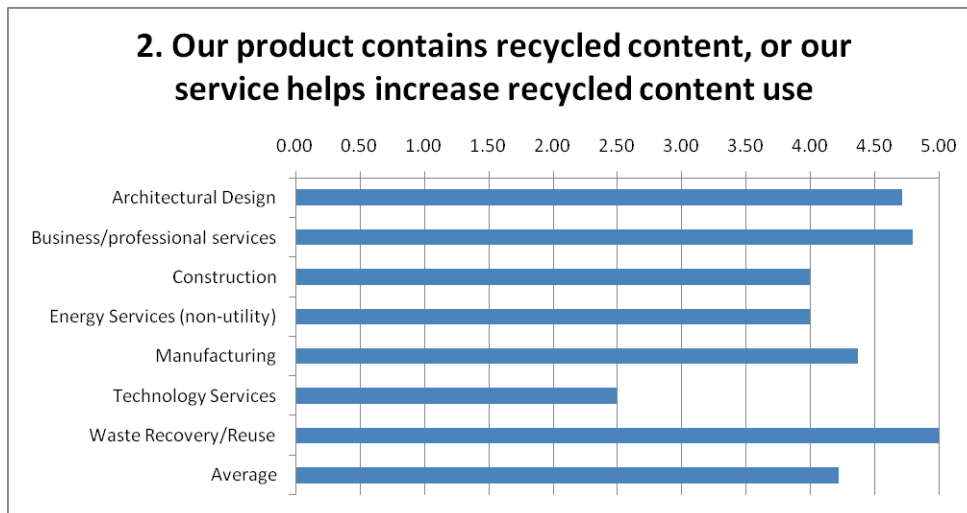
On average, survey respondents believe their product/service is used to help create renewable energy. Many energy service firms in particular are promoting their renewable energy creation abilities. Architectural firms also suggest they are creating renewable energy, but it may be that they actually are promoting sustainable design, renewable material use, and energy efficiency.



2. *Our product contains recycled content, or our service helps increase recycled content use.*

Average Score: 4.23

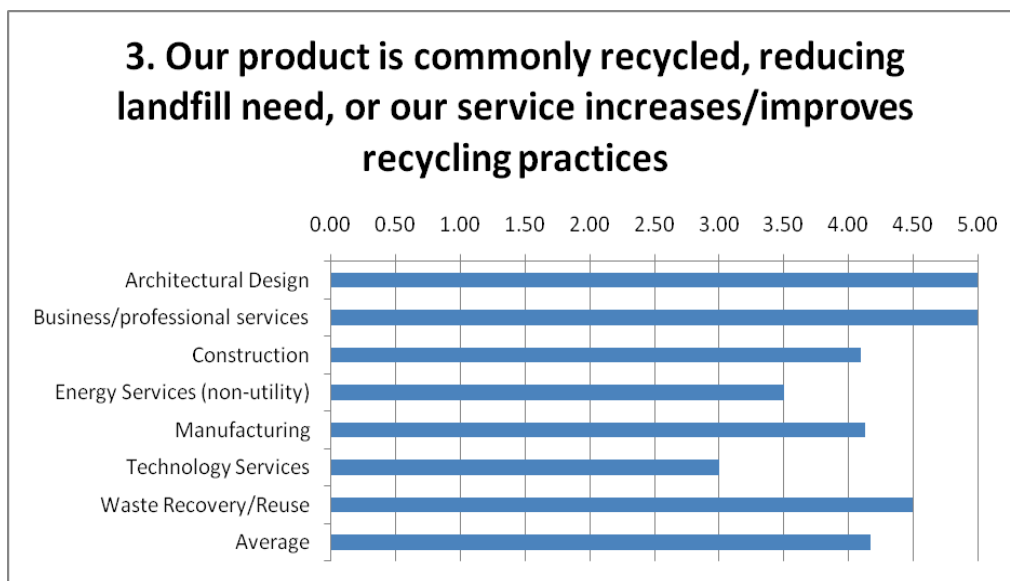
Most sectors with green products or services use recycled content. Green technology services agreed less strongly than other sectors as their efforts are more focused on increasing energy efficiency and reducing energy costs.



3. *Our product is commonly recycled, reducing landfill need, or our service increases/improves recycling practices.*

Average Score: 4.17

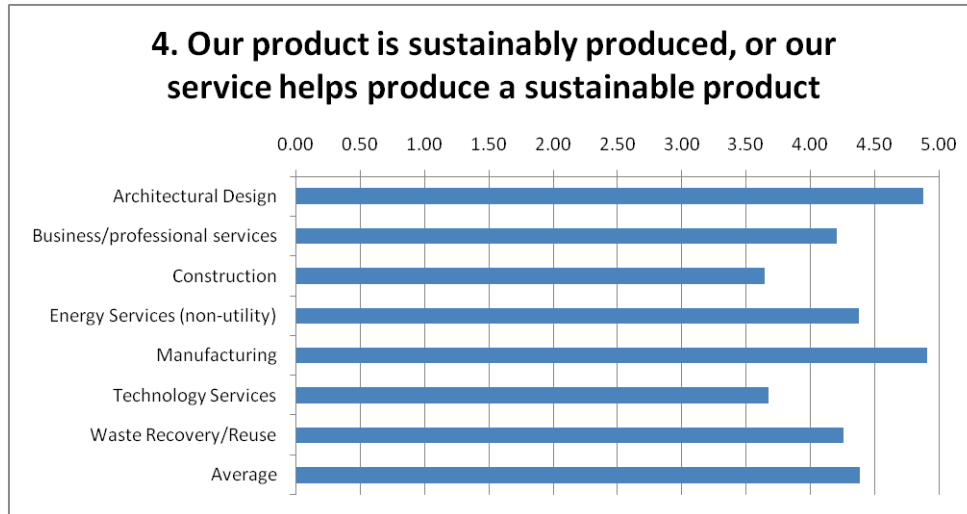
This question focuses on end-consumer product opportunities and services that help clients recycle. Office-based architectural, business, and professional firms strongly agree that they are encouraging recycling practices as part of their green service offering.



