

The Future of the Green Economy

Grand Erie, Hamilton, and Niagara



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The three Local Boards acknowledge report limitations and are committed to ongoing research to enhance findings.



executive summary

The green economy is a rapidly growing sector affecting a wide array of industries and occupations. Increased public awareness of environmental issues, and changing policies and regulations are shifting demands within our communities. In an effort to define the green economy and related industries and jobs, the Workforce Planning Ontario (WPO), formerly known as the Local Boards* – Workforce Planning Board of Grand Erie, Hamilton Training Advisory Board and Niagara Workforce Planning Board – have partnered to examine the impact of the green economy on the economic region of Grand Erie, Hamilton, Niagara (region 3550). The goal of *The Future of the Green Economy: Grand Erie, Hamilton, and Niagara* is to highlight common industries that are enforcing green practices and to increase our understanding of how the green economy influences existing and emerging occupations within key sectors.

The introduction of Ontario's Green Energy and Green Economy Act, 2009, has served as a catalyst for building a stronger, more sustainable economy. Fortunately, the province of Ontario has abundant sources of renewable energy and is well positioned to revitalize traditional industries. While the transition to greener practices may challenge some industries, the Ontario government is working to position this province as a leader in the green economy.

The green economy has gained global recognition and has various definitions. The advisory committees conducting research and consultation for this report have developed a working definition of green jobs as “work in agricultural, manufacturing, research and development, administrative¹, and service activities that contribute substantially to preserving or restoring the quality of land, air and water.” In short, it is a restorative (not destructive) economy. More specifically, the green economy includes economic activities related to the following: reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy².

“Green collar jobs” are another important concept to the green economy. These are occupations that facilitate the reduction of waste and pollution, improve the environment, and pay a living wage with benefits that can support a family and offer potential for upward mobility³. As local organizations plan for labour force development, it is important to understand how the demand for green careers will affect employment in various industries. According to the United Nations Environmental Programme (UNEP), this will happen in at least four ways: job creation, job substitution, job elimination without direct replacement, and finally job transformation as skill sets are redefined according to “green” demands⁴. To support sectoral development and sustainability, we must determine how to effectively transition a traditional labour force to one that can easily move into green careers.

This report will provide a detailed occupational analysis across six key sectors including Utilities; Agriculture; Forestry; Fishing and Hunting; Construction; Manufacturing; Transportation and Warehousing and Administration and Support; Waste Management and Remediation Services. These six sectors were chosen based on their importance to the identified areas as well as their proximity to green markets. The report also includes a brief description of four other industries showing promise in the green economy.

The report is presented in six sections.

Section 1 provides a brief introduction to the green economy and green careers, and the research methodology undertaken in this report.

Section 2 profiles six green industries, with an overview of green clusters. In detail it covers Utilities; Agriculture, Forestry, Fishing and Hunting; Construction; Manufacturing; Transportation and Warehousing and Administration and Support, Waste Management and Remediation Services industries across the Grand Erie, Hamilton and Niagara Local Board areas.

Section 3 offers information on four other industries relevant to the green economy. Three Local Board advisory committees identified these industries as important additions to the report.

Section 4 provides a brief summary of the green employer survey distributed across the three Local Board areas.

Section 5 Report Summary

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* see endnotes

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section one | introduction

The green economy has become a global priority thanks to increased awareness of climate change, resource depletion and the need for sustainable practices. Shifting towards a greener economy demands a transformation of our current economy to accommodate the changing face of industry and communities. In recent years, the Grand Erie, Hamilton and Niagara areas have started to see their local economies change. Larger manufacturing firms have disappeared and are replaced with solar technology companies; agricultural fields are becoming populated with wind turbines and solar panels; and local transportation systems are introducing hybrid vehicles.

This growing interest and investment in a green economy – coupled with the recognition of industrial leaders in the region – has led three Local Boards* to collaborate on an initiative to examine the top green industries and the impact on the local labour market. These boards are the Workforce Planning Board of Grand Erie, the Hamilton Training Advisory Board, and the Niagara Workforce Planning Board. They are among the 25 board areas comprising Workforce Planning Ontario, all of which engage their local organizations and community partners in labour market development. Each area is unique with its own characteristics and labour market issues. In an effort to profile the green economy and related industries and jobs across Niagara, Hamilton, and the Grand Erie economic region, these three Local Boards have partnered to produce *The Future of the Green Economy: Grand Erie, Hamilton, Niagara*.

In 2009 the Government of Ontario introduced the groundbreaking Green Energy Act (GEA). The GEA is a strategic response to the growth in clean and renewable sources of energy such as wind, solar, hydro, and bioenergy. In the short time this act has been in place, many Ontario families and businesses have become active energy conservers. In its first three years, the GEA is expected to create 50,000 clean energy jobs across the province⁵. With the implementation of this act, the province aims to define Ontario as North America's renewable energy leader.

In the United States, four states are working diligently towards a greener economy: California, Oregon, Colorado, and Massachusetts. California leads the way in terms of investment and jobs, accounting for half of the total venture capital invested in the US⁶. Like Ontario, California has introduced attractive public policies that include feed-in tariffs and financial incentives to stimulate the transition to a more environmentally and financially responsible economy⁷. Colorado and Oregon are harnessing their natural resources, such as sun and wind, for the development of energy efficient and renewable energy technologies. In Massachusetts, there has been a strong focus on green technology research at leading universities such as Harvard, Boston and MIT. The initiatives taking place across the United States are echoed here in Ontario. With its abundance of natural resources, major research companies and universities targeting green energy, Ontario is well positioned to become a leader in renewable energy.

We recognize that many institutions have proposed definitions of the green economy, but after research and consultation with advisory committees established in the three regions, our working definition of green economy for this report is “work in agricultural, manufacturing, research and development, administrative⁸, and service activities that contribute substantially to preserving or restoring the quality of land, air and water.” More specifically, the green economy includes economic activities related to the following: reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy⁹.

As noted above, green jobs span various economic sectors from Agriculture, Forestry, Fishing and Hunting to Manufacturing, Transportation and Warehousing. In Canada about three per cent of the national workforce is engaged in environmental-related occupations and about one in ten organizations have environmental employees¹⁰. Many reports project that growth in environmental employment will surpass the average employment growth in the near future. This increased demand – and possible shortage of labour – calls for a close examination of the occupational needs of this new economy.

To better understand the green economy, we conducted a thorough literature review and analysis of the labour market data. We have identified six key industry sectors from across this economic region that captures the green economy. To provide a local perspective, local employers were engaged through an online survey to gain insight on green occupations and required education and skills. Understanding which industries and occupations will be influenced by the green economy is imperative as local organizations plan for workforce development.

* see endnotes

section one | methodology

Early research showed there was no single accepted definition of the green economy. For the purpose of our research, the three Local Boards opted to use four different sources: the United Nations Environment Programme (UNEP)¹¹ for its international perspective and strong foundation supported by several other publications; ECO Canada¹² and Statistics Canada¹³ for their Canadian industry perspective; and lastly, we consulted research by the Occupational Information Network (O*NET)¹⁴, sponsored by the US Department of Labor, and the Bureau of Labor Statistics (BLS) to narrow down industries on the basis of green practices. O*NET also served as a reference for identifying green occupations, as the United States employs a similar occupational classification system. The table below provides a brief description of the definitions offered by these sources.

Table 1: Current Definitions of Green Economy

Source	Definition of Green Economy/ Green Jobs	
International	UNEP	Defines green jobs as work in agricultural, manufacturing, research and development, administrative, and service activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution. Green jobs also need to be good jobs that meet longstanding demands and goals of the labor movement, i.e. adequate wages, safe working conditions, and worker rights, including the right to organize labor unions.
National	Statistics Canada	For analytical purposes, the agency treats the environment industry as consisting of activities undertaken by firms in measuring, preventing, limiting or correcting environmental damage, as well as those that engage in clean or resource-efficient technologies, that reduce emissions and/or that minimize waste disposal problems. Statistics Canada maintains that an environmental job is one that is involved in the production or provision of environmental goods or services.
Sector Council	ECO Canada	Defines environmental employees as individuals working in at least one of the sectors of the economy related to Environmental Protection, Conservation and Preservation of Natural Resources or Environmental Sustainability.
US Department of Labor/ Employment and Training Administration	O*NET Resource Center	The green economy encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy. Understanding green jobs as a group of jobs, found at more than one establishment, in which a common set of tasks are performed or are related in terms of similar objectives, methodologies, materials, products, worker actions, or worker characteristics.



The report methodology was grounded in qualitative and quantitative research, data analysis, and community input derived from primary and secondary sources including online surveys, and key stakeholders including economic development representatives and local subject experts.

The primary data sources employed in this report included:

- **Canadian Business Patterns (CBP)**¹⁵. This data was used to identify the number of employers and size of the industry across the six industry sectors.
- **National Occupational Classification (NOC)**¹⁶. This nationally accepted reference classifies 520 occupational groups with a four-digit code according to skill type and skill level. The NOC classification model assisted our research to identify the top occupations across selected industries.
- **2006 Census**¹⁷. This customized data prepared for the Local Boards Network, along with the NOC system, were used to highlight the number of people employed in the six key industry sectors.
- **Matrix of Skills Transferability**¹⁸. The matrix assisted us to identify potential employment opportunities for workers in different occupations, and determine possible paths of mobility between occupations.

The secondary research was drawn from existing document research, reports, newspaper articles and an online employer survey. The survey was distributed across the three Local Board areas¹⁹ and resulted in a total of 48 respondents. Over 66 per cent of businesses who responded to the green employer survey were Small to Medium Enterprises (SMEs), ranging from 1 to 49 employees. Industries participating in the survey included: Utilities; Agriculture; Forestry; Fishing and Hunting; Construction; Manufacturing; Transportation and Warehousing and Administration and Support; Waste Management and Remediation Services.

Utilities (NAICS 22) industry overview

The establishments that make up this sector are primarily engaged in operating electric, gas and water utilities. They generate, transmit, control and distribute electric power; distribute natural gas; treat and distribute water; operate sewer systems and sewage treatment facilities; and provide related services, generally through a permanent infrastructure of lines, pipes and treatment and processing facilities²⁰. The main sub-sectors in this industry are:

- Electric Power Generation, Transmission and Distribution (NAICS 2211)
- Natural Gas Distribution (NAICS 2212)
- Water, Sewage and Other Systems (NAICS 2213)

Examples of green activities within these subsectors include:

- Renewable Energy
- Bioenergy
- Hydrogen and Fuel Cells
- Energy Saving Lighting and HVAC
- Advanced Batteries, Energy Storage and Charging Systems

industry presence

The Utilities industry across Grand Erie, Hamilton and Niagara is relatively small compared to other industries in terms of the number of employers and the number of people employed. In 2006, 3,990 people were employed in this industry, 0.69% of the total workforce from all three regions, compared to 0.79% across Ontario. The table below shows the respective numbers in each of the three areas.

Table 2: Number of People Employed in Utilities (NAICS 22)

	Grand Erie	Hamilton	Niagara	Total	Ontario
Utilities (NAICS 22)	1285	1245	1460	3990	48640
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in Utilities	1.09%	0.51%	0.69%	0.69%	0.79%

Source: Statistics Canada, 2006 Census

In total, there are 48,640 people employed in the Utilities industry across Ontario, and 8.2% work in Grand Erie, Hamilton and Niagara. Across this economic region, three additional employers began operations in the Utilities industry between December 2003 to June 2010²¹. The largest growth occurred with employers in the indeterminate category²². Additionally, over the same period one large-sized employer (500+) now operates in this economic region and has created many promising opportunities.

While growth in this industry appears small across this economic region, Utilities is expected to develop more rapidly across Ontario. The growing concern about the use of fossil fuels will create opportunities as the green economy emerges. Secondary research suggests the Utilities industry is one that is facing both large threats and opportunities in the wake of the green economy.



the green economy and utilities

While the economic shift to a greener economy will impact many industries, the most noticeable change can be found in Utilities. The core component of “going green” is reducing energy use and creating new and more efficient energy sources. As a result of this new focus, the Utilities industry has shifted from the traditional power plant format to one that is new, technologically advanced, environmentally conscious and economically promising. By 2011 there will be an estimated 24,000 plus environmental employees in the Utilities and Transportation and Warehousing industries in Canada, an increase of 1.1% from 2006²³.

For decades, Ontarians relied heavily on five air-polluting coal plants for energy production, a system contrary to green practices. In 2007, only 18 per cent of electricity came from coal fired plants. Hydro-electric and nuclear reactors accounted for nearly 73 per cent of Ontario’s electricity. The Ontario government recognized the need to shift to cleaner electricity with its Green Energy Act, 2009, which compels the Utilities industry to enforce cleaner practices with a focus on eliminating coal by 2014²⁴. Over the next three years, Ontario’s Green Energy Act is projected to support over 50,000 direct and indirect jobs in smart grid and transmission and distribution upgrades, renewable energy and conservation²⁵.

The growing interest in cleaner practices within the Utilities industry sector is evident across the three Local Board areas. In response to the Government of Ontario’s proposal to eliminate coal plants by 2014, the communities of **Grand Erie** are working with the province and developers to bring a natural gas generating facility to the region²⁶. The natural gas plant as well as the biomass plant in Haldimand would allow the region to replace coal with a cleaner alternative. Additionally, this community and Brant Power, the local utility, are in discussions to convert methane gas into a viable energy source, turning landfills into electrical generation plants. The solution would be cost effective and less damaging to the environment.

In the **Niagara** area, the government has committed to maximizing current generation potential by expanding hydro-electric power generation through the Niagara Tunnel Project. The project will increase the amount of water flowing to existing turbines and produce enough power to meet the annual needs of 160,000 homes²⁷.

In **Hamilton**, the recent closure of the Siemens turbine plant came as a shock to the 550 workers who provided many years of service to this sophisticated utilities company. However, in March 2010 Horizon Energy Solutions Inc. (HESI) launched its new solar energy generating business in Hamilton. HESI is one of Ontario’s first commercial solar energy generating enterprises and works to promote green practices through collaboration and research. HESI has partnered with the cities of Hamilton and St. Catharines, along with McMaster University and Mohawk College as founding members of the Golden Horseshoe Strategic Energy Alliance. Together these partners aim to position the Golden Horseshoe as a leader in Canada’s green economy²⁸. Moreover, the City of Hamilton reports continued interest from companies of “clean technology” products, such as solar power, windmill, biomass and alternative energy inquiring about possible relocation opportunities²⁹. Growing interest from clean technology companies, innovative projects and collaboration opportunities across the three Local Board areas suggests an encouraging future for the changing Utilities industry.



key occupations

There are a total of 3,990 people employed throughout the Utilities industry across the Grand Erie, Hamilton and Niagara Local Board areas. Drawing on secondary sources and our employer survey, we produced a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. See the table below for employment numbers of the top green occupations across Grand Erie, Hamilton and Niagara.

