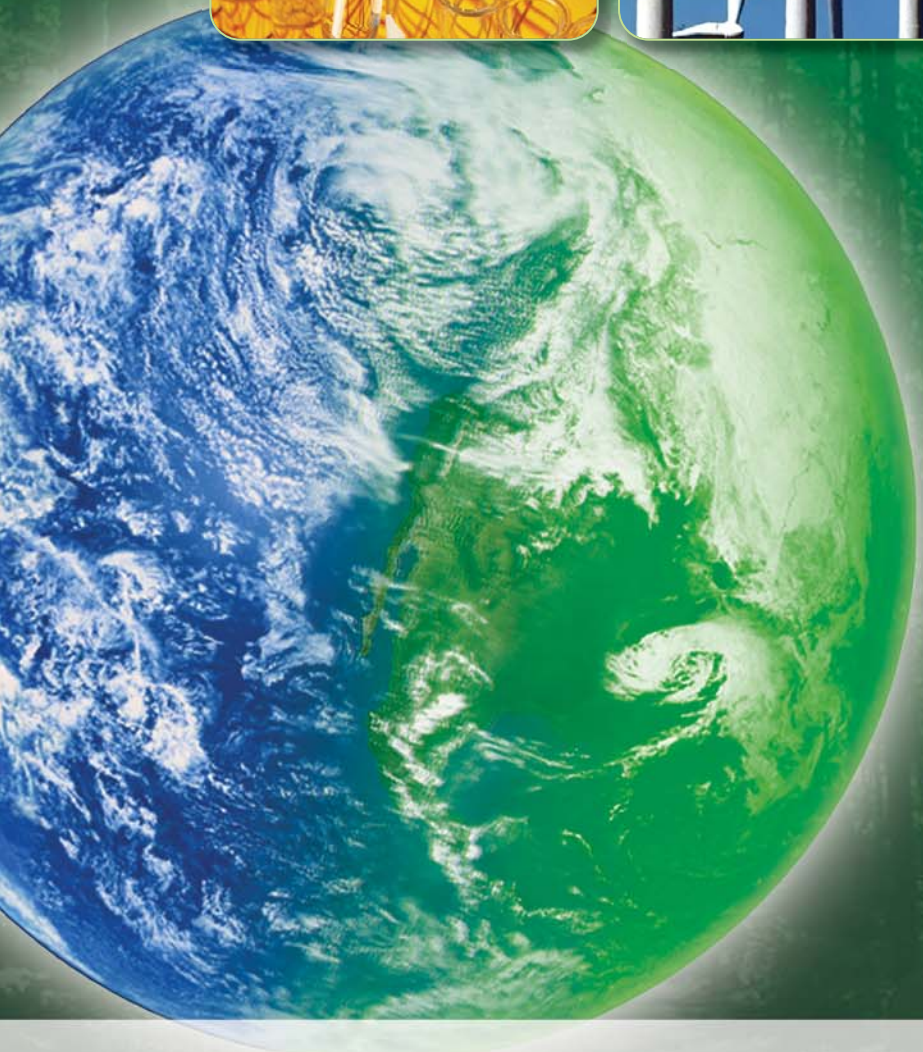
Greening the Economy



Transitioning to New Careers

REPORT

Peel Halton Workforce Development Group

Toronto Workforce Innovation Group

Workforce Planning BOARD
OF YORK REGION & BRADFORD WEST GWILLIMBURY

Peel Halton Workforce Development Group

www.peelhaltonworkforce.com

PEEL HALTON

Toronto Workforce Innovation Group

www.workforceinnovation.ca

TORONTO

Workforce Planning BOARD
OF YORK REGION & BRADFORD WEST GWILLIMBURY

www.wpboard.ca

YORK REGION

Published 2011 • Printed in Canada

EMPLOYMENT ONTARIO
Ontario's employment & training network

Greening the Economy
Transitioning to New Careers

February, 2011

Contents

List of Tables 2

Executive Summary 3

Introduction 5
- Scope and Report Structure 7
- Methodology 8

Emerging Green Industries 9
- Overview 9
- Utilities 10
- Construction 15
- Manufacturing 20
- Retail Trade 26
- Financial 30
- Information Communication Technology (ICT) 36

Emerging Green Careers 42

References 46

Appendices 47
- Appendix A – Matrix of Skills Transferability 47
- Appendix B – Environmentally Related Education Programs 59

Additional Programs and Certificates 64

Endnotes 66

Summary 68

List of Tables

Table 1: Number of People Employed in Utilities (NAICS 22)

Table 2: Top Occupations in Utilities (NAICS 22) by the Number of People Employed

Table 3: Top Occupations in Utilities (NAICS 22) and Skills Transferability Possibilities

Table 4: Number of People Employed in Construction (NAICS 23)

Table 5: Top Occupations in Construction (NAICS 23) by the Number of People Employed

Table 6: Top Occupations in Construction (NAICS 23) and Skills Transferability Possibilities

Table 7: Number of People Employed in Manufacturing (NAICS 31-33)

Table 8: Top Occupations in Manufacturing (NAICS 31-33) by the Number of People Employed

Table 9: Top Occupations in Manufacturing (NAICS 31-33) and Skills Transferability Possibilities

Table 10: Number of People Employed in Retail Trade (NAICS 44-45)

Table 11: Top Occupations in Retail Trade (NAICS 44-45) by the Number of People Employed

Table 12: Top Occupations in Retail Trade (NAICS 44-45) and Skills Transferability Possibilities

Table 13: ECO Canada Environmental Careers and the Number of People Employed

Table 14: ECO Canada Environmental Careers and the Top Industries of Employment

Executive Summary

Transitioning to a Green Economy is the result of collaboration between three Local Board areas - the Toronto Workforce Innovation Group (TWIG), Workforce Planning Board for York Region and Bradford West Gwillimbury and the Peel-Halton Workforce Development Group. The goal of the project is to identify industries affected by the green economy and increase our understanding of the effect of the green economy on occupations within key sectors.

The global crisis of 2008-2009 is forcing communities, regions and provinces to explore new areas for growth, examine the existing economic base for business retention and expansion, and investigate possibilities for future employment opportunities. The threat of climate change is causing companies and shareholders to change their priorities. The shift to green is evidenced in regional economic growth strategies that are driving the quest for local investment. The green economy has become an emerging cluster to watch and with that emergence is a wave of new job opportunities across many industries and sub-sectors.

The green economy has been defined as an emerging marketplace that seeks to optimize the synergy among three sets of values: social, environmental and financial.[1] One aspect of the green economy is green collar jobs. These are occupations that facilitate the reduction of waste and pollution, improve the environment, and pay a livable wage with benefits that can support a family and offer potential for upward mobility.[2] Another facet is the introduction of a whole range of green careers and a surge in demand for environmental auditors, environmental engineers, experts in retrofitting and using new, sustainable technology. As with the introduction of any new industry, it follows that the labour force required will experience a shift in the level and types of skills required. In order to support sectoral development, growth and sustainability it is important to understand what and how industries and occupations will be influenced by this "green" movement and what is required 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 four key sectors including Utilities, Construction, Manufacturing and Retail Trade. These four sectors were chosen based on their importance to these areas in terms of employment size and growth. However, the industries' significance was not the only factor that determined their inclusion. Additional information based on existing green economy research informed the Local Boards' decision to profile these industries.