4. *Our product is sustainably produced, or our service helps produce a sustainable product.*

Average Score: 4.38

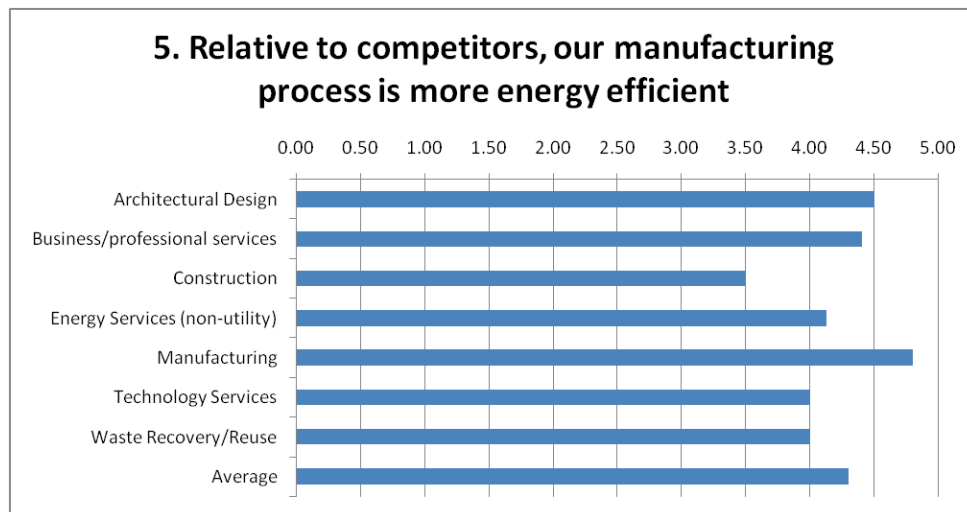
Most respondents with the exception of construction and technology services suggest their product or service helps produce a sustainable product. The theme in technology services is more about conserving resources rather than producing green products.



5. *Relative to competitors, our manufacturing process is more energy efficient.*

Average Score: 4.30

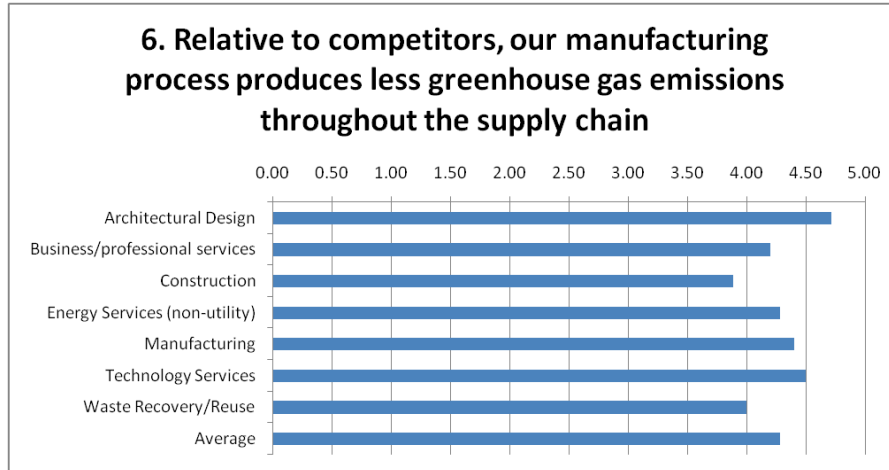
While possible that our survey attracts only the most energy efficient companies, another conclusion could be our respondents are optimistic and biased that their processes are more energy efficient than their competitors. Either way, they should continue to strive for further efficiency improvement.



6. *Relative to competitors, our manufacturing process produces less greenhouse gas emissions throughout the supply chain.*