Table 3: Top Green Occupations in Utilities (NAICS 22)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
0912	Utilities manager	70	45	60	175	4.39%
1453	Customer service, information and related workers	130	45	65	240	6.02%
2131	Civil engineers	10	10	10	30	0.75%
2211	Chemical technologists and technicians	0	15	20	35	0.88%
2232	Mechanical engineering technologists and technicians	35	10	20	65	1.63%
2233	Industrial engineering and manufacturing technologists and technicians	0	0	10	10	0.25%
2241	Electrical and electronics engineering technologists and technicians	50	20	35	105	2.63%
7243	Power system electricians	15	15	45	75	1.88%
7244	Electrical power line and cable workers	30	55	110	195	4.89%
7265	Welders and related machine operators	15	0	20	35	0.88%
7352	Power systems and power station operators	115	55	25	195	4.89%
7421	Heavy equipment operators (except crane)	20	20	30	70	1.75%
Total – All Occupations		1285	1245	1460	3990	--

Source: Statistics Canada, 2006 Census

skills transferability

Using the Matrix of Skills Transferability (Appendix A), it is possible to determine the occupations with the greatest skills transferability. The following table outlines the top green occupations in Utilities and matches them with occupations where skills transferability exists.



Table 4: Top Occupations in Utilities (NAICS 22) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
0912	Utilities manager	Management level occupation, internal progression though unit group is strong	
1453	Customer service, information and related workers	Low skilled occupation, internal progression is strong	
2131	Civil engineers	2154	Land surveyors
		2251	Architectural technologists and technicians
		2253	Drafting technologists and technicians
		2254	Land survey technologists and technicians
2211	Chemical technologists and technicians	No occupations were found where direct transfers exist; however these occupations are related but may require further education:	
		2112	Chemists
		2134	Chemical engineers
		2142	Metallurgical and materials engineers
		2145	Petroleum engineers
		3131	Pharmacists
2232	Mechanical engineering technologists and technicians	No occupations were found where direct transfers exist; however these occupations are related but may require further education:	
		2132	Mechanical engineers
		2146	Aerospace engineers
2233	Industrial engineering and manufacturing technologists and technicians	No occupations were found where direct transfers exist; however these occupations are related but may require further education:	
		2132	Mechanical engineers
		2141	Industrial and manufacturing engineers
		2253	Drafting technologists and technicians
2241	Electrical and electronics engineering technologists and technicians	2147	Computer engineers (except software engineers and designers)
		2241	Electrical and electronics engineering technologists and technicians
		2242	Electronic service technicians (household and business equipment)
		2253	Drafting technologists and technicians
7243	Power system electricians	No occupations were found where direct transfers exist; however these occupations are related but may require further education:	
		7241	Electricians (except industrial and power system)
7244	Electrical power line & cable workers	None	
7265	Welders & related machine operators	None	
7352	Power systems and power station operators	No occupations were found where direct transfers exist; however these occupations are related but may require further education:	
		7351	Stationary engineers and auxiliary equipment operators
7421	Heavy equipment operators (except crane)	Low skilled occupation, internal progression is strong	



educational programs and certifications

The transferability of traditional occupations throughout the Utilities industry to green collar occupations often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Utilities industry are:

- Construction and Maintenance Electrician
- Electronics Engineering Technician/Technology
- Electrical Engineering
- Environmental Systems Engineering Technology – Energy Management Program
- Environment and Energy
- Industrial Electrician
- Sustainable Energy
- Utilities Systems Operator
- Water Distribution and Supply
- Waster Distribution and Wastewater Collection
- Wastewater Collection



employer spotlight

Brian Lennie is Advisor, Applications and Approvals for Horizon Energy Solutions Inc. (HESI), a sister company to energy distribution company Horizon Utilities Corporation. In 2009, the Horizon group of companies were named Company of the Year by the Ontario Energy Association, recognized for developing the first-ever sustainability-based annual report by an energy company in Ontario completed to the Global Reporting Initiative international standard. Horizon Energy Solutions, based in Hamilton, is one of Ontario's first commercial solar energy generating enterprises.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: In 2010 Horizon, recognizing the new market opportunities created by customers' shift toward sustainable energy solutions, took the bold step of expanding HESI's mandate to a new focus – solar rooftop generation offerings under the Ontario Power Authority's Feed-In Tariff Program (FIT).

In less than a year, HESI has assembled a significant portfolio of rooftops under lease and continues to grow this number as we speak. We have an innovative, leading edge market approach that allows us to achieve the solutions that work best for each of our individual building owners located across southern Ontario. And we have the strong support of our municipal owners, the cities of Hamilton and St. Catharines.

Q: How will the shift towards a green economy impact employment in your sector, in terms of...

...changing skills, new jobs created or lost?

A: Certainly new jobs have been created in HESI's case. As a solar developer, we handle all technical and administrative facets of the solar installation and use contracted partners to conduct the installations. For HESI, this has meant hiring a robust staff of knowledge workers.

...and specific green occupations in demand?

A: To date, we ourselves have hired for positions in project management, project analysis, and applications/government relations (not to mention a full sales staff). Engineering roles with expertise in solar or wind are also desirable.

There is a strong demand for the creation of a new knowledge sector in the green industry. Our staff investigates new product offerings for our customers; works closely with government entities and stays abreast of changing regulations; and evaluates the costs and benefits of all projects or opportunities.

Q: What does it take to work in this sector as a Green Collar worker?

A: You must be flexible and innovative. It's a constantly changing industry with new opportunities and challenges occurring almost weekly. And that's what makes it so great. Investors are realizing that this is a burgeoning sector and are investing heavily. This is leading to new innovations in renewable generation and energy solutions offerings for customers. These innovations are happening at a rapid pace, so you need to be able to 'go with the flow' as a Green Collar worker.

Q: What are your hiring challenges?

A: The industry is still in its infancy, so finding well-educated candidates knowledgeable in areas of sustainable energy is a challenge. Primarily, it's getting the word out that the Green Collar jobs are out there. You would be surprised – a lot of workers in Ontario don't know about the explosion in employment that's happening. So it's our goal as a company to aggressively market ourselves as we continue to grow.

Another challenge is finding employees with the right skill set for the new green knowledge sector, because it's so new. At the very least, you need to be able to learn on the fly.

Q: Any advice for job seekers wanting to work in this sector?

A: Read up as much as you can on current trends in the green, energy efficiency and low carbon industries. Because it's constantly changing, you need to stay ahead of all that is going on.

I'll reiterate that being flexible and innovative are musts. There are plenty of opportunities in the sector now for employees who are willing to change as customer demands do, travel all over the province as needed, etc.

Agriculture, Forestry, Fishing and Hunting (NAICS 11)

industry overview

The Agriculture, Forestry, Fishing and Hunting sector is comprised of establishments primarily engaged in growing crops, raising animals, harvesting timber, harvesting fish and other animals from their natural habitats and providing related support activities. Establishments engaged mainly in agricultural research or that supply veterinary services are not included in this sector³⁰. The main sub-sectors of the Agriculture, Forestry, Fishing and Hunting sector are:

- Crop Production (NAICS 111)
- Animal Production (NAICS 112)
- Forestry and Logging (NAICS113)
- Fishing, Hunting and Trapping (NAICS 114)
- Support Activities for Agriculture and Forestry (NAICS 115)

Examples of green activities within these subsectors include:

- Sustainable and Organic Farming
- Sustainable and Organic Wineries
- Agroforestry
- Sustainable Forestry Management
- Reforestation

industry presence

2006 Statistics Canada Census data revealed that 16,990 people were employed across the three Local Board areas in the Agriculture, Forestry, Fishing and Hunting industry, accounting for 2.95% of the total workforce compared to 1.77% across Ontario. The table below shows the respective numbers in each of the three areas.

Table 5: Number of People Employed in Agriculture, Forestry, Fishing and Hunting (NAICS 11)

	Grand Erie	Hamilton	Niagara	Total	Ontario
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	6930	3565	6495	16990	108930
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in Agriculture, Forestry, Fishing and Hunting	5.87%	1.45%	3.06%	2.95%	1.77%

Source: Statistics Canada, 2006 Census

In total, there are 108,930 people employed in the Agriculture, Forestry, Fishing and Hunting industry across Ontario, 15.6% of which are employed throughout Grand Erie, Hamilton and Niagara. From December 2003 to June 2010, Canadian Business Patterns³¹ data reports a total decrease of 646 businesses across the three Local Board areas. While the overall total has declined during this period, business growth occurred in the medium to large-sized employer categories; the greatest increase was in the 20-49 employee size range.



the green economy and agriculture, forestry, fishing and hunting

Ontario's natural environment is unlike most other regions in Canada. Ontario has over half of the "Class 1" (highest quality) agricultural land in Canada and even more Class 2 and Class 3 land, both of which are considered very suitable for agriculture³². Over 57,000 farms are located in this province and generate \$10.3 billion in revenue, accounting for about 25% of all farm revenue in Canada. In addition, Ontario's sustainable forests set a strong foundation for our forestry products industry. Large areas of Ontario's forests in 2008 have been designated protected since they are crucial for storing carbon dioxide.

As the green economy emerges, the agriculture sector will be influenced by bio-based materials, farm-efficient technologies, micro-irrigation systems, bio-remediation, non-toxic cleaners and natural pesticides. One area of growing interest has been organic farming, which aims to develop enterprises that are sustainable and harmonious with the environment³³. The demand for organic produce grown without chemicals or pesticides is expected to further increase, which will have a direct impact on small farms³⁴ across Ontario. Organic farming continues to flourish across the three areas, particularly in the Niagara region with the introduction of organic wineries.

Developing and improving sustainable on-farm practices will deliver both environmental and economic benefits for the agricultural sector. As part of Agriculture and Agri-Food Canada's Growing Forward environmental initiatives, \$199.5 million in funding will go towards developing new agri-environmental knowledge, programs and initiative. This will help farmers address key environmental challenges on water quality, water use, climate change and greenhouse gas emissions. Farmers will also be able to explore new economic opportunities that encourage additional environmental action³⁵. In 2008, the City of **Hamilton** released a study reporting that the strengths of its agricultural sector are its diversity, prime farming lands, proximity to water, good climate, multi-modal transportation network and access to markets³⁶. These strengths are echoed in the neighbouring community of **Grand Erie** as it is the fifth largest agricultural region in Ontario and reports over \$415 million in annual farm gross receipts³⁷. The Hamilton, Grand Erie and Niagara areas are well situated to offer many local opportunities in the "green" agricultural economy.

As research progresses on enhancements to current agricultural practices, many communities are now implementing sustainable practices. Across the three Local Board areas, citizens continue to promote local produce through the "100 mile diet" trend. Communities challenge their citizens to eat foods grown, produced and sold within 100 miles of their home. The economic impact of this initiative is tremendous for local farmers, and for all other work that supports local agriculture. The **Niagara** Region is now the second-largest producer of greenhouse products in Ontario and represents the second largest sector of the agricultural economy. Niagara's 200 greenhouses generate over \$240 million in annual sales and employing over 3,000 people³⁸. Outside of the greenhouse industry Niagara's agricultural industry is home to 86 per cent of Ontario's grape production and 82 per cent of Ontario's Peaches³⁹.

The agricultural sector enhances the quality of life and contributes to the sustainability of a community. As the three areas transition to a green economy abundant research suggests the Agriculture, Forestry, Fishing and Hunting industry will be positively impacted by this change. Not only will this shift impact local farms, but it will also decrease our ecological footprint and increase food security.



key occupations

A total of 16,990 people are employed throughout the Agriculture, Forestry, Fishing and Hunting industries across Grand Erie, Hamilton and Niagara. Drawing on secondary sources and our employer survey, we developed a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. See the table below for employment numbers of the top green occupations across Grand Erie, Hamilton and Niagara.

Table 6: Top Green Occupation in Agriculture, Forestry, Fishing and Hunting (NAICS 11)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
1471	Shippers and receivers	25	40	125	190	1.12%
1475	Dispatchers and radio operators	0	0	10	10	0.06%
2123	Agricultural representatives, consultants and specialists	10	0	10	20	0.12%
6421	Retail salespersons and clerks	60	85	160	305	1.80%
7265	Welders and related machine operators	10	15	30	55	0.32%
7271	Carpenters	0	0	15	15	0.09%
7411	Truck drivers	115	75	70	260	1.53%
7452	Material handlers	35	0	25	60	0.35%
8251	Farmers and farm managers	3085	990	1825	5900	34.73%
8253	Farm supervisors and specialized livestock workers	85	85	75	245	1.44%
Total – All Occupations		6930	3565	6495	16990	--

Source: Statistics Canada, 2006 Census



skills transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest skills transferability. The next table outlines the top occupations in Agriculture, Forestry, Fishing and Hunting and matches them with occupations where skills transferability exists.

Table 7: Top Occupations in Agriculture, Forestry, Fishing and Hunting (NAICS 11) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
1471	Shippers and receivers	Low skilled occupation, internal progression is strong	
1475	Dispatchers and radio operators	Low skilled occupation, internal progression is strong	
2123	Agricultural representatives, consultants and specialists	2221	Biological technologists and technicians
6421	Retail salespersons and clerks	Low skilled occupations, internal progression is strong	
7265	Welders and related machine operators	None	
7271	Carpenters	7293	Insulators
7411	Truck drivers	Low skilled occupations, internal progression is strong	
7452	Material handlers	Low skilled occupation, internal progression is strong	
8251	Farmers and farm managers	Heterogeneous group, internal progression is strong	
8253	Farm supervisors and specialized livestock workers	Heterogeneous group, internal progression is strong	

educational programs and certifications

The transferability of a traditional Agriculture, Forestry, Fishing or Hunting occupation to a green collar occupation often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Agriculture, Forestry, Fishing and Hunting industry are:

- Agricultural Business
- Agricultural Economics
- Crop, Horticulture and Turfgrass Sciences
- Earth and Atmospheric Science
- Ecosystem Restoration
- Environmental Biology
- Environmental Management
- Greenhouse Technician
- Landscape Architecture
- Natural Resources Management
- Organic Agriculture
- Sustainable Agriculture



employer spotlight

Whistling Gardens is an agriculture business, a wholesale and retail garden centre that is also building Canada's newest botanical garden. Wanda Heimbecker is the company's Director of Marketing & Business Development.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: It might be in choosing a different type of pesticide, and working with regulatory standards that are working with new green products – some of which are mandatory.