Executive Summary

The report is presented in three major sections.
Section 1 is a brief overview of the issue, an introduction to the green economy and green careers, the research methodology undertaken as well as an outline of the report structure.

Section 2 profiles green industries, providing an overview of green clusters. This section includes detailed profiles of the Utilities, Construction, Manufacturing and Retail Trade sectors for the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas.

Section 3 describes key emerging green careers as identified by the Environmental Careers Organization (ECO) Canada. The 15 occupations outlined as "top emerging green careers" have been profiled for each of the three regions. Additionally, this section provides an overview of the types of educational programs available for green careers.

In an effort to better document the status of the green economy, this report has collected data from a number of recognized sources. The report`s industry analysis utilized Canadian Business Patterns (CBP) data from 2003 and 2009.[3] Industry information is defined using the North American Industry Classification System (NAICS).[4] To determine the number of people employed and the top occupations based on the National Occupational Classification system (NOC)[5], 2006 Statistics Canada Census data[6] was utilized. The Matrix of Skills Transferability[7] served to determine related occupations that use the same transferable skills. Extensive secondary data research relating to the green economy supported findings and analysis.

The green economy requires a skilled and ready labour force that can effectively transition into emerging occupations. Identification of specific skills and ensuring appropriate training programs are available and accessible are key elements for success and local labour market readiness. Many green careers require some level of post-secondary education, thus supporting the need for availability and accessibility of environmentally related education programs.[8] A region's economic competitiveness and successful transition is dependent on both a strong economic position and a skilled workforce.

Introduction

The Greater Toronto Region is becoming a significant centre of an emerging green economy. A surge in demand is creating new opportunities for "green" careers and/or green collar jobs such as environmental auditors, environmental engineers, the manufacturing and installation of solar panels and an expansion of the technology to build and manufacture wind turbines. This growing interest and investment in a green economy coupled with the recognition of the region as a leader in policies and programs to combat climate change led three local boards to collaborate on an initiative to examine the potential of transitioning workers into growing or emerging sectors related to greening the economy.

The three Local Boards are the Peel-Halton Workforce Development Group, the Toronto Workforce Innovation Group and the Workforce Planning Board of York Region and Bradford West Gwillimbury. The 21 Local Boards in Ontario are not-for-profit organizations, led by volunteer Boards of Directors. These Local Boards identify the significant labour market development. Issues in their communities and develop innovative solutions to those issues through partnerships with local stakeholders.

The economic turmoil of 2008-2009 caused great unrest in the global marketplace. Fluctuating dollar values, demands for efficiencies, advances in technology as well as organizational restructuring, downsizing and closures have resulted in significant job losses and the re-evaluation of priorities across many sectors.

This economic reset has hastened the efforts of communities, regions and provinces to explore alternative areas for growth, examine the existing economic base for business retention and expansion, and investigate possibilities for new investment and employment. Ontario, possibly the Province hit hardest by rising rates of unemployment in 2009, has developed innovative policies and programs to encourage the investment and development of alternative sources of energy.

The Province of Ontario's Green Energy Act, enacted in May 2009, is a strategic response to the growing need for renewable sources of energy and sustainable sources of fuel. This act is expected to stimulate increased investment in energy alternatives and create between 50,000 to 90,000 new jobs. As new economic opportunities are examined, the importance of a more sustainable future for our environment has taken centre stage. Countries have put forward their vision for a cleaner and more energy conscious approach to economic growth that maximizes resources and protects the environment at the Climate Change Conference in Copenhagen in December 2009. The reduction of greenhouse gas emissions, a focus on reducing carbon footprints and support for the development of energy efficiency measures are examples of policies, strategies and approaches that are bringing the green economy to the forefront across the globe.

In response to the focus on "greening the economy", new job opportunities are emerging in many industries and sectors. Since 2003, the Government of Ontario has invested more than $600 million in research projects and companies working on green technologies and initiatives.[9] These kinds of investments are increasing the demand for a highly skilled and competitive workforce with the skills and competencies to support the emergence of green careers and green collar jobs.

The green economy is an emerging marketplace that seeks to optimize the synergy among three sets of values: social, environmental and financial.[10] One aspect of the green economy is green jobs. A green job is an occupation that facilitates the reduction of waste and pollution, benefits the environment, and pays a livable wage with benefits that can support a family and offers potential for upward mobility.[11] Green jobs are positions in agriculture, manufacturing, research and development and administrative and service activities that contribute substantially to preserving or restoring environmental quality. This includes jobs that directly or indirectly help to protect ecosystems or biodiversity; reduce the use of energy, materials and water consumption; "decarbonize" the economy and minimize or avoid waste pollution.[12] Upgrading traditional jobs to green jobs in industries such as manufacturing that have seen severe job losses over the past two decades creates new opportunities. These opportunities, however, are not without challenges and add to the importance of ensuring a strategic, data-driven workforce development strategy.

The Province of Ontario`s Green Energy Act sets out to define Ontario's place as North America's renewable energy leader. Estimates are that between 50,000 - 90,000 could be created.[13] A recent report suggests that 90,000 net new jobs per year could be generated by building Ontario's green economy.[14]

Understanding what industries and occupations will be influenced by going "green" will help the green economy to thrive and bring new jobs and opportunities to Ontario's communities. Knowing what is required to effectively transition a traditional labour force to one that is green economy ready is crucial. Facilitating this transformation as quickly and efficiently as possible is an important part of "greening" the economy.

Report Scope and Structure

Transitioning to a Green Economy is a collaboration between three Local Board areas - the Toronto Workforce Innovation Group, Workforce Planning Board for York Region, Bradford West Gwillimbury and the Peel-Halton Workforce Development Group. The goal is to identify industries affected by the green economy and increase understanding of the effect across occupations. This analysis will provide a thorough understanding of the green economy cluster`s workforce needs for the three Local Board areas. This project aims to expand the understanding of the transfer of skills from shrinking sectors to emerging green sectors. The report is designed to explore the green economy and the opportunities it generates from an occupational perspective across Peel-Halton, Toronto and York Region, Bradford West Gwillimbury in four sectors: Utilities, Construction, Manufacturing and Retail Trade.

The report is divided into three sections.

Section 1 provides a brief overview of the issue, an introduction to the green economy and green careers. It includes a description of the research methodology and an outline of the report structure.

Section 2 provides an overview of the green cluster and includes detailed profiles of the Utilities, Construction, Manufacturing and Retail Trade sectors for the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas.

Section 3 describes the top emerging green careers as identified by the Environmental Careers Organization of Canada ECO. The 15 occupations defined as "top emerging green careers" are profiled for each of the three regions. This section emphasizes the growth occurring in green careers and the increased demand for skilled workers. As well, section 3 provides an overview of the types of educational programs required for these green careers.