Average Score: 4.28

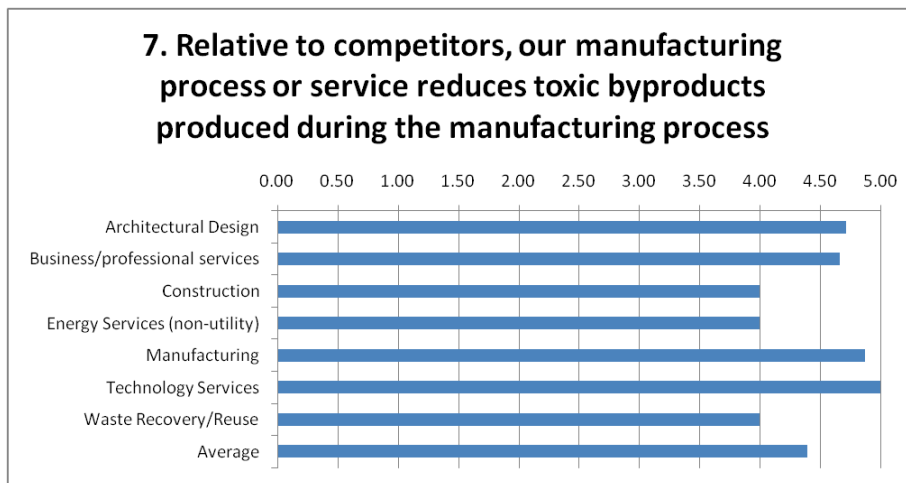
This is a lifecycle analysis question where many firms likely do not actually know supply chain partners' greenhouse gas emissions; however, firms may feel pressure to create a greener product/service and may wish to provide a greener marketing message and may therefore attempt to buy from greener suppliers.



7. *Relative to competitors, our manufacturing process or service reduces toxic byproducts produced during the manufacturing process.*

Average Score: 4.39

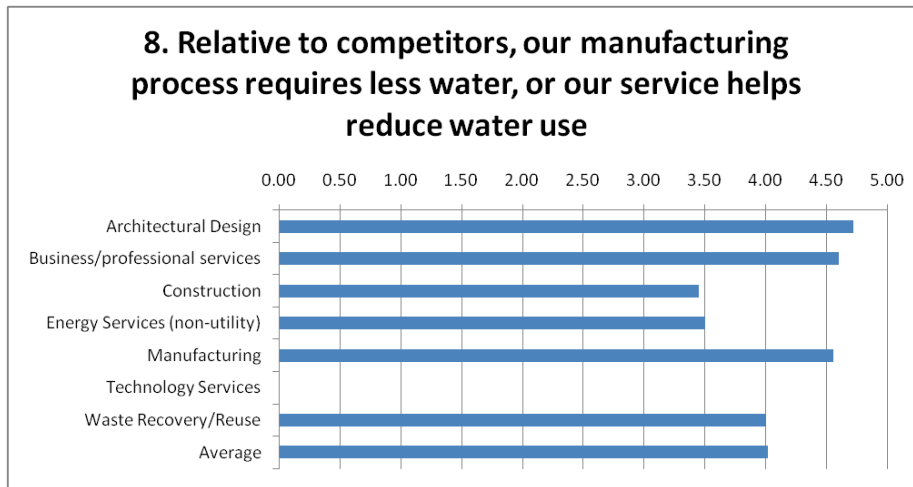
The respondents suggest that their products and services reduce toxic byproducts relative to competitors. Manufacturers, who strongly agree that they help reduce toxic byproducts, may feel that their air quality emission requirements help them achieve this goal. Construction services recognize that some toxic byproducts may exist in their products and processes and therefore do not agree as strongly.



8. *Relative to competitors, our manufacturing process requires less water, or our service helps reduce water use.*

Average Score: 4.02

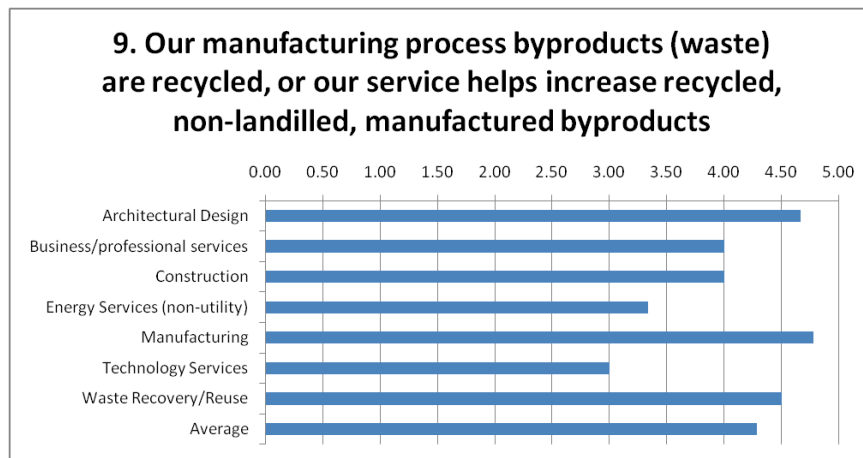
The World Business Council for Sustainable Development (WBCSD) has begun creation of a water footprint guide, similar to their guides on taking a carbon footprint.ⁱⁱⁱ Both improving water quality and preserving water quantity are both issues In Minnesota, partially due to mercury emissions from coal-based power plants, agricultural runoff into streams and rivers. The sectors generally attempt to reduce water consumption with some exceptions.