As an aside, I have been looking into the idea of carbon credits. I'm just starting to research this, but the way it works is that this type of program offers incentives (possibly monetary value to be traded or exchanged) based on planting. We would earn a carbon credit for every tree planted. There are programs that recognize the intrinsic value of planting and enhancing the atmosphere through creating additional green spaces, resulting in a positive impact on birds and wildlife.

Q: How will the shift towards a green economy impact employment in your sector?

A: We have identified that we will hire new staff by 2012, and that's a result of the current business cycle. In our garden centre we look for customer service skills, some plant knowledge, and preferably a horticultural degree (for a management job). And as with any growing business, our employees can expect an increase in supplier relationships. They will work with an accountant, a lawyer, people we might import products from, and also second-tier relationships like local produce growers and wineries.

Q: What does it take to work in this sector as a Green Collar worker?

A: Have a culture of consciousness. Many people want to consider themselves green, but there's a certain culture that really cares. Some wouldn't think about dropping a piece of garbage out of their car. You might have a horticulture degree, but do you actually care about nature by changing habits and thinking about the long-term impact?

Q: What are your hiring challenges?

A: None. We're not at that point yet where we've put that kind of generic call out there. We have a lot of people within our circle of influence. We're in that hidden job market, where it's all about who you know and who you trust.

Q: Any advice for job seekers wanting to work in this sector?

A: Research the industry and especially the culture. Search out that type of business through the Internet and read information about the company to identify what's important to them and the types of programs they have.

Also, be a perpetual learner. I am. It doesn't matter if you will own a company, or be the best employee in management or customer service. Care about your profession enough to stay on top of it. I'm a member of several professional associations. I volunteer. I take calculated risks, and every now and then I have an opportunity to lead, which is phenomenal. Leadership is important because it shows trustworthiness, accountability and responsibility. The more you reinvest in yourself, the more you increase your professional and personal success.

Be bondable, especially if you will be managing cash. Get a criminal background clearance. Those kinds of things have merit.

Construction (NAICS 23)

industry overview

The Construction industry contains establishments primarily engaged in constructing, repairing and renovating buildings and engineering works, and in subdividing and developing land. These establishments may operate on their own account or under contract to other establishments or property owners. They may produce complete projects or just parts of projects. Firms often subcontract some or all of the work involved in a project, or work together in joint ventures. Companies may produce new construction, or undertake repairs and renovations to existing structures⁴⁰. The main sub-sectors within the Construction industry are:

- Construction of Buildings (NAICS 236)
- Heavy and Civil Engineering Construction (NAICS 237)
- Specialty Trade Contractors (NAICS 238)

Examples of green activities within these subsectors include:

- Architecture, Community Design and Green Infrastructure
- Sustainable Development, Property Management
- LEED Certified Green Buildings
- LEED Eligible Building Materials
- Energy Star, LEED, and Efficient Equipment
- Restoration and Renovation

industry presence

The Construction industry employed 37,360 people in 2006 in the Hamilton, Grand Erie and Niagara Local Board areas, which represents 6.48% of the total workforce from all regions. Additionally, the Grand Erie, Hamilton and Niagara Local Board areas have a higher concentration of employment at 6.48% compared to 5.88% across Ontario.

Table 8: Number of People Employed in Construction (NAICS 23)

	Grand Erie	Hamilton	Niagara	Total	Ontario
Construction (NAICS 23)	7525	16500	13335	37360	362450
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in industry	6.38%	6.70%	6.28%	6.48%	5.88%

Source: Statistics Canada, 2006 Census

Ontario's Construction industry currently employs 362,450 people, 10.30% of which are employed throughout the Grand Erie, Hamilton and Niagara areas. This would suggest that the Construction industry is a fairly significant employer across these three Local Board areas.

Construction is the top ranked industry in these areas with over 8,500 employers as of June 2010⁴¹. Though the total number of businesses decreased from December 2003 to June 2010 by almost 400 employers, small-sized employers with five to nine employees experienced the most growth. A strong gain in small-sized employers may indicate promising entrepreneurial activity that could promote lasting growth in this industry.



the green economy and construction

As sustainable practice development shifts to the forefront of the sector, construction is increasingly focused on green building. Efficiency measures in the building sector include new green buildings as well as retrofitting and improving efficiency of individual building components, such as water heaters, cooking equipment, domestic appliances, electronic appliances, heating, ventilation and air conditioning systems and lighting. Not only does energy conservation help the environment and save money, it also creates new jobs; jobs for people who conduct audits to carry out retrofits, for those who install solar or geothermal equipment, and for those specializing in energy efficient construction⁴².

In Ontario, the launch of the Green Energy Act, 2009, is expected to raise the demand for green construction as this legislation compels firms to reassess their environmental footprint. The increased emphasis on meeting new requirements and standards such as the Green Roof Construction Standard in Toronto and Leadership in Energy and Environmental Design (LEED)⁴³ certification is expanding the need for green collar workers in the Construction industry. As of April 2009 Ontario had more LEED certified buildings than any other province with a total of 57⁴⁴.

Across the three Local Board areas there is a growing commitment to ensuring all buildings are energy efficient. In **Haldimand County**, many facilities have had energy audits, and improvements to the area's wastewater and water facilities are already underway. In the **Niagara** and **Hamilton** areas, financial incentives that encourage LEED building designs on all future developments have become a part of their economic strategies. In addition, Ontario is investing approximately \$100 million in what is likely one of the largest ever retrofits in North America, creating 1,000 new jobs and 455,000 square feet of state-of-the-art green office space. The retrofit began in the summer of 2009 and scheduled to be completed by spring 2011. While the exact number of jobs impacted by this shift towards green building construction cannot be confirmed, the national estimate is that energy-efficient building measures and municipal building retrofits will create 5,600 to 7,840 full time jobs throughout the country⁴⁵. Reflecting these new practices in building codes is having significant impact in the job market. In Australia, the BASIX (building sustainability index) is part of the building code and has generated thousands of jobs in the sustainable built environment sector.

key occupations

A total of 37,360 people are employed throughout the Construction industry across the Grand Erie, Hamilton and Niagara Local Board areas. Drawing on secondary sources and our employer survey, we developed a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. See the table below for employment numbers of the top green occupations across Grand Erie, Hamilton and Niagara.

Table 9: Top Green Occupation in Construction (NAICS 23)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
0711	Construction managers	240	715	580	1535	4.11%
7241	Electricians (except industrial and power system)	455	995	680	2130	5.70%
7251	Plumbers	215	490	395	1100	2.94%
7271	Carpenters	735	1500	1190	3425	9.17%
7291	Roofers and shinglers	225	520	400	1145	3.06%
7313	Refrigeration and air conditioning	210	400	305	915	2.45%
7411	Truck drivers	150	155	195	500	1.34%
7421	Heavy equipment operators (except crane)	250	360	415	1025	2.74%
7441	Residential and commercial installers and services	195	380	415	990	2.65%
7611	Construction trades helpers and labourers	1045	1925	1590	4560	12.21%
Total – All Occupations		7525	16500	13335	37360	--

Source: Statistics Canada, 2006 Census



skills transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest skills and transferability. The next table outlines the top occupations in Construction and matches them with occupations where skills transferability exists.

Table 10: Top Occupations in Construction (NAICS 23) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
0711	Construction managers	Management level occupation, internal progression though unit group is strong	
7241	Electricians (except industrial and power system)	No occupations were found where direct transfers exist; however occupations with significant overlap between the skills and knowledge required are: 7242 Industrial electricians 7243 Power system electricians	
7251	Plumbers	No occupations were found where direct transfers exist; however occupations with significant overlap between the skills and knowledge required are: 7252 Steamfitters, pipefitters and sprinkler system installers	
7271	Carpenters	None	
7291	Roofers and shinglers	None	
7313	Refrigeration and air conditioning	None	
7411	Truck drivers	None	
7421	Heavy equipment operators (except crane)	Low skilled occupations, internal progression is strong	
7441	Residential and commercial installers and services	Low skilled occupations, internal progression is strong	
7611	Construction trades helpers and labourers	Low skilled occupation, internal progression is strong	

educational programs and certifications

The transferability of a traditional Construction occupation to a green collar occupation often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Construction industry are:

- Architectural Science
- Architectural Technician/Technology
- Building Renovation Technician/Technology
- Building Construction Technician
- Carpentry Construction Techniques
- Civil Engineering
- Construction Science and Management
- Construction Engineering Technician/Technology
- Environmental Engineering Science Certificate
- Geographic Analysis
- Plumbing
- Sustainable Building Design and Construction
- Sustainable Energy and Building Technology

employer spotlight

Neil Kromhout is founder and CEO of EnerMin Solutions, a construction company based in Dunnville. The company began by specializing in building energy efficient and healthy buildings. Neil spent 30 years working in construction – roofing, framing, sheet metal and more – before launching his dream company in March, 2008. In March 2010 the company expanded into the renewable energy sector, another area that had interested Neil for many years.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: Our company was born out of the drive to save customers money by saving energy. A 2,000 square foot home will cost about \$5,000 more to build in a way that saves energy, but you will save that back in less than five years.

One focus we will be looking at later on this year is a program we will offer building owners, whereby we will do a complete retrofit on the building. They continue to pay the utility bills at the pre renovation benchmark but to us, and we pay the new bill on their behalf. The difference is use to pay off the retrofit costs plus interest and management.

One change we expect to see is a bigger and more receptive client base. Our focus is on saving our clients money over the long term – and everyone wants to save money. That's the easy sell when it comes to going green.

The most common question we have when talking to people about the solar electric systems is "How do I get rid of my hydro bill?" People are getting desperate to cut that unpredictable expense out of their budget. This is so common that we are preparing new products lines that will not only address this issue of power consumption for the homeowner, but also business, industry and even the public sector.

Q: How will the shift towards a green economy impact employment in your sector?

A: We are going to be hiring a lot of people. We'll be looking for basic knowledge, skills and abilities, but from there we'll have to do a lot of in-house training to familiarize them with the newer concepts and techniques, which are not very commonplace. Working with solar modules, for example, looks easy, but they can be deadly if you don't know what you're doing. Currently there are limited teaching resources for some of the technology that we work with. Therefore some of the training will be done in-house.

Q: Why the emphasis on in-house training? Doesn't education cover these things?

A: Right now we're not seeing enough training in the schools. I'm working with Niagara College on a program for renewable energy technician, however, some areas won't be covered that we need to address for our own staff. Every product we use is relatively unknown in the market.

In construction, traditional methods are having to be put aside. Jobs such as an insulator – someone who goes in and stuffs batt insulation into the walls – I see that job going by the wayside. Insulation will actually happen when the framer builds the structure. When I frame a building, insulation and vapour barrier and structure are all in one.

Q: What does it take to work in this sector as a Green Collar worker?

A: It takes a desire to learn, and an ability to think like air and water. If you can figure out how to keep air and water out of where you don't want them, you've got the job beat!

The manufacturing sector hasn't kept up with standards they used to have, especially when it comes to lumber. Often the new stuff is stored outside and goes into your home soaking wet. When I was framing we were putting lumber into homes that already had mold growing on it. There are standards for the quality of lumber, but no standards on mold. We want to raise the standard and ensure people have well-built, healthy and energy efficient homes.

Regarding the desire to learn: When I was framing, I took guys who barely knew which end of the hammer to use, but who had the desire to learn. And I taught them. I'll give someone like that a chance over someone who thinks they know it all.

Q: What are your hiring challenges?

A: Right now we're not in a position where we're hiring, but I can foresee challenges to get the knowledge, skills and abilities that we need. We're very particular about how a person interacts, not only with the interviewer but with the whole desire to learn and willingness to adapt. We use a standardized test that really digs deep into a person's skills, abilities, knowledge, strengths, and weaknesses.

The old way of hiring – where you get a number, you're told what your job is, and that's what you do – is gone, just like traditional advertising and traditional management styles are gone. They're archaic.

When you become an employee now, you become part of this family. If there's a need in this family, guess what? You're expected to step over and help out. You'll need to be challenged. And the idea of family goes both ways. If you've got a problem at home, my door is open. Come and see me. If you need an extra day off, let's talk, and we'll get someone else in the family to step in.

Q: Any advice for job seekers wanting to work in this sector?

A: Embrace the new technologies. It's the one thing I can't stress enough. The old ways are exactly that – the old ways. Otherwise we will continue to have inefficient, sick homes.

Know the company you are applying to. And if you really want to work and be effective in being green, you need to understand what's out there.

This is a great opportunity to make a difference. If job seekers are looking for companies that are green, companies will have no choice but to go green as well. Job seekers can literally affect the company they're going to work for. Some think they'll have to conform to the company (and honestly I did the same thing), but it comes down to your principles, ideals and ethics. If you hold true to yourself, you hold those employers to a higher standard.

Manufacturing (NAICS 31–33)

industry overview

This sector comprises establishments primarily engaged in the physical or chemical transformation of materials or substances into new products. These products may be finished, in the sense that they are ready to be used or consumed, or semi-finished, in the sense of becoming a raw material for an establishment to use in further manufacturing. Related activities such as assembling the component parts of manufacturing goods, blending materials, and finishing manufactured products by dyeing, heat-treating or plating are also treated as manufacturing activities. Manufacturing companies are known by a variety of trade designations, such as plants, factories or mills. The main sub-sectors within the Manufacturing industry are:

- Food Manufacturing (NAICS 311)
- Beverage and Tobacco Product Manufacturing (NAICS 312)
- Textile Product Mills (NAICS 314)
- Clothing Manufacturing (NAICS 315)
- Leather and Allied Product Manufacturing (NAICS 316)
- Wood Product Manufacturing (NAICS 321)
- Paper Manufacturing (NAICS 322)
- Printing and Related Support Activities
- Petroleum and Coal Product Manufacturing (NAICS 324)
- Chemical Manufacturing (NAICS 325)
- Plastics and Rubber Products Manufacturing
- (NAICS 326)
- Non-Metallic Mineral Product Manufacturing (NAICS 327)
- Primary Metal Manufacturing (NAICS 331)
- Fabricated Metal Product Manufacturing (NAICS 332)
- Machinery Manufacturing (NAICS 333)
- Computer and Electronic Product Manufacturing (NAICS 334)
- Electrical Equipment, Appliance and Component Manufacturing (NAICS 335)
- Transportation Equipment Manufacturing (NAICS 336)
- Furniture and Related Manufacturing (NAICS 337)

Examples of green activities within these subsectors include:

- Organic Certified Food
- Paper Products Made from Recycled Inputs
- Use of Recovered Scrap Metals in Metal Manufacturing
- Clean Technology Products
- Modifying Manufacturing Process to Lessen Environmental Impact
- Manufacturing using local resources for regional distribution



industry presence

Manufacturing is a relatively larger industry than most in terms of number of employers and number of people employed. In 2006, a total of 93,055 people were employed in this industry across the Grand Erie, Hamilton and Niagara Local Board areas, accounting for 16.14% of the total workforce, compared to 13.86% across Ontario. The table below shows the respective numbers in each of the three regions.