Additional information about related programs and training opportunities is found in Appendix B, which provides detailed charts of the available college and university programs in the Greater Toronto Area.

Methodology

In order to develop a greater understanding of the green economy and the opportunities it generates from an occupational perspective, Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Boards collaborated on a research project entitled "Transitioning into a Green Economy". This research is one response to the current shift in focus towards an environmentally conscious and forward thinking economy. Understanding the impact of "greening" the economy from an industry and occupation perspective will help develop and generate new job opportunities.

The "green economy" is an emerging term; one that was, until recently, not widely used. Canada's National Occupational Classification system does not yet recognize many of the new green careers. The North American Industry Classification System has not yet adapted to include new emerging green sectors in established industries. This creates difficulty in capturing the full scope of the green economy from both the industry and occupational perspective.

In an effort to document the status of the green economy, data was collected from a number of recognized sources. The report`s industry analysis utilized Canadian Business Patterns (CBP) data[17] from 2003 and 2009. Canadian Business Patterns data reflects counts of business establishments and locations by nine (9) employment size ranges including indeterminate employers.[18] CBP data is further divided by geographic groupings - province/territory, census division, census subdivision, census metropolitan area and census agglomeration. It is also divided by industry, using the North American Industry Classification System (NAICS).[19]

2006 Statistics Canada Census data[20] was mined to determine the number of people employed and the top occupations based on the National Occupational Classification system (NOC).[21] The NOC is a nationally accepted reference on occupations that groups over 30,000 job titles into 520 occupational groups, providing a standardized framework for organizing the workforce into a coherent system.

The Matrix of Skills Transferability[22] was applied to determine related occupations that share the same transferable skills. This matrix is an occupational model developed by Human Resources Skills Development Canada. Based on the National Occupational Classification (NOC), the matrix is designed to identify potential employment opportunities for workers in different occupations, inform possible paths of mobility between occupations based on nature of the work, knowledge required, occupation-specific skills and generic or basic skills. Labour market practices, such as inter-occupational mobility and internal progressions, were also analyzed.

Extensive secondary research related to the green economy was done, including a literature search. Periodic contact between the research team and the project advisory team enabled researchers to discuss, clarify and refine specific study parameters and monitor the validity and utility of the research.

Emerging Green Industries

Overview

The rising demand for environmentally friendly practices is inspiring the creation of green jobs. The global transition to a green economy that is environmentally conscious, low-carbon and sustainable, is transforming traditional jobs in many sectors of Ontario's economy and across the globe.

The forces generating interest in the green economy include social pressures on businesses to go "green" and the economic benefits and savings of green investments and current government policies. The rising cost of non-renewable sources of energy is pressuring businesses to incorporate environmentally friendly practices. Studies and research projects that examine the economic benefits are demonstrating results that serve as an incentive for businesses trying to reduce costs and increase profits. The passage of government policies and legislation such as the Green Energy Act passed in Ontario on May 14, 2009, are vital to this movement.

The impact of an emerging green economy is also felt in the labour force. The introduction of new industry sectors and areas of specialization focusing on the environment is resulting in new occupations and job creation. As energy creation becomes greener, employment will shift from working with traditional fossil fuels to jobs centered on renewable energy. While some jobs may be phased out, many traditional jobs are remaining and/or transforming into green collar occupations. Traditional plumbers and roofers will still be in demand; however, the demand for green plumbing and roofing specialists is predicted to grow.[23]

Green employment exists in a broad range of industries. The creation of green employment in one sector of the economy has the potential to spread to multiple sectors and industries, greening large sections of the total workforce.[24] Some industries are directly affected by the emergence of the green economy. The following section focuses on the influence of the green economy on the Utilities, Construction, Manufacturing and Retail Trade in relation to the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas. Four sectors were chosen based on their importance to these geographic areas in terms of employment size and growth. Information based on existing green economy research informed the Local Boards` decision to focus on these industries. The Local Boards will continue to examine green economy influence and impact across other industries.

Utilities (NAICS 22)

Industry Overview

The Utilities sector is comprised of firms primarily engaged in operating electric, gas and water utilities. These firms 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 through a permanent infrastructure of lines, pipes and treatment and processing facilities.[25] The main sub-sectors in this industry are:

- Electric Power Generation, Transmission and Distribution
- Natural Gas Distribution
- Water, Sewage and Other Systems

Industry Presence

The Utilities industry across these Local Board areas is relatively small as compared to other industries in terms of the number of employers and the number of people employed. In 2006, 13,705 people were employed in this industry, 0.53% of the total workforce from all three regions, as compared to 0.79% across Ontario. The table below shows the respective numbers in each of the three areas.

Table 1: Number of People Employed in Utilities (NAICS 22)

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Utilities (NAICS 22)	4,415	3,245	6,045	13,705	48,640
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
Percentage employed in Utilities	0.52%	0.26%	1.24%	0.53%	0.79%

Source: Statistics Canada, 2006 Census

In total, there are 48,640 people employed in the Utilities sector across Ontario, 28.2% work in Peel-Halton, Toronto and York Region, Bradford West Gwillimbury. Despite its size, the Utilities industry is prominent in the Greater Toronto Area. The industry is also seeing promising growth and opportunity in the current economy. Across the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas, the Utilities industry saw a total increase of 101 employers from December 2003 to June 2009, an increase of 56.1% from 2003[26] - the largest growth occurred with employers in the indeterminate category.[27] Additionally, there was a gain of 16 small sized employers in this industry over the same period. A large increase in small sized employers can be an indicator of strong entrepreneurial activity and point to sustained growth.

This industry is showing strong growth and providing promising opportunities as the green economy emerges, putting pressure on the traditional Utilities industry that mainly utilizes fossil fuels. Secondary research suggests that the Utilities industry is one that is facing both large threats and opportunities in the wake of the green economy.[28] The next section discusses how the green economy affects the Utilities industry in the Greater Toronto Area.

The Green Economy and Utilities

Although the economic shift to a greener economy has significant impacts on many industries, the most noticeable change is occurring in Utilities. The core component of "going green" is reducing energy use and creating new and more efficient sources of energy. The Utilities industry is shifting from the traditional power plant format to one that is new, technologically advanced, environmentally conscious and economically promising. By 2011 it is estimated that there will be over 24,000 environmental employees in the Utilities and Transportation and Warehousing industries in Canada, an increase of 1.1%from 2006.[29]

Globally, in 2006, there were over 2.2 million people employed in the renewable energy sector. The demand for energy conservation and the increased research on and development of new renewable energy are projected to increase this number. Estimates predict that total possible employment for the renewable energy sector could reach over 20 million jobs globally by 2030.[30]

The Ontario Green Energy Act, 2009, proposes to make Ontario a global leader in the development of renewable energy, clean energy distribution and energy conservation. This will lead to the creation of thousands of jobs, economic prosperity, energy security, and climate protection. Experts estimate that 50,000 jobs will be created in Ontario over the next three years as a result of projects related to the Act.[31] Industry Canada states that Canada's potential in the renewable energy sector could create 13,000 jobs by the year 2012 and produce $10 billion in revenue. The Ontario Power Authority (OPA) will invest up to $30 million over five years on a new industrial energy efficiency program to reduce both electricity and gas consumption in the GTA.[32] Investment creates employment and these investments will fuel the creation of green careers across the Utilities industry, which in turn will filter down to many other sectors. It is estimated that for every $1million invested in green energy generation and conservation, 8 direct and 7 indirect jobs will be created.[33]

There are several projects currently underway that will increase green demand in the Utilities sector. For example, the Institute for Chemicals and Fuels from Alternative Resources (ICFAR) at the University of Western Ontario is working on behalf of Agri-Therm Inc., a company in the early stages of bringing new bio-fuel technology to the market. Ontario is investing in this project under the Innovation Agenda, a $3.2 billion strategy to make the province one of the best places in the world to turn

emerging knowledge and ideas into new businesses and jobs. This project alone is anticipated to have a significant positive impact, bringing new jobs to Ontario, including positions for research engineers and contractors to build the final product.