9. *Our manufacturing process byproducts (waste) are recycled, or our service helps increase recycled, non-land filled, manufactured byproducts.*

Average Score: 4.28

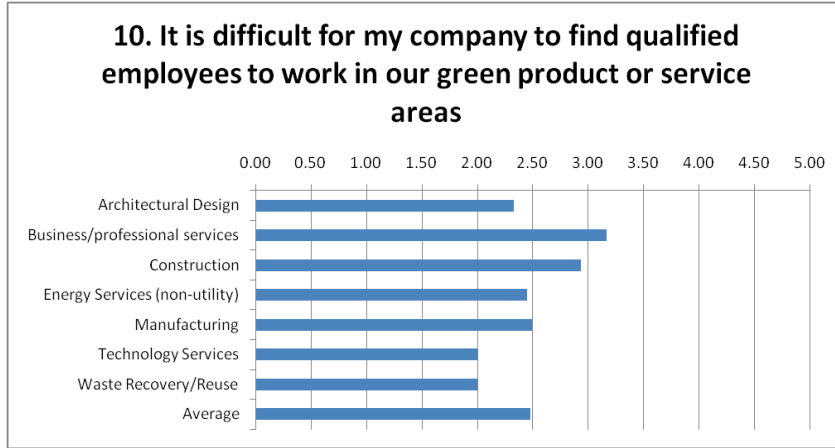
This question involves byproducts and not primary products. Most sectors attempt to recycle byproduct waste, presumably to avoid landfill costs when a convenient recycling avenue is available.



10. It is difficult for my company to find qualified employees to work in our green product or service areas.

Average Score: 2.48

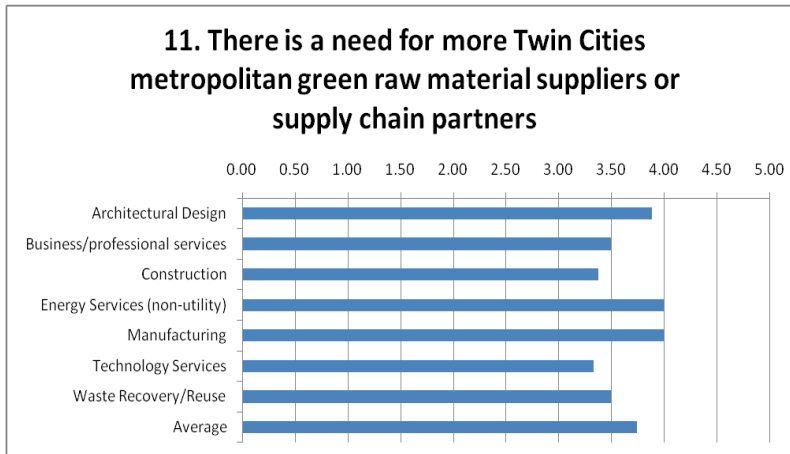
All sectors are neutral or disagree that it is difficult to find qualified employees. Since survey respondents highly believe skill sets for their positions are readily available, this suggests that one strategy for the Twin Cities metropolitan area is to attract businesses to the area and not solely re-train its unemployed workforce.



11. There is a need for more Twin Cities metropolitan green raw material suppliers or supply chain partners.

Average Score: 3.74

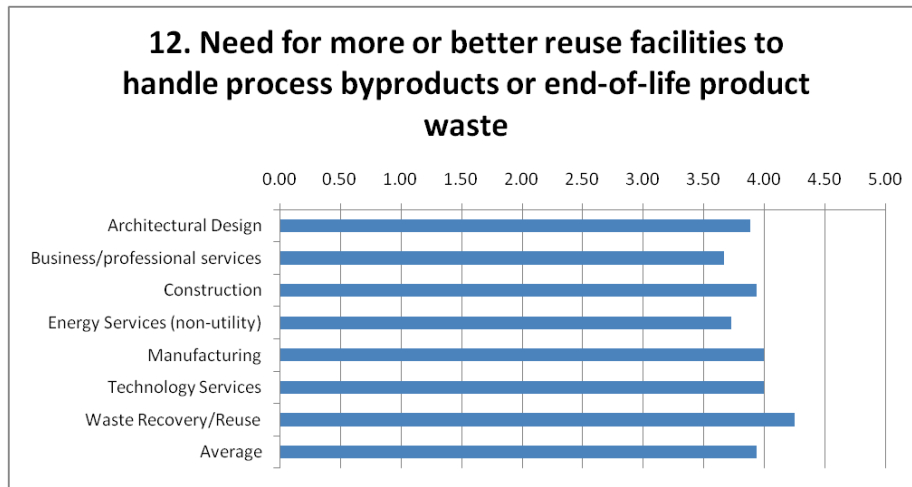
Most respondents are neutral or generally agree that more suppliers or supply chain partners should be brought to the Twin Cities. Many firms already may have trusted supply chain partners or many supply chain partners may already exist in the metropolitan region. Service firms are a little different and may not require nearby partners as the Internet and phone networks work well to allow long-distance communications. Future projects and focus groups could try to understand why companies do not more strongly agree.