Table 11: Number of People Employed in Manufacturing (NAICS 31-33)

	Grand Erie	Hamilton	Niagara	Total	Ontario
Manufacturing (NAICS 31-33)	24040	40395	28620	93055	854380
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in industry	20.37%	16.40%	13.48%	16.14%	13.86%

Source: Statistics Canada, 2006 Census

Ontario's Manufacturing sector employs 854,830 people, 16.14% of which are in the Grand Erie, Hamilton and Niagara areas. This suggests that Manufacturing is very important in these areas. The industry has seen severe losses in the past two decades and more rapid losses in the past two years. Canadian Business Patterns data from December 2003 and June 2010⁴⁷ reveals a 50% decrease in large sized employers across this economic region. The Grand Erie, Hamilton and Niagara areas have experienced a total loss of 511 employers over the same period. Despite the severe losses, Manufacturing is still a vital component of Ontario's economy. The transition from traditional manufacturing to green manufacturing is expected to create more opportunity across various occupations.

the green economy and manufacturing

The Manufacturing industry in Ontario is well situated to serve major Canadian and U.S. markets and has become one of Ontario's top industries. In fact, Ontario has the second highest number of manufacturing employees of any jurisdiction in North America after California⁴⁸. While the economic crisis of 2008 had a severe impact on the manufacturing industry, emerging Manufacturing sectors related to the green economy are growing.

As an example, in recent years manufacturers of clean energy products are appearing all across Ontario, creating new opportunities for green collar workers. In Kingston, the building of a \$500 million solar module manufacturing plant is expected to create over 1,200 green jobs. In Windsor and Tillsonburg, Ontario, Samsung C&T Corporation recently announced plans to open a wind turbine factory, which will create 600 direct manufacturing jobs⁴⁹. Even closer, JNE Consulting and Chinese company Daqo Co. Ltd. have partnered in a joint \$5-million project to construct a solar assembly plant in the **Hamilton** area over the next two to three years. This project is expected to bring up to 300 new manufacturing jobs to Hamilton⁵⁰.

As the current economy shifts towards greater sustainability, manufacturing may be the industry most affected by the emergence of green practices. Jobs specific to the Manufacturing industry will demand the transformation of skills sets as green demands redefine job requirements. Manufacturing plants that are going green are creating new demand for managers, engineers, labourers, operators and material handlers who are green specialists. The shift is also generating indirect jobs. For example, an increase in alternative energy such as wind energy has an impact on the demand for the manufacture of wind turbines. Producing a wind turbine tower requires about 8,000 parts, the manufacturing of which creates demand for trades' workers and manufacturers knowledgeable about the latest green manufacturing⁵¹ processes.



key occupations

Across the Grand Erie, Hamilton and Niagara Local Board areas a total of 93,055 people work in Manufacturing. Drawing on secondary sources and our employer survey, we created a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. While these occupations will appear very traditional, it is important to recognize that occupations will experience transitioning and introduction to new occupations as this emerging sector continues to be introduced across local economies. See the table below for employment numbers of the top green occupations across Grand Erie, Hamilton and Niagara.

Table 12: Top Green Occupation in Manufacturing (NAICS 31-33)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
0911	Manufacturing managers	695	1270	965	2930	3.15%
1471	Shippers and receivers	585	800	400	1785	1.92%
2263	Health and safety inspectors	50	80	60	190	0.20%
7231	Machinists and machining and tooling inspectors	625	1140	1005	2770	2.98%
7242	Industrial electricians	260	815	545	1620	1.74%
7265	Welders and related machine operators	1080	1720	1220	4020	4.32%
7311	Construction millwrights and industrial mechanics (except textile)	1155	1310	845	3310	3.56%
7452	Material handlers	770	990	750	2510	2.70%
9461	Process control and machine operators, food and beverage processing	385	735	560	1680	1.81%
9482	Motor vehicle	1475	1415	2000	4890	5.25%
9511	Machining tool operators	430	760	875	2065	2.22%
Total – All Occupations		24040	40395	28620	93055	--

Source: Statistics Canada, 2006 Census



skills transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest skills transferability. The next table outlines the top occupations in Manufacturing and matches them with occupations where skills transferability exists.

Table 13: Top Occupations in Manufacturing (NAICS 31-33) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
0911	Manufacturing managers	Management level occupation, internal progression though unit group is strong	
1471	Shippers and receivers	Low skilled occupation, internal progression is strong	
2263	Health and safety inspector	Very heterogeneous; discipline specific	
7231	Machinists and machining and tooling inspectors	7316	Machine fitters
7242	Industrial electricians	No occupations were found where direct transfers exist; however occupations with significant overlap between the skills and knowledge required are: 7242 Industrial electricians 7243 Power system electricians	
7265	Welders and related machine operators	None	
7311	Construction millwrights and industries mechanics (except textile)	7316	Machine fitters
7452	Material handlers	Low skilled occupation, internal progression is strong	
9461	Process control and machine operators, food and beverage processing	Low skilled occupation, internal progression is strong	
9482	Motor vehicle assemblers, inspectors and testers	Low skilled occupation, internal progression is strong	
9511	Machining tool operators	Low skilled occupation, internal progression is strong	

educational programs and certifications

The transferability of a traditional Manufacturing occupation to a green collar occupation often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Manufacturing industry are:

- Industrial Mechanic Millwright
- Manufacturing Engineering Technician
- Material Engineering
- Mechanical Engineering
- Mechanical Engineering Technician/Technology – Design and Drafting
- Mechanical Technicians – CAD/CAM
- Quality Assurance – Manufacturing and Management
- Welding and Fabrication Technician
- Woodworking Manufacturing Management

employer spotlight

Andy McFarlane is Plant Manager at Jervis B. Webb company of Canada Ltd. in Hamilton. The company is part of a global enterprise that manufactures durable material handling systems, including Automatic Guided Vehicles (AGVs), conveyors, baggage handling systems and Automated Storage and Retrieval Systems.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: Jervis B. Webb led a Green Economy Initiative, launched in late 2008, intended to assess how sectors – such as renewable energies, clean and efficient technologies, water services and a sustainable recycling program – can contribute to our economic growth, and sustainability. The economic crisis was a grave concern that affected our automotive customers and indirectly impacted us negatively. Nevertheless, like all moments of crisis, it has led to an opportunity for innovation and creativity.

Jervis B. Webb's guiding criteria for going green are to encourage conservation of our natural resources, invest in renewable energy and energy efficiency, improve our carbon footprint, and protect our environment.

Q: How will the shift towards a green economy impact employment in your sector?

A: The shift will create jobs in several areas of manufacturing:

- Engineering and research
- Scientific retooling for production of green products, such as electric cars and other substitutes for non-biodegradable products
- Construction companies will have to widely expand their operations because of global demands to have the homes, buildings and establishments installed with fuel-efficient devices
- Wind and solar power generation will become the alternative to energy created by burning fossil fuel

Q: What does it take to work in this sector as a Green Collar worker?

A: Skills and education will have to be transferable and applied more to creativity and innovation. Managers, supervisors, office workers, designers, engineers, welders and fitters, installers, electricians, technicians, and other workers are going to require special green skills to promote renewable energy, biocircle environmental solutions, conservation and recycling.

Q: What are your hiring challenges?

A: There is a lack of personnel experience and awareness as Green Technology slowly develops. Our green economy workforce study revealed industry is experiencing significant workforce issues. In Ontario 71% have difficulty recruiting employees with adequate skills and work experience.

Q: Any advice for job seekers wanting to work in this sector?

A: It will take time for this industry to determine exactly what set of successful skills will be needed. However, it is important for employees to use qualifications not only from education, work experience and training, but from an attitude that will demonstrate great work ethic, creativity, determination, hard work, and commitment. Whether the job is committed to design, labour or management tasks, it is vital as well that the workers have the capability to think and provide advanced, innovative thinking.



Administration and Support, Waste Management and Remediation Services (NAICS 56)

industry overview

The Administration and Support, Waste Management and Remediation Services industry is comprised of two different types of establishments: those primarily engaged in activities that support the day-to-day operations of other organizations, and those primarily engaged in waste management. The emerging green economy brings an emphasis on sustainable waste management. Those establishments within the waste management sector are engaged in the collection, treatment and disposal of waste material, the operation of material recovery facilities, the remediation of polluted sites and the cleaning of septic tanks⁵². The main sub-sectors of this industry include:

- Administrative and Support Services (NAICS 561)
- Waste Management and Remediation Services (NAICS 562)

Examples of green activities within this industry include:

- Pollution Mitigation, Control and Remediation
- Waste Management, Reduction and Recycling
- Environmental Consulting
- Energy Efficient Landscaping
- Janitorial, Landscaping, Other Services

industry presence

Across the Grand Erie, Hamilton and Niagara areas, this industry employs 27,885 people, 4.84% of the total workforce, compared to 4.66% across Ontario. The table below shows the respective numbers in each of the three regions.

Table 14: Number of People Employed in Administration and Support, Waste Management and Remediation Services (NAICS 56)

	Grand Erie	Hamilton	Niagara	Total	Ontario
Administration and Support, Waste Management and Remediation Services (NAICS 56)	5485	11390	11010	27885	286960
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in industry	4.65%	4.62%	5.19%	4.84%	4.66%

Source: Statistics Canada, 2006 Census

There are 286,960 people employed in the Administration and Support, Waste Management and Remediation Services industry across Ontario, 9.72% of which are employed throughout Grand Erie, Hamilton and Niagara. The industry is a fairly significant employer across these three areas.

While the total number of businesses in the Administration and Support, Waste Management and Remediation Services industry decreased from December 2003 to June 2010, there was an increase in small sized (1-19) and large size (100 – 500+) employers. Despite the overall decline, there appears to be much opportunity as this industry transitions into the green economy. The emerging pattern is one of reducing size of companies and increasing diversity. This is completely an indication of a more sustainable workforce.



the **green** economy and administration and support, waste management and remediation services

A key component of Ontario's green transformation relies on its ability to move beyond landfills and towards waste recovery and recycling. The renewed focus on eliminating waste rather than managing it stands to create many job opportunities. When discarded materials are collected with skill and care, and upgraded with quality in mind, the materials become a local resource that can contribute to local revenue, job creation, business expansion and the local economic base⁵³. The Administrative and Support, Waste Management and Remediation Services industry offers many respectable career options that promote environmental health and protection.

A recent study on employment within the waste management industry suggests that over the next three years there will be an annual growth of 6%, with 80% of new positions comprised of labourers (45%) and operators (35%)⁵⁴. The growing need for qualified workers is echoed in the water/wastewater division of this industry as well. Current studies suggests that turnover in water/wastewater treatment facilities has nearly doubled to that of the solid waste facilities. Most often employers reveal difficulties in retaining workers at the intermediate experience level⁵⁵, such as facility managers, laboratory supervisors and experienced operators. Again, the shortage of qualified operators can be found in each of these sub-sectors which suggest increased demand for these positions.

Another important aspect of greening this industry is the introduction of soil remediation through Brownsfield Redevelopment initiatives. "Brownfields" have been defined as abandoned, idled or underused industrial or commercial properties that have been complicated by real or perceived environmental contamination, building deterioration and/or inadequate infrastructure. Recognizing that the City of Hamilton is one of the oldest and most heavily industrialized cities in Canada, the opportunity to reinvest environmentally inadequate spaces has become a priority for Hamilton. In fact, Hamilton has been acknowledged as a leader in brownfields for their proactive response to cleaning up former industrial lands with the Environmental Remediation and site Enhancement (ERASE) and Brownfield Community Improvement Plan (CIP). The three largest cities in Niagara - Welland, Niagara Falls and St. Catharines - all have Brownfield CIP programs.

The three Local Board areas are producing considerable research to further develop the waste management and remediation services industry. Strong institutional expertise at the National Water Research Institute, Wastewater Technology Centre, Canadian Water Network and Great Lakes Institute for Environmental Research provide a strong foundation for this industry to flourish. From an economic development perspective, the strong research base may attract more companies to the area offering further opportunities to the local labour force.

As stated in the previous section, the overall change across the economic region from 2003 to 2010 in the Administrative and Support, Waste Management and Remediation Services industry revealed a decline in the total number of business⁵⁶. This was largely due to firms in the administrative and support services, however, while the waste management and remediation services sub-sector reports a growth of over 25 businesses during the same time period. Opportunities for employment in this industry are expected to grow as an increased value is placed on recycling, reducing and reusing our current materials.



key occupations

A total of 27, 885 people are employed in the Administrative and Support, Waste Management and Remediation Services industry across the Grand Erie, Hamilton and Niagara Local Board areas. Drawing on secondary sources and our employer survey, we created a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. See the table below for employment numbers of the top green occupations across the Grand Erie, Hamilton and Niagara.