Renewable energy generates more jobs per unit of installed capacity, per unit of power generated and per dollar invested, as compared to fossil-fuel power plants.[34] This suggests that there will be an increasing demand on this industry in the future. Canada's potential in the renewable energy sector could create 5000 Mega Watts (MW) of energy and 13,000 jobs (2.5 jobs per MW) by 2012.[35] Currently, Canada's installed wind energy capacity is 3,000 MW per year. This is expected to grow to 12,000 by 2015 – creating both renewable energy and new employment opportunities. Furthermore, home energy audits in Canada are currently at 25,000 - 30,000 per year. This is expected to increase to 200,000 per year increasing the energy auditing jobs from 150 to 800 across Canada.[36] Understanding the employment opportunities in this sector that will arise to meet that demand will ensure that the labour force will be prepared for these emerging opportunities.

Key Occupations

There are a total of 13,705 people employed throughout the Utilities industry in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas combined. Utilizing the 2006 Census data released by Statistics Canada determines the occupations of those 13,705 people. Table 2 shows the top occupations based on the number of people employed.

Table 2: Top Occupations in Utilities (NAICS 22) by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
0912 Utilities managers	270	320	150	740	5.40%
2133 Electrical and electronics engineers	185	390	155	730	5.33%
2132 Mechanical engineers	130	375	155	660	4.82%
7244 Electrical power line and cable workers	270	185	105	560	4.09%
1411 General office clerks	210	190	150	550	4.01%
1453 Customer service, information and related clerks	200	155	110	465	3.39%
2241 Electrical and electronics engineering technologists and technicians	105	155	130	390	2.85%
1431 Accounting and related clerks	135	175	55	365	2.66%
9212 Supervisors, petroleum, gas and chemical processing and utilities	110	130	120	360	2.63%
2171 Information systems analysts and consultants	100	150	105	355	2.59%
Total - All Occupations	**4,415**	**6,045**	**3,245**	**13,705**	---

Source: Statistics Canada, 2006 Census

Utilities occupations span a wide range of skill and education levels. In the sector there are opportunities for those who have minimal formal education as well as those with bachelor`s and master`s degrees. Of the ten occupations listed above, one is a management level occupation, three are skill level A occupations requiring a university education, three are skill level B occupations, requiring a college education or apprenticeship training and two are skill level C occupations, requiring secondary school and on-the-job training.[37] Throughout the Utilities industry there are occupations across all skill levels providing a wide range of employment possibilities.

Skills Transferability

By utilizing the Matrix of Skills Transferability (Appendix A), it is possible to determine the occupations with the most skills transferability. Table 3 outlines the top occupations in Utilities and matches them with occupations where skills transferability exists.

Table 3 shows that there are several occupations in this industry that lend easily to skills transferability. Many of these occupations are characterized by internal progression though the occupational unit group. This provides opportunities for those employed in the Utilities industry.

Table 3: Top Occupations in Utilities (NAICS 22) and Skills Transferability Possibilities

Occupation	Occupations with Skills Transferability
0912 Utilities managers	Management level occupation, internal progression though unit group is strong
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
2132 Mechanical engineers	2141 Industrial and manufacturing engineers 2146 Aerospace engineers 2232 Mechanical engineering technologists and technicians 2233 Industrial engineering and manufacturing technologists and technicians 2253 Drafting technologists and technicians
7244 Electrical power line and cable workers	None
1411 General office clerks	Low skilled occupation, internal progression is strong
1453 Customer service, information and related clerks	Low skilled occupation, internal progression is strong
2241 Electrical & electronics engineering technologists & 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
1431 Accounting and related clerks	Low skilled occupation, internal progression is strong
9212 Supervisors, petroleum, gas and chemical processing and utilities	Very diverse unit group, most occupations are dominated by internal progression
2171 Information systems analysts and consultants	Strong mobility exists between this unit group

Educational Programs and Certifications

The transferability of traditional occupations throughout the Utilities industry to green occupations may require 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
- Water Distribution and Supply
- Water Distribution and Wastewater Collection
- Wastewater Collection

Additional Occupations for Consideration

Additional occupations that are identified as green careers and relate to the Utilities industry are:

- Civil Engineer
- Emerging Energy Researcher
- Energy Auditor
- Wastewater Collection and Treatment Operator
- Wind Energy Developer

Construction (NAICS 23)

Industry Overview

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

- Construction of Buildings
- Heavy and Civil Engineering Construction
- Specialty Trade Contractors

Industry Presence

In 2006, the Construction industry employed 136,515 people across Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas, accounting for 5.30% of the total workforce as compared to 5.88% across Ontario. Table 4 shows the respective numbers in each of the three regions.

Table 4: Number of People Employed in Construction (NAICS 23)

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Construction (NAICS 23)	43,915	59,660	32,940	136,515	362,450
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
Percentage employed in Construction	5.18%	4.80%	6.77%	5.30%	5.88%

Source: Statistics Canada, 2006 Census

There are 362,450 people employed in the Construction industry in Ontario, 37.7% of which are employed throughout Peel-Halton, Toronto and York Region, Bradford West Gwillimbury. This means that the Construction industry is a substantial employer across these three Local Board areas and this workforce is a substantial portion of the province's entire construction sector.

Across the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury areas, the Construction industry saw a total increase of 1,521 employers from December 2003 to June 2009, an increase of 3.64% from 2003.[39] The largest growth occurred with employers in the small sized category, those employing 1-49 employees. A strong gain in small sized employers may indicate promising entrepreneurial activity that could promote lasting growth in this industry.

Construction is one of the key industries in the GTA and employs over 130,000 workers. Research predicts that the industry will respond to a green economy with increasing opportunities. The next section discusses how the green economy affects the Construction industry across these three Local Board areas.