12. *There is a need for more or better reuse facilities to handle process byproducts or end-of-life product.*

Average Score: 3.94

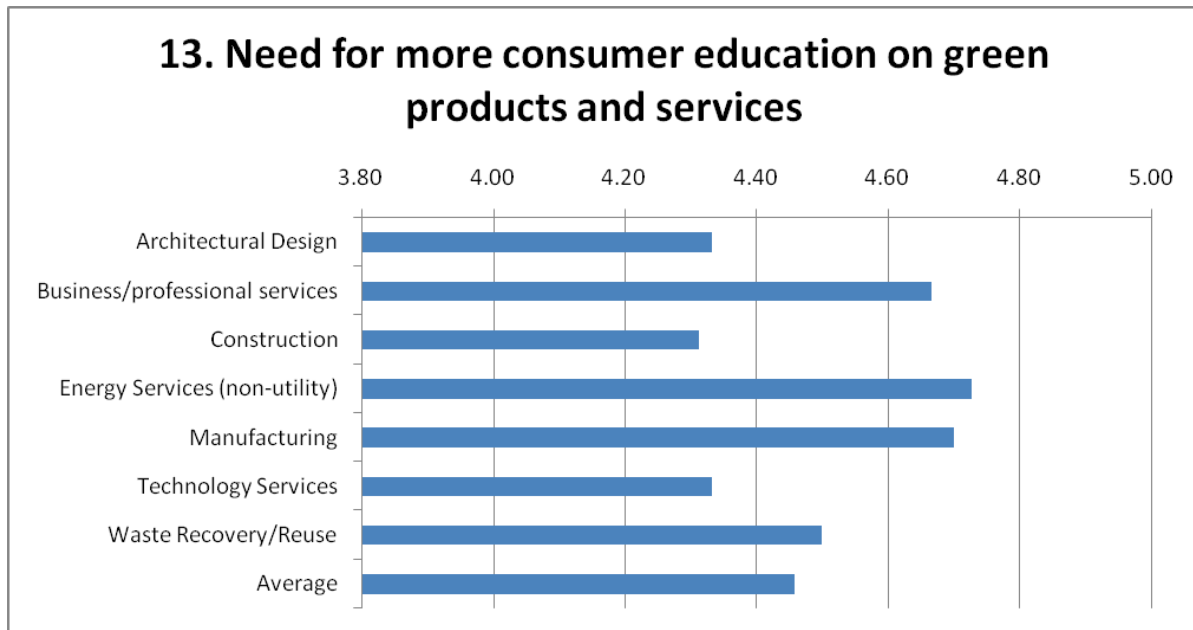
Most respondents are neutral or generally agree that there is need for more or better reuse facilities to handle process byproducts or end-of-life product waste. This may not be most firms' most pressing need, but could be an avenue to explore for job growth.



13. *There is need for more consumer education on green products and services.*

Average Score: 4.46

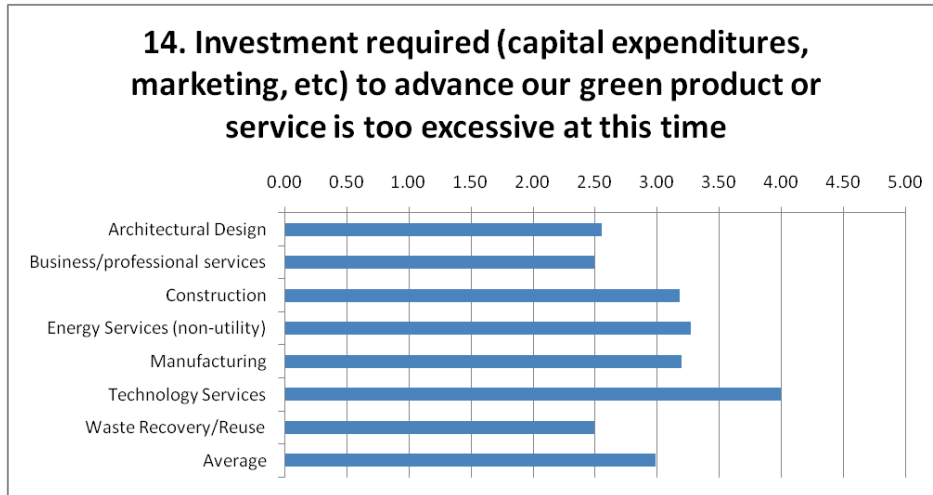
Without a doubt, all sectors agree there could be more consumer education to encourage green product and service adoption. This suggests green marketing firms or a new overarching green business council similar to the Northwest Environmental Business Council^{iv} and New England Business Council^v could help promote products and services from the Twin Cities metropolitan region. Such a business council could hold events to educate consumers and to distribute marketing materials on behalf of member organizations. While several organizations in Minnesota may already wish to be the “one-stop shop”, independence from government is important for efficiency and focused promotion. Another suggestion is to provide more government level incentives, rebates, or credits to promote a product or service’s green attributes. If consumers are effectively given an incentive to purchase a green product or service, they will gain knowledge first-hand through experience. Word-of-mouth and media articles may then provide mass adoption opportunities in other states and regions.



14. Investment required (capital expenditures, marketing, etc) to advance our green product or service is too excessive at this time.