Table 15: Top Green Occupation in Administration and Support, Waste Management and Remediation Services industry (NAICS 56)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
0114	Other administrative service managers	25	30	95	150	0.54%
0611	Sales, marketing and advertising managers	30	90	50	170	0.61%
0721	Facility Operation and Maintenance Managers	10	20	25	55	0.20%
1453	Customer service, information and related clerks	275	355	1895	2525	9.06%
1475	Dispatchers and radio operators	0	40	55	95	0.34%
2211	Chemical Technologists and Technicians	0	25	10	35	0.13%
4131	College and other vocational instructors	20	20	35	75	0.27%
6421	Retail salespersons and sales clerks	95	165	135	395	1.42%
7321	Automotive service technicians, truck and bus mechanics and mechanical repairers	10	10	30	50	0.18%
7411	Truck drivers	145	240	230	615	2.21%
7452	Material handlers	170	210	115	495	1.78%
7621	Public works and maintenance labourers	35	125	90	250	0.90%
9482	Motor vehicle assemblers, inspectors and testers	30	30	70	130	0.47%
Total – All Occupations		5485	11390	11010	27885	--

Source: Statistics Canada, 2006 Census

skills transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest skills transferability. The next table outlines the top occupations in Administrative and Support, Waste Management and Remediation Services and matches them with occupations where skills transferability exists.



Table 16: Top Occupations in Administration and Support, Waste Management and Remediation Services industry (NAICS 56) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
0114	Other administrative service managers	Management level occupation, internal progression though unit group is strong	
0611	Sales, marketing and advertising managers	Management level occupation, internal progression though unit group is strong	
0721	Facility operation and maintenance managers	Management level occupation, internal progression though unit group is strong	
1453	Customer service, information and related clerks	Low skilled occupation, internal progression is strong	
1475	Dispatchers and radio operators	Low skilled occupation, internal progression is strong	
2211	Chemical technologists and technicians	No occupations were found where direct transfers exist; however these occupations are related but may require further education: 2112 Chemists 2134 Chemical engineers 2142 Metallurgical and materials engineers 2145 Petroleum engineers 3131 Pharmacists	
4131	College and other vocational instructors	Highly specialized – no mobility within unit group	
6421	Retail salespersons and sales clerks	Low skilled occupation, internal progression is strong	
7321	Automotive service technicians, truck and bus mechanics and mechanical repairers	7316	Machine fitters
7411	Truck drivers	Low skilled occupation, internal progression is strong	
7452	Material handlers	Low skilled occupation, internal progression is strong	
7621	Public works and maintenance labourers	Low skilled occupation, internal progression is strong	
9482	Motor vehicle assemblers, inspectors and testers	7316	Machine fitters

educational programs and certifications

The transferability of a traditional occupation in the Administration and Support, Waste Management and Remediation Services industry to a green collar occupation often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Administration and Support, Waste Management and Remediation Services industry are:

- Business Operations
- Civil Engineering – Water and Waste Water
- Chemical Engineering Technician/Technology
- Environmental Technician – Waster and Waste Systems Operations
- Water and Waste Water Technician

employer spotlight

Chris Rogers is President of Corporate Chemicals & Equipment, a St. Catharines based, 31-year-old company with the tagline: “The nice guys with cleaning supplies.” Since he took over from his father Cecil in 2005, his focus has been on providing environmentally safe products that are not only recycled but also continually recyclable. His move towards a greener company not only reflects a social trend – it’s also very personal.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: I had my biggest epiphany “aha” moment when, about 10 years ago, my father got lymphatic cancer. He had been in the industry since age 18. My father had been around vats of chemicals all his life, so I thought there must be something to it. I started looking into the chemistry and it was frightening. I was born into this industry and started working in it right out of university.

Because we’re a chemical company, the shift to a green economy affects the way we choose our products, first and foremost. It also affects the way we get them to market – and post consumer content is obviously essential to us. Currently, over 97% of our paper and plastic products are created from post consumer recycled products.

Any products we do make have fairly transparent formulations; I don’t believe in products where they try to hide trade secrets. There are a couple of things that have been a concern lately, like Nonyl Phenol Ethoxylate (estrogen disruptors found in products as simple as dish soap, hand soap and shampoo, that have endless health repercussions). Those were banned a few years ago, and it made us reevaluate a lot of our chemistry.

One challenge is that even if the economy is going green, it doesn’t necessarily mean the clientele is. Some are a lot less interested if it means paying more.

Q: How will the shift towards a green economy impact employment in your sector?

A: I can see things getting more specialized. We may not see a massive change in the number of employees, however the smarter companies that are adopting this ‘green’ logic are certainly more prone to success.

Knowledge is absolutely king. Here’s the reality: When my dad owned this company 25 years ago he had six employees, and none of them had a university degree. Now I have 15 employees, nine with a degree. Are any of the degrees relevant to what we do? Not a single one of them. I’m not saying a degree has absolute relevance, but it takes smart cookies to absorb knowledge. Our tests here involve PSA (sales or personality) tests, which I find essential to pass. Industry has become more high tech.

I would say that as my company builds I will probably hire more people with relevant degrees, such as chemistry. Also, certain certifications are a big benefit to us. One that’s fairly new is the Certified Green Housekeeping program, which is actually a way to teach your employees how to make your building greener. And there are certifications from the Canadian Sanitary Suppliers’ Association, the Worldwide Cleaning Industry Association (ISSA) and others.

Q: What does it take to work in this sector as a Green Collar worker?

A: Sheer interest. Anybody that participates with us has a massive love for green. You don’t have to be a complete tree hugger, but it has to be a complete commitment to green. Since I purchased the company that has been a focus.

Q: What are your hiring challenges?

A: Hiring is less a challenge now than it has ever been, and that is economy based more than anything. We have the same issues all small companies have, which is being able to pay as much as a large company will pay. One of our biggest hiring challenges is trying to compete against school boards. Public enterprise (government) pays almost double, on average, than we can. That has always been the case for small business.

Surprisingly, this hasn’t affected our employee retention. We’ve been fortunate, maybe in part because we treat people with respect and give them the esteem they deserve.

Q: Any advice for job seekers wanting to work in this sector?

A: Research and knowledge. I say this to everybody: Google and Wikipedia are your friends. Research as much as you can about your potential employer. We love what we do, and when people show a valid interest in what we do, it says a whole lot.

Transportation and Warehousing (NAICS 48-49)

industry overview

This sector is comprised of businesses primarily engaged in transporting passengers and goods, warehousing and storing goods, and providing services to these establishments. The modes of transportation are road (trucking, transit and ground passenger), rail, water, air and pipeline. These are further subdivided according to how businesses in each mode organize their establishments. National post office and courier establishments, which also transport goods, are included in this sector. Warehousing and storage establishments are subdivided according to the type of service and facility⁵⁷. The main subsectors of Transportation and Warehousing include:

- Water Transportation (NAICS 483)
- Truck Transportation (NAICS 484)
- Transit and Ground Passenger Transportation (NAICS 485)
- Scenic and Sightseeing Transportation (NAICS 487)

Examples of green activities within these subsectors include:

- Transportation of Waste
- Use of Flex- or Bio-Fuels
- Mass Transit (Public Transportation)
- Specialized Freight Transportation for Wind Turbine Blades & Towers

industry presence

In 2006, the Transportation and Warehousing industry employed 27,610 people across the Grand Erie, Hamilton and Niagara areas, accounting for 4.79% of the total workforce as compared to 4.82% across Ontario. The table below shows the respective numbers in each of the three regions.

Table 17: Number of People Employed in Transportation and Warehousing

	Grand Erie	Hamilton	Niagara	Total	Ontario
Transportation and Warehousing (NAICS 48-49)	6305	11250	10055	27610	297255
Total people employed across all industries	118005	246340	212245	576590	6164245
% employed in industry	5.34%	4.57%	4.74%	4.79%	4.82%

Source: Statistics Canada, 2006 Census

In total, 297,255 people are employed in the Transportation and Warehousing industry across Ontario, 9.29% in Grand Erie, Hamilton and Niagara. This suggests the Transportation and Warehousing is a significant employer across these three Local Board areas.

Across the Grand Erie, Hamilton and Niagara areas, the Transportation and Warehousing industry grew by 564 employers from December 2003 to June 2010, an increase of 17.94% from 2003. The largest growth occurred in the indeterminate employer size, most likely representing the opening of many individually owned transportation businesses. All employers in the small size category saw an increase over the same period. A strong gain in small sized employers may indicate promising entrepreneurial activity that could promote lasting growth in this industry.



the **green** economy and transportation and warehousing

Transportation has become a key component in our daily lives. In 2007 Canada reported over 745,000 kilotonnes of greenhouse gas (GHG) emissions; 26% of which is due to transportation⁵⁸. Our growing dependence and the emergence of the green economy requires communities to re-evaluate how we commute. A greater emphasis on sustainable transportation systems which focus on reducing emissions and fossil fuel consumption, and minimizing the consumption of agricultural land, park and land and wildlife habitat is vital to future sustainability.

Ground transportation accounts for a large portion of the operations in the Transportation and Warehousing industry. Producing more fuel-efficient vehicles is the most immediate way to reduce environmental impacts⁵⁹. In **Hamilton**, local initiatives to minimize emissions include the introduction of the largest hybrid municipal fleets in Canada and an anti-idling law to help make the city's air cleaner⁶⁰. The increase in fuel-efficient transportation will have an indirect and direct impact on jobs across many industries. For example, increased demand for hybrid vehicles will require growth in manufacturing but also service occupations such as automotive service technicians, and truck and coach mechanics to maintain these new vehicles. Additionally, communities across the province have begun implementing a car sharing cooperative, where people are rewarded for taking older high-polluting cars off the road.

Marine transportation is another form of transportation important to the green economy. Research has shown that a single ship can transport the same amount of merchandise as 870 trucks⁶¹. Recognizing the strength in marine transportation, the **Grand Erie, Hamilton** and **Niagara** areas have expressed a commitment to increased marine transportation with their membership in the H20 HWY. Highway H20 is a 3,700 kilometre marine highway that offers shippers direct access to the commercial, industrial and agricultural heartland of North America⁶². Recent studies suggest the marine industry will have to replace upwards of 50% of its current workforce due to retirement alone⁶³. As the Transportation and Warehousing industry embraces the changing economy, many opportunities are available to those interested in the marine industry.

As previously mentioned, the emissions reported in 2007 are simply unacceptable to an economy that transitions to more sustainable practices. The changing perspectives on ground and marine transportation, the introduction of hybrid vehicles, smart logistics software and telecommuting suggest hope for a greener Transportation and Warehousing industry in Canada. While the employment impact of this shift is unclear, there will be an estimated 24,000 or more environmental employees in the Utilities and Transportation and Warehousing industries in Canada by 2011, an increase of 1.1% from 2006⁶⁴.



key occupations

A total of 27,610 people are employed in the Transportation and Warehousing industry across the Grand Erie, Hamilton and Niagara Local Board areas. Drawing on secondary sources and our employer survey, we created a list of the top green occupations. 2006 Census data released by Statistics Canada reveals the total number of people working in each occupation. See the table below for employment numbers of the top green occupations across the Grand Erie, Hamilton and Niagara.

Table 18: Top Green Occupation in Transportation and Warehousing (NAICS 48-49)

NOC	Occupation	Grand Erie	Hamilton	Niagara	Total	% of Total
0611	Sales, marketing and advertising managers	50	50	70	170	0.62%
0713	Transportation managers	90	295	225	610	2.21%
1471	Shippers and receivers	45	165	65	275	1.00%
1475	Dispatchers and radio operators	195	315	245	755	2.73%
6421	Retail salespersons and sales clerks	30	105	95	230	0.83%
7321	Automotive service technicians, truck and bus mechanics and mechanical services	160	270	200	630	2.28%
7411	Truck drivers	2720	2775	2855	8350	30.24%
7412	Bus drivers and subway and other transit operators	605	940	1070	2615	9.47%
7452	Material handlers	195	515	225	935	3.39%
7611	Construction trades helpers and labourers	15	10	105	130	0.47%
Total – All Occupations		6305	11250	10055	27610	--

Source: Statistics Canada, 2006 Census

skills transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest skills transferability. The next table outlines the top occupations in Transportation and Warehousing and matches them with occupations where skills transferability exists.

Table 19: Top Occupations in Transportation and Warehousing (NAICS 48-49) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
NOC	Occupational Title	NOC	Occupational Title
0611	Sales, marketing and advertising managers	Management level occupation, internal progression though unit group is strong	
0713	Transportation managers	Management level occupation, internal progression though unit group is strong	
1471	Shippers and receivers	Low skilled occupation, internal progression is strong	
1475	Dispatchers and radio operators	Low skilled occupation, internal progression is strong	
6421	Retail salespersons and sales clerks	Low skilled occupation internal progression is strong	
7321	Automotive service technicians, truck and bus mechanics and mechanical services	7316	Machine fitters
7411	Truck drivers	Low skilled occupation internal progression is strong	
7412	Bus drivers and subway and other transit operators	Low skilled occupation internal progression is strong	
7452	Material handlers	Low skilled occupation internal progression is strong	
7611	Construction trades helpers and labourers	Low skilled occupation internal progression is strong	
0611	Sales, marketing and advertising managers	Management level occupation, internal progression though unit group is strong	

educational programs and certifications

The transferability of a traditional occupation in the Transportation and Warehousing industry to a green collar occupation often requires the completion of a degree, diploma or certification program.

Education programs and certifications that relate specifically to the Transportation and Warehousing industry are:

- Civil Engineering
- Heavy Duty Equipment / Truck and Transport Repair
- International Transportation and Customs
- Operations and Transportation Management
- Pupil Transportation Management
- Transportation Engineering Technology
- Transportation Logistics
- Truck Driver Training

employer spotlight

Niagara District is a municipal airport located within the Niagara-on-the-Lake boundaries and financially supported by its three surrounding municipalities - Niagara Falls, St Catharines, and Niagara-on-the-Lake. Over a hundred aircraft are based there, and this small airport is going green in a big way. Airport Manager Kenn Moody describes how the new economy is affecting his corner of the transportation sector.

Q: The move towards a green economy is making many businesses re-evaluate their operations. How has this shift impacted your company?

A: We're really quite a small operation here, so I'd say the move hasn't had a big impact on us on the operational side. The shift is occurring in the planning and development side. We have spent a fair bit of time on infrastructure renewal here. What we did was environmentally sound, making the smallest draw from energy resources and, generally, coinciding with the values of the community.

For example, we decided we would ask that our new terminal building be designed to meet Leadership in Energy and Environmental Design (LEEDS) standards. And while we're not going for certification, we are pretty close to the edge of the standard. We looked at light filtering technology (which helps with heating) – relatively new in the sector – and installed that. At the airport itself, one of our runways was completely pulverized, and we re-milled and reused much of the asphalt around the airport. We are also installing a new technology for runway edge lighting. The lights will be LED instead of incandescent and will save us about 90% on our nighttime electrical energy.