The Green Economy and Construction

"Green" building is becoming more evident across Canada as sustainable development shifts to the forefront in the construction sector. Efficiency measures in the building sector include new green buildings as well as retrofitting and improving the efficiency of individual building components such as water heaters, cooking equipment, domestic appliances, office equipment, electronic appliances, heating, ventilation and air conditioning systems and lighting. Macroeconomic studies[40] show that these energy-efficiency measures lead to an overall net increase in jobs.[41]

Projects studying the employment effects of energy-efficient building measures include one study that estimates that retrofitting municipal buildings on a national scale in Canada will create 5,600 to 7,840 full time jobs throughout the country.[42] As well, Ontario is investing approximately $100 million in what is believed to be among 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 will start in summer 2009 and is scheduled to be completed by spring 2011.[43] The number of workers employed in environmental aspects of the Construction sector across Canada is anticipated to reach over 43,000 by 2011, an increase of 0.9% from 2006.[44]

The introduction of the Green Energy Act in Ontario is expected to raise the demand for green construction, further validating the Construction industry`s significance in terms of the green economy. The rising emphasis on meeting new requirements and standards such as the Green Roof Construction Standard in Toronto and Leadership in Energy and Environmental Design (LEED)[45] certification is expanding the need for green collar workers in the Construction field. As of April 2009, Ontario had more LEED certified buildings than any other Province with a total of 57.[46]

Of the 1521 additional employers added in the three Local Board areas from 2003 to 2009, Specialty Trade Contracts is the largest growing Construction sub-sector, with a gain of 1305 employers over this period. All this demonstrates dramatic growth in the industry, connected to a shift to green construction.

Key Occupations

There are 136,515 people employed in the Construction industry in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas.[47] Table 5 shows the top occupations based on the number of people employed in this sector.

Table 5: Top Occupations in Construction (NAICS 23) by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
7611 Construction trades helpers and labourers	5,015	9,210	3,145	17,370	12.72%
7271 Carpenters	2,990	5,345	2,180	10,515	7.70%
7241 Electricians (except industrial and power system)	2,815	3,295	2,180	8,290	6.07%
0711 Construction managers	2,330	2,900	2,235	7,465	5.47%
7294 Painters and decorators	1,820	3,695	1,265	6,780	4.97%
0712 Residential home builders and renovators	1,820	2,925	1,480	6,225	4.56%
7251 Plumbers	1,465	2,130	1,475	5,070	3.71%
7284 Plasterers, drywall installers and finishers, and lathers	1,440	2,350	885	4,675	3.42%
7219 Contractors and supervisors, other construction trades, installers, repairers and servicers	1,005	1,425	905	3,335	2.44%
7313 Refrigeration & air conditioning mechanics	1,410	1,050	840	3,300	2.42%
Total - All Occupations	**43,915**	**59,660**	**32,940**	**136,515**	---

Source: Statistics Canada, 2006 Census

Construction occupations span a wide range of skill and education levels. In the sector there are opportunities for those who have minimal formal education as well as those with bachelor`s or master`s degrees. Of the ten occupations listed above, two are management level occupations, seven are skill level B occupations and one is a skill level C occupation.[48] The table indicates that in the Construction industry the majority of occupations are skills level B, requiring a college education or apprenticeship training.

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 Construction and matches them with occupations where skills transferability exists.

Table 6 identifies occupations where skills transferability exists in this industry. A few of the above occupations are characterized by internal progression while others provide several direct transfer occupations. The broad occupation group of Construction managers allows for internal progression through many of the above groups.

Table 6: Top Occupations in Construction (NAICS 23) and Skills Transferability Possibilities

Occupation		Occupations with Skills Transferability	
7611	Construction trades helpers and labourers		Low skilled occupation, internal progression is strong
7271	Carpenters	7293	Insulators
7295	Floor covering installers		
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		
0711	Construction managers		Management level occupation, internal progression though unit group is strong
7294	Painters and decorators		None
0712	Residential home builders and renovators		Management level occupation, internal progression though unit group is strong
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		
7284	Plasterers, drywall installers and finishers, and lathers		None
7219	Contractors and supervisors, other construction trades, installers, repairers and servicers		Very diverse unit group, most occupations are dominated by internal progression
7313	Refrigeration and air conditioning mechanics	None	

Educational Programs and Certifications

The transferability of traditional occupations throughout the Construction industry to green jobs 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 Systems Engineering Technician
- Construction Engineering Technician/Technology
- Construction Trades & Techniques
- Civil Engineering
- Environmental Engineering Science Certificate
- Geographic Analysis
- Sustainable Energy & Building Technology

Additional Occupations for Consideration

Additional occupations that are identified as green collar and relate to the Construction industry are:

- External Insulation Mechanic
- Solar Installer
- Geothermal Installer
- Green Roof Specialist
- Project/ Program Coordinator
- Sustainable Architect
- Sustainable Interior Designer

Manufacturing (NAICS 31-33)

Industry Overview

This sector is comprised of businesses 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 the assembly of the component parts of manufactured goods; the blending of materials; and the finishing of manufactured products by dyeing, heat-treating, plating and similar operations are also considered manufacturing activities. Manufacturing firms are known through a variety of trade designations, such as plants, factories or mills.[49] The main sub-sectors within the manufacturing industry are:

- Food Manufacturing
- Beverage and Tobacco Product Manufacturing
- Textile Mills
- Textile Product Mills
- Clothing Manufacturing
- Leather and Allied Product Manufacturing
- Wood Product Manufacturing
- Paper Manufacturing
- Printing and Related Support Activities
- Petroleum and Coal Products Manufacturing
- Chemical Manufacturing
- Plastics and Rubber Products Manufacturing
- Non-Metallic Mineral Product Manufacturing
- Primary Metal Manufacturing
- Fabricated Metal Product Manufacturing
- Machinery Manufacturing
- Computer and Electronic Product Manufacturing
- Electrical Equipment, Appliance and Component Manufacturing
- Transportation Equipment Manufacturing
- Furniture and Related Product Manufacturing
- Miscellaneous Manufacturing

Industry Presence

Canadian Business Patterns data[50] released by Statistics Canada indicates that there were over 17,500 employers in the Manufacturing industry across the Greater Toronto Area in 2009. This means that manufacturing is one of the region`s largest industries. In 2006, there were a total of 346,145 people employed in this industry, accounting for 13.4% of the total workforce across all three Local Boards areas compared to a total of 13.86% across Ontario.

Table 7 shows the respective numbers in each of the three regions.

Table 7: Number of People Employed in Manufacturing (NAICS 31-33)

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Manufacturing (NAICS 31-33)	136,795	144,135	65,215	346,145	854,380
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
% employed in Manufacturing	16.14%	11.60%	13.41%	13.4%	13.86%

Source: Statistics Canada, 2006 Census

There are 854,380 people employed in the Manufacturing sector across Ontario, 40.5% of which are in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury areas. This suggests that Manufacturing is very important in these Local Board areas. The industry has seen severe losses in the past two decades and more rapid losses in the past year's economic downturn. Across the three Local Board areas, the Manufacturing industry lost 3,515 employers from December 2003 to June 2009, a decrease of 16.7% from 2003.[51] Decline in the Manufacturing sector occurred across all employment size ranges. Despite the severe losses Manufacturing is still a vital component of Ontario`s economy and the transition from traditional manufacturing to green manufacturing is expected to create more opportunity across various occupations.