Average Score: 2.99

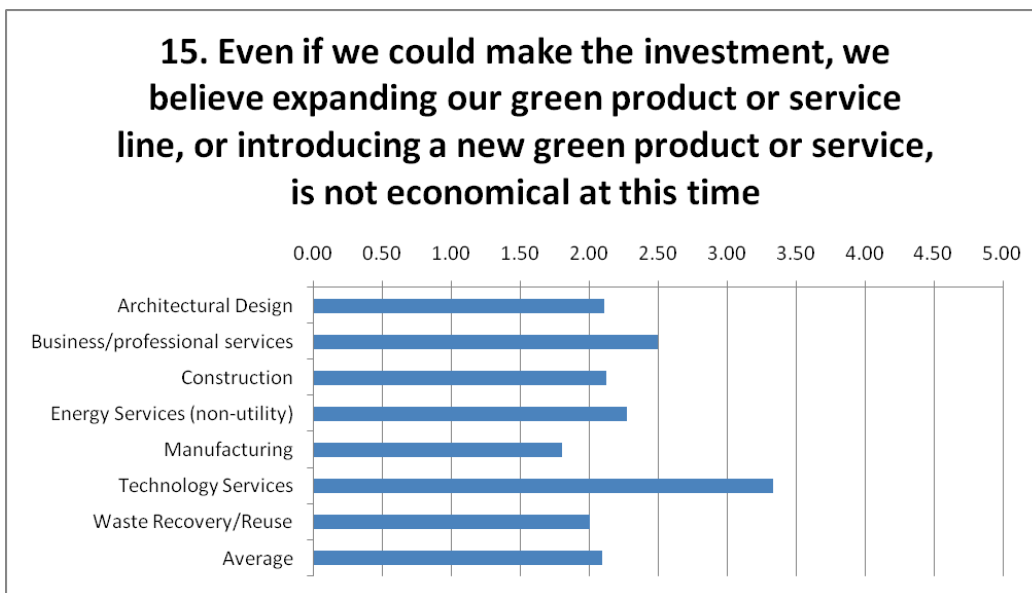
Survey respondents generally believe investment required is not too excessive. This answer may suggest these firms are hopeful of success or are having success already advancing their green product and service offerings with existing capital.



15. Even if we could make the investment, we believe expanding our green product or service line, or introducing a new green product or service, isn't economical at this time.

Average Score: 2.09

As expected, most respondents are considering green product or service expansion.



Other Reports

Due to the growing interest in green initiatives, many other reports have been published. We will spend a few paragraphs to briefly mention one of these other reports.

The Pew Charitable Trusts published a report in May 2009 that reveals clean economy job growth trends from 1998 to 2007 for all states and the District of Columbia. The links to the Minnesota fact sheet and full national report are provided as endnotes^{vi, vii}. This report is comprehensive and would have become a greater basis of our report had it been released earlier in our project process. It is interesting to note that while other reports often use the terms “green jobs” or “green employees” (including this report), the Pew Charitable Trusts report uses the terminology “clean economy employees” instead.

Overall, 0.64% of Minnesota’s workforce includes clean economy employees, ranking Minnesota 5th, tied with Colorado, and behind Oregon (1.02%), Maine (.85%) California (.71%) and Massachusetts (.69%)^{viii}. See Table 4 below for more details.

Table 4 - Minnesota Clean Economy Employees

Clean Economy Employees (2007)	Minnesota	National
Training and Support	680	52,386
Energy Efficiency	1,679	73,187
Environmentally Friendly Production	3,819	53,927
Clean Energy	4,039	89,365
Conservation and Pollution Mitigation	9,797	501,521
Total	19,994	770,385

Clean Economy Employees by % (2007)	Minnesota (%)	National (%)
Training and Support	3.4%	6.8%
Energy Efficiency	8.4%	9.5%
Environmentally Friendly Production	19.1%	7.0%
Clean Energy	20.2%	11.6%
Conservation and Pollution Mitigation	49.0%	65.1%
Total	100%	100%

Source: Pew Charitable Trusts^{ix}

Using these two charts, we can see how Minnesota’s clean economy workforce compares to national averages. Minnesota is above the national average by percentage in environmentally friendly production and clean energy. Some growth opportunities are complementary to Minnesota’s strengths. For example, Minnesota’s strength in environmentally friendly production, which includes transportation, manufacturing, agriculture, energy production, and materials, could have some further application in building retrofits and new, LEED certified buildings, increasing employees in the energy efficiency cluster.

The Pew Charitable Trusts suggests in its conclusion that there will be winners and losers in the growing clean energy economy. Those states that implement new, supportive policies are more likely to experience greater than average clean economy employee growth. Noted areas that could use policy incentives nationally, according to the Pew Charitable Trusts, are clean/renewable energy generation, energy efficiency programs, and vehicle emission reduction programs^x.

Employment Opportunities

Several organizations are actively training and providing knowledge tools to the current workforce. For example, Enterprise Minnesota offers Lean 101 training programs for company workforces to train them to recognize and implement lean practices.^{xi} Lean manufacturing processes reduce waste streams and energy requirements and are therefore inherently green process reengineering services. Such efficiency training courses are among the most popular training programs as manufacturers attempt to gain competitive advantage. The State of Minnesota's Department for Employment and Economic Development (DEED) recently awarded five grants to Minnesota manufacturing companies for a total of \$192,000 to improve productivity, capacity, and manufacturing efficiency.^{xii} These grants are not provided specifically to green product and service firms, but, creating manufacturing efficiencies is, once again, inherently green. More dedicated programs to accelerate greening of firms, especially those that produce green products or provide green services could further provide a sustainable, growing green workforce. Thus, our workforce development recommendations are less about workforce training opportunities and more about new programs.

There is another report written by Civic Source for the Blue Green Alliance that discusses workforce development for particular renewable energy fields like solar, wind, and other renewables. Please seek that report for more employment opportunities.