Q: How will the shift towards a green economy impact employment in your sector?

A: I have a staff of five and a half (I'm the half). So the shift will probably not impact airports of our size. But in larger airports, like in Hamilton or Toronto, you'll probably find that people are going to hire environmental expertise to make sure that best practices are environmentally sound.

Q: What does it take to work in this sector as a Green Collar worker?

A: A greater breadth of knowledge in the people we have now, or room for learning. We have to be aware of emerging technology and also, for that matter, the escalating prices of some of the resources we use.

Going back to the runway edge lighting, that will likely require some special training for my maintenance staff (probably added skills as opposed to a complete change in skill sets).

At the manager level, when I go about trying to replace myself, there will definitely be some questions on a competitive interview. Applicants should at least look at green technology a bit before they come into an interview, most importantly at the management level.

At our level, especially because we're a small operation, I tend to look for a breadth of skills. I need someone who's got some electrical background, some automotive and mechanical background, and someone able to observe and know what to do with wildlife control – a jack of all trades.

Q: What are your hiring challenges?

A: My maintenance supervisor is thinking of retiring in the fall, so I'll probably have to hire one. What I'm thinking of now is whether I need to go back to the job description and hiring requirements and rethink whether there's anything that might require green technology. I won't be surprised if I have to make some amendments.

Q: Any advice for job seekers wanting to work in this sector?

A: Be sensitive to the way the economy is changing, and in our own case, be sensitive to best practices at the airport. We don't want fuel spills. We need to know what's going to be done if we introduce aircraft deicing, which involves potentially hazardous substances.

section three | additional green industries

The industries selected in the Green Jobs Report represent industries of high importance across the three Local Board areas and show promise in the green economy. Through consultation with our advisory committees four additional industries were identified as having a significant impact on this economic region. Industries such as health care and educational services present fewer green practices than many other industries. However, both industries are involved in many research and development and sustainable development practices which promote a greener economy. Below you will find a brief summary of the industry presence across the Grand Erie, Hamilton and Niagara areas.

health care

Across the three Local Board areas health care is the second largest industry based on the total number of establishments as of June 2010. From December 2003 to June 2010, establishments in health care and social assistance (NAICS 62) increased by 865 businesses.

The impact of the shift towards a green economy is evident in both the Hamilton and Niagara areas. In January 2011 the Hamilton Community Health Care Centre will open its doors and become the largest and most energy efficient community health centre in the Province. The Niagara Health System has also committed to greener practices with the announcement of its \$12 million commitment to retrofit seven of its sites. When fully implemented the retrofits will have the same greenhouse gas reduction effect as taking nearly 1,000 vehicles off the road and will also save the hospital \$1.2 million annually⁶⁵.

education

The growing interest in green practices and sustainable development requires research universities to play a critical role in producing these solutions. Fortunately, the Grand Erie, Hamilton and Niagara areas are well equipped to address these matters with educational facilities such as Wilfrid Laurier University, Nipissing University, McMaster University, and Brock University prepared to assist in green research across this economic region. In addition, Mohawk College and Niagara College each have programs focused on green and renewable energy. In Hamilton, Hydro One and Mohawk College have partnered to ensure the necessary skills and employment opportunities are available to those working in the utilities industry.

There are a total of 39,750 people employed throughout the Educational Services industry across the Grand Erie, Hamilton and Niagara Local Board areas. With an increase of over 40 businesses from December 2003 to June 2010, this industry continues to show promising opportunities.

retail trade

While it is clear how industries such as utilities, construction and waste management contribute to the greening of our economy, the retail trade has a more indirect approach to greening the environment. Within the retail trade industry many environmentally friendly goods and services have been introduced in light of the growing green emphasis. An increase in consumer spending on these products could result in the “greening” of the retail industry. The number of individuals employed in environmental aspects of the Retail and Wholesale Trade sector is expected to reach over 51,000 across Canada by 2011, an increase of 2.1% from 2006.

According to June 2010 Canadian Business Patterns data, retail trade accounts for 10% of all businesses and employs 64,795 people across the Grand Erie, Hamilton and Niagara areas.

professional, scientific and technical services

This industry is extremely unique as it includes establishments primarily engaged in activities which human capital is the major input. Many businesses in this sector make available the knowledge and skills of their employees, often on an assignment basis. The individual industries of this sector are defined on the basis of the particular expertise and training of the service provider. In the green economy, architectural, engineering and related services, design services, scientific research and development services are all industries that will impact the growth of the green economy.

Across the three Local Board areas, there are 25,270 people employed in the Professional, Scientific and Technical Services industry. As of June 2010, there were a total of 6,688 businesses in operation. The largest concentration of employers is in the indeterminate category⁶⁶.



section four | green employer survey

To gain a greater understanding of the green economy, our methodology included a thorough literature review and analysis of the labour market data. From this research six key industry sectors were identified as being important in the green economy across the three regions. In an effort to include a local perspective on the emerging green economy, an online employer survey was distributed to selected employers across the three Local Board areas. The survey asked these employers to comment on their experience in the green economy, more specifically on green occupations, education and skills.

summary of responses

The survey was distributed across the three Local Board areas to selected employers and resulted in a total of 48 respondents, providing only a snapshot of the green economy in this economic region. We advise readers to use discretion when examining the results as this information may not be representative of the broader employer experience.

The following provides a brief summary of the responses collected.

- Over 66% of respondents to the green employer survey were Small to Medium Enterprises (SMEs), ranging from 1 to 49 employees. Indeterminate or owner-operated businesses are not represented.
- Over 60% of respondents have been in business for 25 years or more. Based on the responses well established businesses are more likely to “go green” than new businesses.
- 42% of businesses surveyed stated that commitment to improving environmental quality was the reason for going green.
- 23% of respondents also recognized an increased market demand in going green; with cost reduction and legal compliance being in the minority at 15% and 6% respectively.
- 46% of respondents identified in house training as the preferred method for training workers. In addition, 35% of respondents identified that upgrading and/or professional development training was also needed.

industry responses

With the help of our advisory committee members the green employer survey was distributed to selected employers (Appendix B) across the six industry sectors identified in this report. The following provides a summary of the employer responses from each of the six industry sectors.

Table 20: Green Employer Survey Responses Utilities (NAICS 22)

Reasons to “go green”	85% of respondents in the Utilities industry stated a commitment to improving environmental quality as the reason for going green Increased market demand, legal compliance and cost reduction also play a role in the decision to go green for these companies
Green occupations (listed in order of occurrence)	0912 Utilities managers 7352 Power systems and power station operators 2241 Electrical and electronics engineering technologists and technicians 7244 Electrical power line and cable workers 7243 Power system electricians 2131 Civil engineers 2232 Mechanical engineering technologists and technicians 1453 Customer service, information and related clerks 7265 Welders and related machine operators 2211 Chemical technologists and technicians 2233 Industrial engineering and manufacturing technologists and technicians 7421 Heavy equipment operators (except crane)
Additional green occupations provided by employers	7442 Water, gas and electrical installers 7219 Roof specialists 7611 General labour for installations 4161 Environmental specialists 2131 Environmental engineers 2132 Conservation managers 2132 Power generation specialists CDM administrators
Top technical skills identified by employers when hiring Green-Collar workers	Renewable energy industry experience Computer skills Project management experience Product knowledge and consumer friendly
Most challenging aspect(s) of finding qualified individuals with necessary training and education	This is a new and emerging field with shortage of experience individuals Ability to locate skilled workers is dependent on skill requirements
Level of education required for most Green-Collar jobs (listed in order of occurrence)	1. University and/or College 2. Apprenticeship 3. No post-secondary
Method used to develop the skills of existing workers (listed in order of occurrence)	Offer upgrading/professional development training Train in house

Table 21: Green Employer Survey Responses Agriculture, Forestry, Fishing and Hunting (NAICS 11)

Reasons to “go green”	<p>The majority of respondents in the Agriculture, Forestry and Hunting industry, a total of 33%, stated a commitment to improving environmental quality as the main reason for going green</p> <p>Cost reduction was second, at 25%, for the reason employers have chose to participate in the green economy</p>
Green occupations (listed in order of occurrence)	<p>8251 Farmers and farm managers</p> <p>1471 Shippers and receivers</p> <p>2123 Agricultural representatives, consultants and specialists</p> <p>6421 Retail salespersons and sales</p> <p>8253 Farm supervisors and specialized livestock workers</p> <p>7411 Truck drivers</p> <p>7452 Material handlers</p> <p>7265 Welders and related machine operators</p>
Additional green occupations provided by employers	N/A
Top technical skills identified by employers when hiring Green-Collar workers	<p>Product support/knowledge</p> <p>Familiarity with agriculture work environment</p> <p>Physical ability</p> <p>Communication, both written and oral</p> <p>Willingness to work</p> <p>Technical knowledge</p> <p>Engineering skills</p> <p>Ability to embrace and adapt to new ideas and circumstances</p> <p>Ability to think critically</p>
Most challenging aspect(s) of finding qualified individuals with necessary training and education	<p>Qualified people with experience</p> <p>Specialized product knowledge is required for seasonal work</p>
Level of education required for most Green-Collar jobs (listed in order of occurrence)	<p>1. No post-secondary</p> <p>2. University, College, and/or Apprenticeship</p>
Method used to develop the skills of existing workers (listed in order of occurrence):	<p>Train in house</p> <p>Offer upgrading/professional development training</p>



Table 22: Green Employer Survey Responses Construction (NAICS 23)

Reasons to “go green”	100% of respondents reported increase market demand as being the main reason for choosing to “go green”
Green occupations (listed in order of occurrence)	0711 Construction managers 7441 Residential and commercial installers and services
Additional green occupations provided by employers	N/A
Top technical skills identified by employers when hiring Green-Collar workers	LEED certification Electrical understanding (AC versus DC) Willingness to continue further education General construction experience
Most challenging aspect(s) of finding qualified individuals with necessary training and education	Training is limited Short supply of qualified individuals
Level of education required for most Green-Collar jobs (listed in order of occurrence)	None specified, however LEED certification is very important to Green-Collar jobs in this field
Method used to develop the skills of existing workers(listed in order of occurrence)	Train in house Offer upgrading/professional development training



Table 23: Green Employer Survey Responses Manufacturing (NAICS 31-33)

Reasons to “go green”	Over 40% of respondents in the Manufacturing industry reported commitment to improving environmental quality as being the main reason for “going green” Cost reduction and increased market demand are also significant reasons for this shift towards greener practices
Green occupations (listed in order of occurrence)	1471 Shippers and receivers 7452 Material handlers 7265 Welders and related machine operators 0911 Manufacturing managers 7231 Machinists and machining and tooling inspectors 9511 Machining tool operators 7311 Construction millwrights and industries mechanics (except textile) 7242 Industrial electricians 9461 Process control and machine operators, food and beverage processing 9482 Motor vehicle assemblers, inspectors and testers
Additional green occupations provided by employers	2133 Electrical technicians 2141 Quality engineers 2132 Mechanical Engineers
Top technical skills identified by employers when hiring Green-Collar workers	Technical skills Mechanical skills
Most challenging aspect(s) of finding qualified individuals with necessary training and education	Requires very specialized skill set making it difficult to hire Few people with necessary experience are available
Level of education required for most Green-Collar jobs(listed in order of occurrence)	1. Apprenticeship 2. University – Mechanical and Chemical Engineering 3. College
Method used to develop the skills of existing workers (listed in order of occurrence)	Train in house Offer upgrading/professional development training



Table 24: Green Employer Survey Responses Administration and Support, Waste Management and Remediation (NAICS 56)

Reasons to “go green”	Most respondents stated a commitment to improving environmental quality as the main reason for “going green”
Green occupations (listed in order of occurrence)	<p>7452 Material handlers</p> <p>1453 Customer service, information and related clerks</p> <p>0611 Sales, marketing and advertising managers</p> <p>0114 Other administrative service managers</p> <p>7411 Truck drivers</p> <p>6421 Retail salespersons and sales clerks</p> <p>1475 Dispatchers and radio operators</p> <p>9482 Motor vehicle assemblers, inspectors and testers</p>
Additional green occupations provided by employers	<p>2133 Electrical technicians</p> <p>2132 Mechanical Engineers</p>
Top technical skills identified by employers when hiring Green-Collar workers	<p>Industry knowledge</p> <p>Equipment experience</p> <p>Markets and commodities experience</p> <p>Willingness to learn</p> <p>Positive attitude</p>
Most challenging aspect(s) of finding qualified individuals with necessary training and education	Requires very specialized skill set making it difficult to hire
Level of education (listed in order of occurrence)	<p>1. College</p> <p>2. Apprenticeship</p>
Method used to develop the skills of existing workers (listed in order of occurrence)	<p>Train in house</p> <p>Offer upgrading/professional development train</p>



Table 25: Green Employer Survey Responses Transportation and Warehousing (NAICS 48-49)

Reasons to “go green”	<p>Over 30% of respondents reported a commitment to improving environmental quality as being the central reason for “going green”</p> <p>Employers also indicated cost reduction, legal compliance and increased market demand as reasons for going green</p>
Green occupations (listed in order of occurrence)	<p>7321 Automotive service technicians, truck and bus mechanics and mechanical repairers</p> <p>0611 Sales, marketing and advertising managers</p> <p>7611 Construction trades helpers and labourers</p> <p>7412 Bus drivers and subway and other transit operators</p>
Additional green occupations provided by employers	<p>Engineers – Civil, Mechanical, Electrical</p> <p>Electrical power instructors</p>
Top technical skills identified by employers when hiring Green-Collar workers	<p>Professional Engineering (P. Eng) licensing</p> <p>Waste and property conservation</p> <p>Experience in driving practices that reduce the use of fuel</p> <p>Ability to assess footprint reduction versus cost</p> <p>Knowledge of government regulations and incentives</p> <p>Knowledge of glass industry</p> <p>Driving behaviour</p>
Most challenging aspect(s) of finding qualified individuals with necessary training and education	<p>Green practices are still fairly new making it difficult to find qualified labour</p> <p>Lack of experience</p> <p>Immigrant cultures, trade seniority affect government assistance in education and implementation</p>
Level of education required for most Green-Collar jobs (listed in order of occurrence)	<ol style="list-style-type: none"> 1. University 2. Apprenticeship 3. College 4. No post-secondary
Method used to develop the skills of existing workers (listed in order of occurrence)	<p>Train in house</p> <p>Offer upgrading/professional development training</p>



section five | summary

The emerging green economy not only influences industries and their operations, but is having a remarkable effect on the labour market as well. While some jobs are being created, others are being eliminated or transformed as skills sets are redefined according to green demands.