The Green Economy and Manufacturing

Currently there are emerging Manufacturing sectors related to the green economy that are growing. Proof of the importance of the Manufacturing industry in the green economy was highlighted in a recent article from the *Toronto Star*.[52] The article reported that the building of a $500 million solar module manufacturing plant in Kingston, Ontario will create over 1,200 green jobs. Additionally, WindTronics, a wind turbine manufacturer, is opening a plant in Windsor, Ontario. The province is providing $2.7 million to help the company establish its Ontario operations, while the company is investing an additional $2.7 million. This investment will create 174 new jobs by 2012 and bring new capabilities to the province's Manufacturing and alternative energy sectors.

Furthermore, the Ontario government is helping create up to 100 new green-tech jobs by supporting the expansion of the Roxul[53] manufacturing facility in Milton. The 700,000 square foot expansion will triple the company's production capacity. Construction of the new plant began two years ago and was made possible through an Ontario government loan of $10 million. The loan was made through Ontario's Advanced Manufacturing Investment Strategy (AMIS). Since 2005, AMIS has made $100 million in loans to 18 Ontario companies, leveraging $890 million in new investment and creating and supporting 4,000 jobs across Ontario.[54]

Manufacturing may be the industry most affected by the emergence of the green economy in terms of both direct and indirect jobs. Manufacturing plants that are "going green" are creating new demand for managers, engineers, labourers, operators and materials handlers who are green specialists. Indirect jobs are also being generated. For example, an increase in alternative energy such as wind energy has an impact on the demand for the manufacture of wind turbines. There are about 8,000 parts needed in the production of a wind turbine tower, the manufacturing of which creates demand for trades' workers and manufacturers that are knowledgeable about the latest processes used in green manufacturing.[55]

The new Federal Economic Development Agency for Southern Ontario has announced several new funding programs totalling $30 million. Approximately $16 million will be devoted to the Canadian Manufacturers and Exporters (CME) SMART program, which provides grants of up to $50,000 for small and medium-sized manufacturers seeking to increase productivity through efforts such as lean manufacturing, energy efficiency and improved industrial design. Investments such as this will fuel the green manufacturing industry and thus create many new green manufacturing jobs locally.

Key Occupations

There are 346,145 people employed in Manufacturing in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas.

Table 8 shows the occupations of those 346,145 workers.

Table 8: Top Occupations in Manufacturing (NAICS 31-33) by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
9482 Motor vehicle assemblers, inspectors and testers	7,295	5,770	3,975	17,040	4.92%
0911 Manufacturing managers	5,430	3,930	3,545	12,905	3.73%
9619 Other labourers in processing, manufacturing and utilities	4,285	6,225	1,655	12,165	3.51%
9617 Labourers in food, beverage and tobacco processing	3,500	4,740	650	8,890	2.57%
9422 Plastics processing machine operators	3,665	4,010	1,090	8,765	2.53%
7452 Material handlers	3,945	3,200	1,150	8,295	2.40%
1471 Shippers and receivers	3,025	3,440	1,145	7,610	2.20%
9451 Sewing machine operators	960	5,195	1,365	7,520	2.17%
9511 Machining tool operators	2,805	3,555	1,095	7,455	2.15%
0611 Sales, marketing and advertising managers	2,940	2,135	1,520	6,595	1.91%
Total - All Occupations	**136,795**	**144,135**	**65,215**	**346,145**	---

Source: Statistics Canada, 2006 Census

Of the ten occupations listed above, two are management level occupations, six are skill level C occupations and two are skill level D.[56] In the Manufacturing industry the majority of occupations are skill level C, however, the presence of management level occupations provides the opportunity for internal progression.

Skills Transferability

Applying the Matrix of Skills Transferability (Appendix A) determines the occupations with the greatest potential for skills transferability. Table 9 outlines the top occupations in Manufacturing and matches them with occupations where skills transferability exists.

Table 9 shows that the majority of occupations in the Manufacturing industry are lower skilled, requiring little-to-no formal education. There is strong mobility between occupations in this sector. Possessing additional education and certification will allow for faster mobility to higher level occupations in this industry and support a more advanced manufacturing environment.

Table 9: Top Occupations in Manufacturing (NAICS 31-33) and Skills Transferability Possibilities

Occupation	Occupations with Skills Transferability
9482 Motor vehicle assemblers, inspectors and testers	Low skilled occupation, internal progression is strong
0911 Manufacturing managers	Management level occupation, internal progression though unit group is strong
9619 Other labourers in processing, manufacturing and utilities	Low skilled occupation, internal progression is strong
9617 Labourers in food, beverage and tobacco processing	Low skilled occupation, internal progression is strong
9422 Plastics processing machine operators	Low skilled occupation, internal progression is strong
7452 Material handlers	Low skilled occupation, internal progression is strong
1471 Shippers and receivers	Low skilled occupation, internal progression is strong
9451 Sewing machine operators	Low skilled occupation, internal progression is strong
9511 Machining tool operators	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 traditional occupations throughout the Manufacturing 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 Manufacturing industry are:

- Industrial Mechanic Millwright
- Mechanical Engineering
- Mechanical Engineering Technician/Technology – Design and Drafting
- Mechanical Technician – CAD/CAM
- Materials Engineering
- Quality Assurance - Manufacturing & Management

Additional Occupations for Consideration

Additional occupations that are identified as green collar and relate to the Manufacturing industry are:

- Air Quality Engineer
- Biochemist
- Chemical Technician
- Environmental Chemist
- Environmental Engineer
- Hazardous Materials Specialist
- Industrial Designer
- Process Engineer

Retail Trade (NAICS 44-45)

Industry Overview

The Retail Trade sector is comprised of firms primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The retailing process is the final step in the distribution of merchandise; retailers are therefore organized to sell merchandise in small quantities to the consumer market. This sector is made up of two main types of retailers, store and non-store retailers.[57] The main sub-sectors of the Retail Trade industry are:

- Motor Vehicle and Parts Dealers
- Furniture and Home Furnishings Stores
- Electronics and Appliance Stores
- Building Material and Garden Equipment and Supplies Dealers
- Food and Beverage Stores
- Health and Personal Care Stores
- Gasoline Stations
- Clothing and Clothing Accessories Stores
- Sporting Goods, Hobby, Book and Music Stores
- General Merchandise Stores
- Miscellaneous Store Retailers
- Non-store Retailers

Industry Presence

The Retail Trade industry is relatively large compared to most other industries in terms of the number of employers and the number of people employed. In 2006 a total of 269,580 people were employed in this industry across Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas, 10.47% of the total workforce from all regions, compared to 11.03% across Ontario. The table below shows the respective numbers in each of the three regions.