1. New Building Restrictions and Existing Building Retrofits

According to the McKinsey & Company report "Reducing U.S. Greenhouse Gas Emissions: *How Much at What Cost?*" new building restrictions that require greater energy efficient building materials and design typically cost a fraction of the equivalent energy efficiency materials and design implemented as a retrofit^{xiii}.

While promotion of energy efficient building design for new buildings is paramount, retrofits of energy inefficient buildings should also be emphasized. Architectural and construction firms should become certified under programs like the LEED certification programs offered by the US Green Building Council. For residential retrofits and new construction, firms can use MN Greenstar programs. Economic stimulus dollars and the general economic condition may not induce new building construction, but we have many architectural, construction, and engineering companies in our green directory. Developing and perfecting LEED capabilities through regional retrofits may be very important to maintain these workforces. Many firms already have LEED accredited staff that can help buildings gain LEED certifications. The bottom-line is that there should be some way to facilitate faster growth of LEED and MN Greenstar retrofits. If faster

growth could exist, more architectural and construction firms would have more work, more green building material manufacturers would find a market for their products, and more operational energy savings would occur.

2. Lean Manufacturing

It is important to aggressively develop lean manufacturing training and mechanisms to fund this training. If companies considering relocation understand that Minnesota is here to help them learn to lean their processes today and provide extreme support in the future through funded training programs, they will see a sustainable Minnesota initiative to help them remain competitive with consistent and innovative retooling support. From an operational point-of-view, these capital expenses often provide immediate cost reduction which translates to greater gross margins. But companies often do not focus on continual lean manufacturing training when left to their own devices.

Minnesota already has programs such as the Growth Acceleration Program (GAP) in which small manufacturers commonly receive a 15:1 return since 2007 in business improvement services. One million dollars was appropriated to Enterprise Minnesota for 2009 and “The newly funded GAP program includes a three-to-one match for companies with fewer than 50 employees, a one-to-one match for those with 50 to 100 employees, and a one-to-three match for companies with more than 100 but fewer than 250 employees.”^{xiv} Continuous improvement pressure from external organizations like Enterprise Minnesota, the Blue Green Alliance, or an environmental marketing council, will help firms achieve competitive advantage.

In addition to lean manufacturing process reengineering, degree programs in manufacturing technology can improve manufacturer opportunities. The University of Minnesota and other educational institutions offer a Manufacturing Technology bachelors degree which provides in-depth training in global manufacturing innovation. Manufacturing is a high-technology business and consistent analysis of new processes will help manufacturers remain competitive.

3. Energy Infrastructure Development

Transmission infrastructure and rail/mass transport infrastructure upgrades are also critically important. New, more efficient power lines can reduce fossil fuel supply requirements like coal and natural gas, while also providing additional and higher power capacity connections to wind farms. Additional mass transit and commuter options like the Central Corridor Mass Transit line generally increase jobs through construction and continuous operations while promoting a denser, more efficient urban core for inhabitants.

4. Nationwide and Global Marketing (with New Business Incentives)

Since individuals with the necessary skill sets for current green product/service jobs already may exist in the Twin Cities, we should continue our efforts to attract a greater number of green businesses, including those with complementary supply chain interests, to the Twin Cities. Tax incentives and other job zone benefits can help bring companies to the metropolitan region. Those offered by the Green Jobs Investment Initiative provide a start^{xv}. These suggestions are not new, but effectively crafting incentives is not trivial. Packages to attract businesses, especially larger manufacturing businesses, are often creatively-designed and heavy on incentives due to cut-throat competition with other U.S. and global cities.

5. Marketing on Behalf of Metropolitan Green Businesses

In our survey results, respondents strongly agreed that consumers are not yet well-informed about green products and services. More knowledge dissemination is required to attract buyers to green products and services. There is a need to aggressively develop a marketing arm to cross-promote all Minnesota businesses. Like the Northwest and New England Business Councils, a Minnesota marketing firm could be member funded and setup as a nonprofit organization. This could also be a regional Midwestern initiative similar to the Northwest and New England regional councils. In fact, that may be ideal to challenge the strengths of other U.S. regions. These business councils send out marketing materials to attract new clients on behalf of their member organizations and organize seminars to attract new consumers. An available, external marketing firm would be another reason for companies to locate in Minnesota and may be our most important proposal for workforce development.

Certainly, a Minnesota organization already in existence could provide this service. However, we have not yet found such a Minnesota organization that could do so without changing its mission or bylaws. Several organizations come close, but each organization we studied has other additional initiatives that would complicate matters. Even the state government is trying to setup a one-stop clean energy shop which we believe has great value, but is not quite what we would propose. This marketing effort, in order to be most efficient, must be separate from other organizations. The sole goal would be to support its member environmental and clean energy clusters through enhanced marketing efforts. The organization we are proposing would also provide another service – ensuring the continuation and further development of the green product and service directory.

6. R&D Efforts

Business logic suggests that as research and development spending falls, revenue will also eventually fall as old products are retired and limited new innovative products are available for replacement. We suggest continuing to provide incentives to green chemistry and other green research and development efforts, entrepreneurial or established, in the Twin Cities metropolitan region. Our goal would include creative incentives to encourage local R&D firms to build pilot and full commercialization plants within the region.