As public policy now demands that employers take action, many are deeply concerned about hiring, training, re-training and retaining qualified people to fill emerging “green” jobs. Understanding how industries are impacted and the jobs that are required will allow for effective planning for the workforce demands associated with the green economy. The industries and occupations profiled in this report provide a snapshot of how the green movement is influencing our current economy across the Grand Erie, Hamilton, and Niagara economic region. To be successful in this transition, industries and job seekers must understand how occupations and skills sets will evolve as high-tech and service industries grow and manufacturers change. Conducting relevant research such as this on emerging occupations and trends is vital to meeting labour force demands. For Ontario to be a leader in the green economy, the demand for new jobs must be met with the necessary supply.

Across the Grand Erie, Hamilton and Niagara areas, change is already underway. The push towards a greener economy is now embedded in the economic and workforce strategies for future development. As new companies promoting clean technology products surface in the manufacturing sector, and a growing number of employers obtain LEED certification in the construction industry, these three Local Board areas are working hard to inform through research and local intelligence contributing to a sustainable future. Embracing clean technologies is no longer just an option for our communities but a necessity if we want to remain competitive in the international economy.

section six | appendix

appendix a | matrix of skills transferability

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
PROFESSIONAL – BUSINESS, FINANCE AND ADMINISTRATIVE OCCUPATIONS	
1111 Financial auditors and accountants	1221 Administrative officers 1225 Purchasing agents and officers 1231 Bookkeepers
1112 Financial and investment analysts	1122 Professional occupations in business services to management
1113 Securities agents, investment dealers and traders	
1114 Other financial officers	Very heterogeneous unit group, unable to identify transferability
1121 Specialists in human resources	1223 Personnel and recruitment officers
1122 Professional occupations in business services to management	
PROFESSIONAL — NATURAL AND APPLIED SCIENCES	
2111 Physicists and astronomers	2212 Geological and mineral technologists and technicians 2147 Computer engineers (except software engineers and designers)
2112 Chemists	2211 Chemical technologists and technicians 2212 Geological and mineral technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
2113 Geologists, geochemists and geophysicists	2212 Geological and mineral technologists and technicians
2114 Meteorologists	2213 Meteorological technicians
2115 Other professional occupations in physical sciences	Very heterogeneous unit group, unable to identify transferability
2121 Biologists and related scientists	2221 Biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
2122 Forestry professionals	2223 Forestry technologists and technicians
2123 Agricultural representatives, consultants and specialists	2221 Biological technologists and technicians
2131 Civil engineers	2154 Land surveyors 223 Technical occupations in civil, mechanical and industrial engineering 2251 Architectural technologists and technicians 2253 Drafting technologists and technicians 2254 Land Survey technologists and technicians
2132 Mechanical engineers	2141 Industrial and manufacturing engineers
2133 Electrical and electronics engineers	2147 Computer engineers (except software engineers and designers) 2241 Electrical and electronics engineering technologists and technicians 2242 Electronic service technicians (household and business equipment) 2253 Drafting technologists and technicians
2134 Chemical engineers	2211 Chemical technologists and technicians 2142 Metallurgical and materials engineers 2253 Drafting technologists and technicians
2141 Industrial and manufacturing engineers	2132 Mechanical engineers 2233 Industrial engineering and manufacturing technologists and technicians 2253 Drafting technologists and technicians
2142 Metallurgical and materials engineers	2211 Chemical technologists and technicians 2212 Geological and mineral technologists and technicians 2253 Drafting technologists and technicians

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
2143 Mining engineers	2212 Geological and mineral technologists and technicians 2253 Drafting technologists and technicians
2144 Geological engineers	2212 Geological and mineral technologists and technicians 2253 Drafting technologists and technicians
2145 Petroleum engineers	2211 Chemical technologists and technicians 2212 Geological and mineral technologists and technicians 2253 Drafting technologists and technicians
2146 Aerospace engineers	2232 Mechanical engineering technologists and technicians 2253 Drafting technologists and technicians
2147 Computer engineers (Except Software Engineers and Designers)	2133 Electrical and electronics engineers 2162 Computer systems analysts 2163 Computer programmers 2241 Electrical and electronics engineering technologists and technicians 2242 Electronic service technicians (household and business equipment) 2253 Drafting technologists and technicians
2148 Other professional engineers	Very heterogeneous unit group, unable to identify transferability
2151 Architects	2251 Architectural technologists and technicians 2253 Drafting technologists and technicians
2152 Landscape architects	2225 Landscape and horticulture technicians and specialists 2253 Drafting technologists and technicians
2153 Urban and land use planners	1122 Professional occupations in business services to management
2154 Land surveyors	
2161 Mathematicians, statisticians and actuaries	2147 Computer engineers (except software engineers and designers) 216 Mathematicians, statisticians and actuaries
2162 Computer systems analysts	1122 Professional occupations in business services to management 2147 Computer engineers (except software engineers and designers) 216 Mathematicians, statisticians and actuaries
2163 Computer programmers	216 Mathematicians, statisticians and actuaries
PROFESSIONAL – HEALTH OCCUPATIONS	
3111 Specialist physicians	2221 Biological technologists and technicians biological technologists and technicians 3112 General practitioners and family physicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
3112 General practitioners and family physicians	2221 Biological technologists and technicians biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
3113 Dentists	3221 Denturists 3222 Dental hygienists and dental therapists
3114 Veterinarians	2221 Biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians 3213 Veterinary and animal health technologists and technicians
3121 Optometrists	3231 Opticians
3122 Chiropractors	
3123 Other professional occupations in health diagnosing and treating	Very heterogeneous unit group, unable to identify transferability
3131 Pharmacists	2211 Chemical technologists and technicians 2221 Biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
3132 Dietitians and nutritionists	2211 Chemical technologists and technicians 2221 Biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
3141 Audiologists and speech-language pathologists	
3142 Physiotherapists	2221 Biological technologists and technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
3143 Occupational therapists	
3144 Other professional occupations in therapy and assessment	Very heterogeneous unit group, unable to identify transferability
3151 Head nurses and supervisors	3152 Registered nurses 3233 Licensed practical nurses
3152 Registered nurses	3233 Licensed practical nurses 3234 Ambulance attendants and other paramedical occupations 4212 Community and social service workers
PROFESSIONAL – SOCIAL SCIENCE, EDUCATION, GOVERNMENTS ETC.	
4111 Judges	Eliminate Unit Group, No direct hiring
4112 Lawyers and Quebec notaries	4211 Paralegal and related occupations
4121 University professors	Highly specialized — No mobility within unit group
4122 Post-secondary teaching and research assistants	Highly specialized — No mobility within unit group
4131 College and other vocational instructors	Highly specialized — No mobility within unit group
4141 Secondary school teachers	4142 Elementary school and kindergarten teachers 4215 Instructors and teachers of persons with disabilities
4142 Elementary school and kindergarten teachers	4141 Secondary school teachers 4215 Instructors and teachers of persons with disabilities
4143 School and guidance counsellors	4141 Secondary school teachers 4142 Elementary school and kindergarten teachers 4212 Community and social service workers 4213 Employment counsellors 4215 Instructors and teachers of persons with disabilities
4151 Psychologists	4153 Family, marriage and other related counsellors 4155 Probation and parole officers and related occupations 4212 Community and social service workers
4152 Social workers	4153 Family, marriage and other related counsellors 4155 Probation and parole officers and related occupations 4212 Community and social service workers
4153 Family, marriage and other related counsellors	4212 Community and social service workers
4154 Ministers of religion	Highly Specialized — No mobility within unit group
4155 Probation and parole officers and related occupations	4212 Community and social service workers
4160 Health and social policy researchers, consultants and program officers	Very heterogeneous unit group, unable to identify transferability
4161 Natural and applied science policy researchers, consultants and program officers	Very heterogeneous unit group, unable to identify transferability
4162 Economists and economic policy researchers and analysts	1112 Financial and investment analysts 1113 Securities agents, investment dealers and brokers 4163 Economic development officers and marketing researchers and consultants
4163 Economic development officers and marketing researchers and consultants	
4166 Education policy researchers, consultants and program officers	
4167 Recreation and sports program supervisors and consultants	5254 Program leaders and instructors in recreation, sport and fitness

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
4168 Program officers unique to government	
PROFESSIONAL – ART, CULTURE, RECREATION AND SPORT	
5111 Librarians	5211 Library and archive technicians and assistants
5112 Conservators and curators	
5113 Archivists	5111 Librarians 5211 Library and archive technicians and assistants
5121 Writers	5122 Editors 5123 Journalists 5124 Professional occupations in public relations and communications
5122 Editors	5121 Writers 5123 Journalists 5124 Professional occupations in public relations and communications
5123 Journalists	5121 Writers 5122 Editors 5124 Professional occupations in public relations and communications
5124 Professional occupations in public relations and communications	5121 Writers 5122 Editors 5123 Journalists 5124 Professional occupations in public relations and communications
5125 Translators, terminologists and interpreters	
5131 Producers, directors, choreographers and related occupations	
5132 Conductors, composers and arrangers	5133 Musicians and singers
5133 Musicians and singers	
5134 Dancers	
5135 Actors	5231 Announcers and other broadcasters
5136 Painters, sculptors and other visual artists	
SKILLED — BUSINESS, FINANCE AND ADMINISTRATION	
1211 Supervisors, general office & administrative support clerks	Very heterogeneous unit group, unable to identify transferability. internal progression though unit group is high
1212 Supervisors, finance & insurance clerks	Very heterogeneous unit group, unable to identify transferability. internal progression though unit group is high
1213 Supervisors, library, correspondence & related clerks	Very heterogeneous unit group, unable to identify transferability. internal progression though unit group is high
1214 Supervisors, mail and message distribution	Very heterogeneous unit group, unable to identify transferability. internal progression though unit group is high
1215 Supervisors, recording, distributing & scheduling occupations	Very heterogeneous unit group, unable to identify transferability. internal progression though unit group is high
1221 Administrative officers	1222 Executive assistants 1241 Secretaries (except legal and medical)
1222 Executive assistants	1221 Administrative officers 1241 Secretaries (except legal and medical)
1223 Personnel and recruitment officers	
1224 Property administrators	Internal progression though unit group is high
1225 Purchasing agents and officers	
1226 Conference and event planners	1221 Administrative officers 1222 Executive assistants

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
1227 Court officers and justices of the peace	Eliminate Unit Group, no direct hiring
1228 Immigration, unemployment insurance and revenue officers	4168 Program officers unique to government
1231 Bookkeepers	
1232 Loan officers	
1233 Insurance adjusters and claims examiners	6231 Insurance agents and brokers
1234 Insurance underwriters	6231 Insurance agents and brokers
1235 Assessors, valuers and appraisers	Eliminate Unit Group, Very heterogeneous & Specialized
1236 Customs, ship and other brokers	Eliminate Unit Group, Very heterogeneous & Specialized
1241 Secretaries (except legal and medical)	
1242 Legal secretaries	1241 Secretaries (except legal and medical)
1243 Medical secretaries	1241 Secretaries (except legal and medical)
1244 Court recorders and medical transcriptionists	Eliminate Unit Group, Very heterogeneous & Specialized
TECHNICAL — SCIENCE AND APPLIED SCIENCES	
2211 Applied chemical technologists and technicians	3212 Medical laboratory technicians
2212 Geological and mineral technologists and technicians geological and mineral technologists and technicians	
2213 Meteorological technicians	
2221 Biological technologists and technicians Biological technologists and technicians	3212 Medical laboratory technicians
2222 Agricultural and fish products inspectors	Eliminate Unit Group, Very heterogeneous & product specific
2223 Forestry technologists and technicians	
2224 Conservation and fishery officers	
2225 Landscape and horticultural technicians and specialists	Eliminate Unit Group, Very heterogeneous
223 Technical occupations in civil, mechanical and industrial engineering	2231 Civil engineering technologists and technicians 2232 Mechanical engineering technologists and technicians 2233 Industrial engineering and manufacturing technologists and technicians 2234 Construction estimators 2253 Drafting technologists and technicians 2254 Land survey technologists and technicians 2264 Construction inspectors
2232 Mechanical engineering technologists and technicians	2253 Drafting technologists and technicians
2233 Industrial engineering and manufacturing technologists and technicians	2253 Drafting technologists and technicians
2234 Construction estimators (NOC only)	Eliminate Unit Group NOC only
2241 Electrical and electronics engineering technologists and technicians	2242 Electronic service technicians (household and business equipment) 2243 Industrial instrument technicians and mechanics 2244 Aircraft instrument, electrical and avionics mechanics, technicians and inspectors 2253 Drafting technologists and technicians
2242 Electronic service technicians (household and business equipment)	
2243 Industrial instrument technicians and mechanics	
2244 Aircraft instrument, electrical and avionics mechanics, technicians and inspectors	2242 Electronic service technicians (household and business equipment)
2251 Architectural technologists and technicians	2231 Civil engineering technologists and technicians 2232 Mechanical engineering technologists and technicians 2233 Industrial engineering and manufacturing technologists and technicians 2234 Construction estimators 2253 Drafting technologists and technicians 2264 Construction inspectors
2252 Industrial designers	2253 Drafting technologists and technicians