Table 10: Number of People Employed in Retail Trade (NAICS 44-45)

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Retail Trade (NAICS 44-45)	92,100	121,985	55,495	269,580	679,710
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
% employed in Retail Trade	10.87%	9.82%	11.41%	10.47%	11.03%

Source: Statistics Canada, 2006 Census

In total 679,710 people are employed in the Retail Trade sector across Ontario, 39.66% of this workforce is in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas. The industry lost 1,404 employers across the three Local Board areas from December 2003 to June 2009. This is a decline of 4.08% from 2003.[58]

A decline of over 600 employers occurred in the indeterminate employer size, most likely representing the closing of many individually owned retail businesses. At the same time there was an increase of almost 700 employers in small sized businesses (1 to 49 employees), possibly indicating strong entrepreneurial activity in this sector. This may be an indicator or predictor of future growth in retail trade.

The Retail Trade industry is substantial in size throughout Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas. Currently, the industry is seeing strong growth entrepreneurially that may expand more as opportunities emerge related to the growth of environmental awareness as an important consideration in consumer purchases.

The Green Economy and Retail Trade

The focus on the green economy is affecting more than just industries and businesses. Many consumers are becoming more environmentally conscious and reducing their personal carbon footprints. The emergence of green jobs could lead to a new wave of employment opportunities, lower unemployment rates and eventually influence consumer spending. An increase in consumer spending directly affects the purchase of environmentally friendly goods and services and could result in a "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.[59] The International Labour Organization estimates that the global market for environmental products and services will double in size from $1.37 trillion (US) in 2008 to $2.74 trillion (US) by 2020.[60] Statistics Canada reports that Canadian firms earned $1.85 billion from selling environmental goods and services in 2004, an increase of almost 17% from 2002.[61] The retail food industry is perhaps the sector of Retail Trade hit hardest by the "green" movement. The green food and beverage packaging industry is forecasted to total at least US $42 billion by 2010 in the United States, with eco-friendly packaging expected to see 20% growth annually. Similar trends are also seen across Canada, increasing demand on this sector in terms of specialized labour.[62]

Mountain Equipment Co-op, a leading retailer of outdoor clothing and equipment, has recently implemented the position of Sustainability Advisor or Expert. This salesperson advises customers about the life and environmental impacts of the products they purchase. Similarly, Ontario is helping an Ottawa-based sports equipment manufacturer create jobs and produce a new line of innovative, green products. The province is providing a loan of $2.55 million to Combat Sports to develop and produce sporting goods from materials that are more durable than existing products and are recyclable at the end of their useful life. The project will create 112 new jobs and retain 47 existing positions in Ottawa.[63]

Retailers as a whole are dramatically affected by the green economy. Consumers are becoming more discerning and increasingly aware of the effects consumer products have on the environment. All of these trends are pushing the Retail Trade industry to be more environmentally conscious, creating more opportunities for those with special knowledge about environmentally friendly products and services.

Key Occupations

Of the ten occupations listed in Table 11 below, one is a management level occupation, two are skill level B occupations, five are skill level C occupations and two are skill level D.[64] Occupations in the Retail Trade industry span the spectrum of skill levels providing a range of employment opportunities for varying skill levels. Management level occupations provide the opportunity for internal progression in this sector.

Table 11: Top Occupations in Retail Trade (NAICS 44-45) by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
6421 Retail salespersons and sales clerks	28,625	38,740	18,080	85,445	31.70%
0621 Retail trade managers	12,505	17,405	8,570	38,480	14.27%
6611 Cashiers	9,580	13,405	5,165	28,150	10.44%
6622 Grocery clerks and store shelf stockers	5,610	7,435	3,145	16,190	6.01%
6211 Retail trade supervisors	2,895	3,865	1,575	8,335	3.09%
7452 Material handlers	2,155	1,540	430	4,125	1.53%
1471 Shippers and receivers	1,535	2,045	495	4,075	1.51%
1453 Customer service, information and related clerks	1,595	1,505	930	4,030	1.49%
7321 Automotive service technicians, truck and bus mechanics and mechanical repairers	1,440	1,370	1,010	3,820	1.42%
3414 Other assisting occupations in support of health services	1,220	1,795	620	3,635	1.35%
Total - All Occupations	**92,100**	**121,985**	**55,495**	**269,580**	---

Source: Statistics Canada, 2006 Census

Skills Transferability

Applying the Matrix of Skills Transferability (Appendix A) identifies those occupations with the greatest potential for skills transfer. The table below outlines the top occupations in Retail Trade and matches them with occupations with skills transferability.

The majority of occupations in the Retail Trade industry are lower skilled occupations requiring little-to-no formal education. There is strong mobility between occupations throughout this sector. Possessing additional education and certifications or specialty retail knowledge will allow for greater mobility to higher level occupations in this industry.

Table 12: Top Occupations in Retail Trade (NAICS 44-45) and Skills Transferability Possibilities

Occupation	Occupations with Skills Transferability
6421 Retail salespersons and sales clerks	Low skilled occupation, internal progression is strong
0621 Retail trade managers	Management level occupation, internal progression though unit group is strong
6611 Cashiers	Low skilled occupation, internal progression is strong
6622 Grocery clerks and store shelf stockers	Low skilled occupation, internal progression is strong
6211 Retail trade supervisors	Occupations in this unit group are dominated by internal progression
7452 Material handlers	Low skilled occupation, internal progression is strong
1471 Shippers and receivers	Low skilled occupation, internal progression is strong
1453 Customer service, information and related clerks	Low skilled occupation, internal progression is strong
7321 Automotive service technicians, truck and bus mechanics and mechanical repairers	7316 Machine fitters
3414 Other assisting occupations in support of health services	Very diverse unit group, most occupations are dominated by internal progression

Educational Programs and Certifications

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

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

- Business Administration
- Customer Service

Additional Occupations for Consideration

Additional occupations that are identified as green collar and relate to the Retail Trade industry are:

- Environmental Technical Sales Persons
- Sustainability Advisor or Expert

Financial Services (NAICS 52)

Industry Overview

The Financial Services sector is comprised of firms primarily engaged in transactions involving the creation, liquidation, or change in ownership of financial assets, or in facilitating financial transactions.[i] This includes establishments that are engaged in:

- Financial intermediation - these types of firms channel funds from lenders to borrowers and transform or repackage the funds with respect to maturity, scale and risk.
- The pooling of risk by underwriting annuities and insurance - these firms collect fees (i.e. insurance premiums), build up reserves, invest those reserves and make contractual payments. Fees are based on the expected incidence of the insured risk and the expected return on investment.
- Providing specialized services that facilitate or support financial intermediation, insurance and employee benefit programs.

Monetary authorities such as The Bank of Canada are also included in this sector.

Industry Presence

In 2006, the Financial Services sector employed approximately 183,980 people across the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas, 7.14% of this area's total labour force, as compared to 4.98% across Ontario.[ii] The Table below demonstrates the respective numbers in each of the three Local Board areas.