7. Energy Audits, Carbon Footprints, and Environmental Management Systems

Energy audit and carbon footprint measurement tools provide an opportunity for businesses to make decisions based on better quantified knowledge. Once firms have taken measurements and past trends are better understood, then they can set future management goals. Environmental Management Systems also can help firms record and monitor energy-reduction goals. While most firms understand their overall energy picture, the emphasis is on developing additional granularity of sub-processes and daily monitoring. The carbon and energy consultants to perform carbon/energy audits already exist across the Twin Cities region. Working with these consultants, firms can also take the extra step to gain energy certifications or join carbon registries to help draw attention to their business activities. In addition, internal employees could receive training to adequately understand enhanced energy monitoring processes and environmental management systems. Besides energy monitoring, firms could receive more marketing training to help publicize quantified and verified energy reduction data and greening initiatives on brochures, web sites, and other outreach materials without stretching the truth (green washing). Training executive teams and employees to understand energy reduction trends will provide additional word-of-mouth business advantages. Finally, there could be an incentive program to encourage supply chain partners to share energy usage information with the intention of increasing energy reduction collaboration throughout the supply chain.

Conclusion and Next Steps

We propose the following:

- Review workforce development program options with Blue Green Alliance steering committee to incorporate our recommendations into an implementation roadmap.
- Compare our findings with those of the Green Jobs Taskforce^{xvi}, BioBusiness Alliance 25 by 2025 “Vision” documents^{xvii}, and the Blue Green Alliance documents. While some of these other reports cover the full state, there is still pertinent knowledge for the Blue Green Alliance to consider.
- Work with GreenMark to incorporate recommendations into their strategy and marketing plan to promote and improve economic viability of Twin Cities metropolitan green product and service business divisions.

Appendix –*Making It Green* Sector Classification 1.0

Green Building	Transportation	Renewable Energy
<ul style="list-style-type: none"> • Insulation • Windows & Doors • Glass\ Films • HVAC (heating, ventilation and air conditioning) Systems and Controls • Lighting • Wood Products (FSC- Forest Stewardship Council) - Certified) • Alternative Materials • Site and landscape materials • Adhesives • Paints • Testing Kits 	<ul style="list-style-type: none"> • Batteries • Bio-Fuels • Fuel Cells • Generators • Bio-fuels Engine systems (parts) • Hybrid Buses • Neighborhood Electric vehicles (NEV) • Electric cooling\ heating of vehicles 	<ul style="list-style-type: none"> • Wind Turbine OEM suppliers - blades, gear boxes, other • Bio-fuels systems - Ethanol, Bio-Diesel, Cellulosic possibilities • SolarPV • Solar Hot Water • Geothermal - pumps • Pelletization systems • Distributed Power Management Systems • Sensors & diagnostic equipment • Energy Efficient Products • Energy Conservation & Green Energy products

References/Endnotes

ⁱ Interview with Andi

ⁱⁱ Interview with John

ⁱⁱⁱ World Business Council for Sustainable Development, <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzlwMDI> (accessed June 1, 2009)

^{iv} Northwest Environmental Business Council, <http://www.nebc.org/> (accessed June 1, 2009).

^v New England Environmental Business Council, <http://www.ebcne.org/> (accessed June 1, 2009).

^{vi} Pew Charitable Trusts, *The Clean Energy Economy Minnesota*, May 2009, http://www.pewcenteronthestates.org/uploadedFiles/wwwpewcenteronthestatesorg/Fact_Sheets/Clean_Economy_Factsheet_Minnesota.pdf (accessed June 1, 2009).

^{vii} Pew Charitable Trusts, *The Clean Energy Economy*, May 2009, http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf (accessed June 1, 2009).

^{viii} *Ibid*, p.32.

^{ix} Pew Charitable Trusts, *The Clean Energy Economy Minnesota*, May 2009, http://www.pewcenteronthestates.org/uploadedFiles/wwwpewcenteronthestatesorg/Fact_Sheets/Clean_Economy_Factsheet_Minnesota.pdf (accessed June 1, 2009).

^x Pew Charitable Trusts, *The Clean Energy Economy*, May 2009, http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf, p.42 (accessed June 1, 2009).

^{xi} Enterprise Minnesota, March/April 2009, "Slowdown Savvy", p.18.

^{xii} *Twin Cities Business Journal*, May 2009, "DEED Funds Training for MN Companies", <http://www.tcbmag.com/dailydevelopments/dailydevelopments/116571p1.aspx> (accessed June 1, 2009)

^{xiii} *McKinsey & Company*, *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?* December 2007, p. xvi.

^{xiv} Enterprise Minnesota, "Manufacturers Buoyed by New Investment for GAP", May 22, 2009, <http://www.enterpriseminnesota.org/About-Us/Newsroom/Manufacturers-Buoyed-by-New-Investment-for-GAP.aspx> (accessed June 1, 2009).

^{xv} Frederikson & Byron, "Minnesota Governor Pawlenty Unveils 'Green Jobs Investment Initiative'", http://www.fredlaw.com/articles/energy/energy_081113_tat.html (accessed June 1, 2009).

^{xvi} Green Jobs Task Force, <http://www.mngreenjobs.com/> (accessed June 1, 2009).

^{xvii} The BioBusiness Alliance of Minnesota, <http://biobusinessalliance.org/destination/> (accessed June 1, 2009).