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
2253 Drafting technologists and technicians	
2254 Survey technologists and technicians	
2255 Mapping and related technologists and technicians	Eliminate Unit Group Very heterogeneous group; little mobility within group
2261 Non-destructive testers and inspectors	Eliminate Unit Group Very heterogeneous group; internal progression
2262 Engineering inspectors and regulatory officers	Eliminate Unit Group Very heterogeneous group
2263 Inspectors in public and environmental health and occupational health and safety	Eliminate Unit Group Very heterogeneous group; discipline specific
2264 Construction inspectors	
2271 Air pilots, flight engineers and flying instructors	
2272 Air traffic control occupations	
2273 Deck officers, water transport	
2274 Engineer officers, water transport	
2275 Railway and marine traffic controllers	Eliminate Unit Group, Very heterogeneous group; no mobility within group
TECHNICAL — HEALTH OCCUPATIONS	
3211 Medical laboratory technologists and pathologists' assistants	3212 Medical laboratory technicians
3212 Medical laboratory technicians	
3213 Animal health technologists	
3214 Respiratory therapists and clinical perfusionists	
3215 Medical radiation technologists	
3216 Medical sonographers	
3217 Cardiology technologies	
3218 Electroencephalographic and other diagnostic technologists	
3219 Other medical technologists and technicians (except dental health)	Eliminate Unit Group Very heterogeneous group
3221 Denturists	
3222 Dental hygienists and dental therapists	
3223 Dental technicians	Eliminate Unit Group, NOC only
3231 Opticians	
3232 Midwives and practitioners of natural healing	Eliminate Unit Group, Very heterogeneous group; no mobility within group
3233 Registered nursing assistants	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 3234 Ambulance attendants and other paramedical occupations
3234 Ambulance attendants and other paramedical occupations	
3235 Other technical occupations in therapy and assessment	Eliminate Unit Group, Very heterogeneous group
TECHNICAL — SOCIAL SCIENCE, EDUCATION GOVERNMENT ETC.	
4211 Paralegal and related occupations	Eliminate Unit Group Very heterogeneous group; no mobility within group
4212 Community and social service workers	
4213 Employment counsellors	1223 Personnel and recruitment officers
4214 Early Childhood Educators	Eliminate Unit Group. NOC only

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
4215 Instructors and teachers of disabled persons	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 4141 Secondary school teachers 4142 Elementary school and kindergarten teachers 4212 Community and social service workers
4216 Other instructors	Eliminate Unit Group, Very heterogeneous group; no mobility within group
4217 Other religious occupations	Eliminate Unit Group, Very heterogeneous group; no mobility within group
TECHNICAL — ART, CULTURE, RECREATION & SPORT	
5211 Library and archive technicians and assistants	
5212 Technical occupations related to museums and galleries	Eliminate Unit Group, Very heterogeneous group; no mobility within group
5221 Photographers	
5222 Film and video camera operators	
5223 Graphic arts technicians	
5224 Broadcast technicians	5225 Audio and video recording technicians
5225 Audio and video recording technicians	5224 Broadcast technicians
5226 Other technical occupations in motion pictures, broadcasting and the performing arts	5227 Support and assisting occupations in motion pictures, broadcasting and the performing arts
5227 Support and assisting occupations in motion pictures, broadcasting and the performing arts	5226 Other technical occupations in motion pictures, broadcasting and the performing arts
5231 Announcers and other broadcasters	
5232 Other performers	Eliminate Unit Group, Very heterogeneous group; no mobility within group
5241 Graphic designers and illustrating artists	5223 Graphic arts technicians
5242 Interior designers	
5243 Theatre, fashion, exhibit and other creative designers	Eliminate Unit Group Very heterogeneous group; little mobility within group
5244 Artisans and craftsperson's	Eliminate Unit Group Very heterogeneous group; little mobility within group
5245 Patternmakers - textile, leather and fur products	
5251 Athletes	Eliminate Unit Group, Very heterogeneous group; no mobility between sports
5252 Coaches	Eliminate Unit Group, Very heterogeneous group; no mobility between sports
5253 Sports officials and referees	Eliminate Unit Group, Very heterogeneous group; no mobility between sports
5254 Program leaders and instructors in recreation and sport	
SKILLED — SALES & SERVICE	
6211 Retail trade supervisors	Eliminate Unit Group Very heterogeneous group; internal progression
6212 Food service supervisors	Eliminate Unit Group, Very heterogeneous group; internal progression
6213 Executive housekeepers	Eliminate Unit Group, Very heterogeneous group; internal progression
6214 Dry cleaning & laundry supervisors	Eliminate Unit Group, Very heterogeneous group; internal progression
6215 Cleaning supervisors	Eliminate Unit Group, Very heterogeneous group; internal progression
6216 Other service supervisors	Eliminate Unit Group, Very heterogeneous group; internal progression
6221 Technical sales specialists, wholesale trade	Very heterogeneous group, Eliminate Unit Group
6231 Insurance agents and brokers	1233 Insurance adjusters and claims examiners
6232 Real estate agents and salespersons	
6233 Retail and wholesale buyers	1225 Purchasing agents and officers

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
6234 Grain elevator operators	Occupation dominated by internal progression- Direct hiring unlikely
6241 Chefs	6242 Cooks
6242 Cooks	6252 Bakers
6251 Butchers and meat cutters, retail and wholesale	
6252 Bakers	
6261 Police officers (except commissioned)	
6262 Fire-fighters	
6271 Hairstylists and barbers	
6272 Funeral directors and embalmers	
SKILLED — TRADES & TRANSPORT OPERATORS	
7211 Supervisors, machinists and related occupations	Eliminate Unit Group Very heterogeneous group; internal progression
7212 Contractors and supervisors, electrical trades and telecommunications occupations	Eliminate Unit Group Very heterogeneous group; internal progression
7213 Contractors and supervisors, pipefitting trades	Eliminate Unit Group Very heterogeneous group; internal progression
7214 Contractors and supervisors, metal forming, shaping and erecting trades	Eliminate Unit Group Very heterogeneous group; internal progression
7215 Contractors and supervisors, carpentry trades	Eliminate Unit Group Very heterogeneous group; internal progression
7216 Contractors and supervisors, mechanic trades	Eliminate Unit Group Very heterogeneous group; internal progression
7217 Contractors and supervisors, heavy construction equipment crews	Eliminate Unit Group Very heterogeneous group; internal progression
7218 Supervisors, printing and related occupations	Eliminate Unit Group Very heterogeneous group; internal progression
7219 Contractors and supervisors, other construction trades, installers, repairers and servicers	Eliminate Unit Group Very heterogeneous group; internal progression
7221 Supervisors, railway transport operations	Eliminate Unit Group Very heterogeneous group; internal progression
7222 Supervisors, motor transport and other ground transit operators	Eliminate Unit Group Very heterogeneous group; internal progression
7231 Machinists and machining and tooling inspectors	7316 Machine fitters
7232 Tool and die makers	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7231 Machinists and machining and tooling inspectors
7241 Electricians (except industrial and power system)	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7242 Industrial electricians 7243 Power system electricians
7242 Industrial electricians	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7241 Electricians (except industrial and power system) 7243 Power system electricians
7243 Power system electricians	
7244 Electrical power line and cable workers	
7245 Telecommunications line and cable workers	
7246 Telecommunications installation and repair workers	

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
7247 Cable television service and maintenance technicians	
7251 Plumbers	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7252 Steamfitters, pipefitters and sprinkler system installers
7252 Steamfitters, pipefitters and sprinkler system installers	7316 Machine fitters
7253 Gas fitters	
7261 Sheet metal workers	
7262 Boilermakers	7263 Structural metal and platework fabricators and fitters
7263 Structural metal and platework fabricators and fitters	7262 Boilermakers
7264 Ironworkers	
7265 Skilled Welders	Eliminate Unit Group
7266 Blacksmiths & die setters	
7271 Carpenters	7293 Insulators 7295 Floor covering installers
7272 Cabinetmakers	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7271 Carpenters
7281 Bricklayers	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7282 Cement finishers 7283 Tilesetters
7282 Cement finishers	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7283 Tilesetters
7283 Tilesetters	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7281 Bricklayers 7282 Cement finishers 7284 Plasterers, drywall installers and finishers, and lathers
7284 Plasterers, drywall installers and finishers, and lathers	
7291 Roofers and shinglers	
7292 Glaziers	
7293 Insulators	
7294 Painters and decorators	
7295 Floor covering installers	
7311 Construction millwrights and industrial mechanics (except textile)	7316 Machine fitters
7312 Heavy-duty equipment mechanics	7316 Machine fitters
7313 Refrigeration and air conditioning mechanics	
7314 Railway car men/women	Eliminate Unit Group Occupation dominated by internal progression- No direct hiring
7315 Aircraft mechanics and aircraft inspectors	7316 Machine fitters
7316 Machine fitters	
7317 Textile machinery mechanics & repairers	
7318 Elevator constructors and mechanics	
7321 Motor vehicle mechanics, technicians and mechanical repairers	7316 Machine fitters
7322 Motor vehicle body repairers	
7331 Oil and solid fuel heating mechanics	

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
7332 Electric appliance servicers and repairers	
7333 Electrical mechanics	
7334 Motorcycle and other related mechanics	
7335 Other small engine and equipment mechanics	
7341 Upholsterers	
7342 Tailors, dressmakers, furriers and milliners	
7343 Shoe repairers and shoemakers	
7344 Jewellers, watch repairers and related occupations	Eliminate unit group Very heterogeneous group; little mobility within group
7351 Stationary engineers and auxiliary equipment operators	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 7352 Power systems and power station operators
7352 Power systems and power station operators	
7361 Railway and yard locomotive engineers	Eliminate unit group Occupation dominated by internal progression- No direct hiring.
7362 Railway conductors and brakemen/women	Eliminate unit group Occupation dominated by internal progression- No direct hiring.
7371 Crane operators	No occupations were found where direct transfers exist however occupations with significant overlap between the skills and knowledge required are: 8241 Logging machinery operators
7372 Drillers & blasters	
7373 Water well drillers	
7381 Printing press operators	
7382 Commercial divers	
7383 Other trades and related occupations (e.g. gunsmith, locksmith, etc.)	Eliminate unit group Very heterogeneous group; little mobility within group
SKILLED — PRIMARY INDUSTRIES	
8211 Supervisors, logging and forestry	Eliminate unit group Very heterogeneous group; internal progression
8221 Supervisors, mining and quarrying	Eliminate unit group Very heterogeneous group; internal progression
8231 Underground production and development miners	Eliminate unit group Very heterogeneous group; internal progression
8232 Oil & gas well drillers, servicers, testers & related workers	Eliminate unit group UG dominated by internal progression. Outside hiring unlikely
8241 Logging machinery operators	
8251 Farmers and farm managers	Eliminate unit group Heterogeneous group
8252 Agricultural and related service contractors and managers	Eliminate unit group Heterogeneous group; internal progression
8253 Farm supervisors and specialized livestock workers	Eliminate unit group Heterogeneous group; internal progression
8254 Nursery and greenhouse operators and managers	Eliminate unit group Heterogeneous group; internal progression
8255 Landscaping and grounds maintenance contractors and managers	Eliminate unit group Heterogeneous group; internal progression

National Occupational Classification System - Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
8256 Supervisors, landscape and horticulture	Eliminate unit group Heterogeneous group; internal progression
8257 Aquaculture operators and managers	Eliminate unit group Heterogeneous group; internal progression
8261 Fishing masters and officers	8262 Fishing vessel skippers and fishermen/women
8262 Fishing vessel skippers and fishermen/women	
9211 Supervisors, mineral and metal processing	Eliminate unit group Very heterogeneous group; internal progression
9212 Supervisors, petroleum, gas and chemical processing and utilities	Eliminate unit group Very heterogeneous group; internal progression
9213 Supervisors, food, beverage and tobacco processing	Eliminate unit group Very heterogeneous group; internal progression
9214 Supervisors, plastic and rubber products manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9215 Supervisors, forest products processing	Eliminate unit group Very heterogeneous group; internal progression
9216 Supervisors, textile processing	Eliminate unit group Very heterogeneous group; internal progression
9221 Supervisors, motor vehicle assembling	Eliminate unit group Very heterogeneous group; internal progression
9222 Supervisors, electronics manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9223 Supervisors, electrical products manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9224 Supervisors, furniture and fixtures manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9225 Supervisors, fabric, fur and leather products manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9226 Supervisors, other mechanical and metal products manufacturing	Eliminate unit group Very heterogeneous group; internal progression
9227 Supervisors, other products manufacturing and assembly	Eliminate unit group Very heterogeneous group; internal progression
9231 Central control and process operators, mineral and metal processing	Eliminate unit group Very heterogeneous group; internal progression
9232 Petroleum, gas and chemical process operators	Eliminate unit group Very heterogeneous group; internal progression
9233 Pulping control operators	Eliminate unit group Very heterogeneous group; internal progression
9234 Papermaking and coating control operators	Eliminate unit group Very heterogeneous group; internal progression

Source: Human Resources Skills Development Canada, 2003

appendix b | list of participating employers

Utilities

Brantford Generation Inc.
GE Energy – Stoney Creek
Horizon Energy Solutions Inc.
Horizon Utilities
M.K. Ince and Associates Ltd.
Niagara-on-the-Lake Hydro Inc.
PROQUIP International

Agriculture, Forestry, Fishing and Hunting

Breeze Wood Forest Products / Townsend Lumber
J.B. Puddicombe & Sons Ltd.
Lake Erie Farms Inc.
Lake Land Meats & Farm Market
ManoRun Organic Farm
Picard Peanuts Ltd.
Plan B Organic Farms
Simpler Thyme Organic Farm
The Norfolk Fruit Growers' Association
Whistling Gardens
Whitty Farms
Windham Harvest Specialties

Construction

EnerMin Solutions
Merit Contractors Niagara

Manufacturing

Anderson Water Systems Inc.
BIOX Canada
Deb Canada Hygiene Inc.
Elettra Technology Inc.
Jervis B. Webb Company of Canada Ltd.
Kodarin Industries
Koolatron
Niagara Precision Limited
On Time Precision Components Inc.
Teme Engineering Ltd.
Trillium Balsa Ltd.

Administration and Support, Waste Management and Remediation

BFI Canada Inc.
Corporate Chemicals and Equipment
Teme Engineering Ltd.

Transportation and Warehousing

Altruck International Truck Centres
CareGo Innovative Solutions Inc.
Cole Integrated Systems
Connell Transport
Hamilton Chamber of Commerce
HOD4TRUCKING Inc.
Kelowna Flightcraft
Niagara District Airport
Purolator Courier Ltd.
Snider Dock Services Limited L.E. Snider Transport Inc.
Soenar Logistics International Inc.
Titan Trailers Inc.
Trailer Wizards
Vopak Terminals of Canada Inc.
Wills Motors Ltd. / Wills Bus Lines
WP Warehousing Inc.

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WORKFORCE PLANNING BOARDS OF ONTARIO

The three local planning boards, Hamilton Training Advisory Board (HTAB), Niagara Workforce Planning Board (NWPB) and the Workforce Planning Board of Grand Erie (WPBGE), serve their communities as leaders in local labour market planning. The boards deliver authoritative research, identifying employment trends, targeting workforce opportunities and bringing people together to act on solutions. The boards conduct annual research on the trends, opportunities and priorities impacting the local labour market. They release regular updates, reports and an annual publication that captures strategic actions to address key labour market priorities.



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