Table 1: Number of People Employed in Financial Services (NAICS 52)

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Financial Services (NAICS 52)	53,835	95,365	34,780	183,980	307,225
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
Percentage employed in Financial Services	6.35%	7.68%	7.15%	7.14%	4.98%

Source: Statistics Canada, 2006 Census

Peel-Halton, Toronto and York Region, Bradford West Gwillimbury are the dominant regions in Ontario for the Financial Services sector where employment is concerned. In total there are 307,225 people employed across the Financial Services sector in Ontario, 59.9% of which work in the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury local board areas.[iii] While recent economic turmoil has drastically affected the financial markets and its stability, the growing recovery is inspiring innovation and opportunity, particularly in emerging green industry and practices. Because the Financial Services sector is so heavily concentrated in the Greater Toronto Area, it is important to consider its response to the greening economy and the impact this has on overall employment throughout the region.

The Green Economy and Financial Services

The Financial Services sector is a long standing and extremely traditional sector within Canada. It includes consumer, commercial and investment banking, vehicle and equipment leasing, wealth management, insurance, securities and mutual funds.[iv] Over the past several years, however, the sector has seen many changes, including the growth of credit unions, a diversification of product offerings and a relaxation of federal legislation, which will allow for the growth of institutions.[v]

While the shift to green can easily be seen throughout sectors targeted on energy creation and manufacturing, understanding the transitions throughout the Financial Services sector can be more difficult. There are, however, adjustments and transitions occurring in Financial Services that mirror those occurring throughout other sectors and across the green economy as a whole.

Until a few years ago, most traditional banks did not practice "green" banking or actively seek investment opportunities in environmentally-friendly sectors or businesses. Only recently have green financial products and services become more prevalent.[vi] There are numerous innovative green financial products emerging, such as green car loans, energy efficiency mortgages, green venture capital, eco-savings deposits, and green credit cards.[vii] Joel Makower, the Executive Editor of Greener World Media, states that, "while it is hardly a tipping point, financial service companies seem increasingly interested, almost eager, to cater to green-minded consumers and companies."[viii]

In general, the main drivers and trends that are pushing the emergence and growth in green product and service demand are environmental awareness, public opinion, media coverage and environmental regulation and legislation.[ix]

Banks tend to offer green products and services for two main reasons: 1) the management or Board recognizes the opportunity or risk associated with an environmental issue and responds with optimal products or services, and 2) they recognize a considerable demand and opportunity in filling a niche with a green product or service.[x] Green products in the Financial Services sector are those that provide consumers with transparent options to reduce the indirect impacts of their banking activities while reducing negative environmental impacts or providing environmental benefits.[xi]

The United Nations Environment Programme (UNEP) has conducted research on current and emerging green banking products and services offered by banks in North America.

Their work points to the growth of services in the following areas:

Green Mortgages – Green mortgages, or energy efficient mortgages (EEMs) provide retail customers with considerably lower interest rates than market level for clients who purchase new energy efficient homes and/or invest in retrofits, energy efficient appliances or green power.

- The CMCH offers a 10% premium refund on its mortgage loan insurance premiums and extended amortization to a maximum of 35 years (subject to lender availability) to purchase energy efficient homes or make energy efficient renovations.

Commercial Building Loans – Commercial building loans include specific loan designs and arrangements for "green" commercial buildings, characterized by lower energy consumption (15-25% reduction) and reduced waste and pollution levels. Buildings that qualify under these green requirements are receiving credit for reduced operating expenses, improved performance and longer lifetimes. This also includes mortgage loans for building and refinancing LEED-certified commercial buildings. For example, The City of Toronto, through its Toronto Atmospheric Fund, has partnered with Tridel® to pilot the Green Loan Initiative. These green commercial building loans are applied to energy-efficient condo equipment that generates cost savings. These savings are then applied to the cost of the loan.

- Home Equity Loans – These are loans given against home equity for the purpose of financing green retrofits, i.e., the installation of solar electricity panels.
- Auto Loans – Auto loans with preferential rates for hybrid cars.
- Deposits – This includes donations and investments into green and sustainable projects. For example, EcoDeposits are earmarked for lending to local energy-efficient companies that aim to reduce waste and pollution, or are involved in conservation.
- Green Credit Cards – Credit card programs where a portion of sales are donated to environmental groups, used to offset emissions associated with purchases, or where interest rates are reduced for green products and services, among other schemes.

The United Nations Environment Programme research found four broad markets that are expected to grow with this "green finance" trend: 1) green commercial real estate 2) carbon markets 3) clean technology, and 4) climate-related insurance.[xii]

As banks and other financial institutions recognize both the pressing environmental need and the growing consumer demand for more environmentally responsible financial services, the prevalence of green finance will increase. Employment throughout the Financial Services sector will naturally need to adjust to this change.

When an organization shifts their focus towards environmental sustainability, the qualifications for employees also needs to adjust, placing new demands and skills requirements on the labour force. Many occupations in the Financial Services sector are highly skilled, often requiring a university education. This will not change. However, there will be new opportunities emerging throughout banks and other financial institutions for environmentally trained professionals, such as Policy Developers, Sustainability Coordinators, Environmental Auditors, etc.

Key Occupations

Financial Services occupations span a wide range of skill and education levels. In this sector there are opportunities for those who have minimal formal education as well as those with bachelor`s and master`s degrees. Of the ten occupations listed below, one is a management level occupation, five are skill level *A* occupations, requiring a university education, two are skill level *B* occupations, requiring a college education or apprenticeship training and two are skill level *C* occupations, requiring secondary school and on-the-job training.[xiii]

Table 2: Top Occupations in Financial Services (NAICS 52) by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
1433 Customer Service Representatives - Financial Services	5,620	9,330	3,470	18,420	10.01%
0122 Banking, Credit and Other Investment Managers	4,940	8,425	3,015	16,380	8.90%
1114 Other Financial Officers	3,685	5,845	2,610	12,140	6.60%
6231 Insurance Agents and Brokers	3,500	4,055	2,325	9,880	5.37%
1434 Banking, Insurance and Other Financial Clerks	2,685	4,795	1,480	8,960	4.87%
1112 Financial and Investment Analysts	1,980	5,185	1,455	8,620	4.69%
2171 Information Systems Analysts and Consultants	2,125	4,175	1,855	8,155	4.43%
1232 Loan Officers	2,585	3,510	1,450	7,545	4.10%
1113 Securities Agents, Investment Dealers and Brokers	1,765	4,415	1,350	7,530	4.09%
1111 Financial Auditors and Accountants	1,505	2,800	1,055	5,360	2.91%
Total - All Occupations	**92,100**	**121,985**	**55,495**	**269,580**	---

Source: Statistics Canada, 2006 Census

Skills Transferability

The Financial Services sector is marked by the transferability of skills and the mobility of the sector's workforce. Utilizing the Matrix of Skills Transferability (Appendix A), we can determine the occupations with the most skills transferability in the sector. The following Table outlines the top occupations in Financial Services and matches them with occupations where skills transferability exists.

Table 3: Top Occupations in Financial Services (NAICS 52) and Skills Transferability Possibilities [xiv]

Occupation	Occupations with Skills Transferability
1433 Customer Service Representatives - Financial Services	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 1434 Banking, Insurance and Other Financial Clerks • 1453 Customer Service, Information and Related Clerks • 1212 Supervisors, Finance and Insurance Clerks
0122 Banking, Credit and Other Investment Managers	Management level occupation, internal progression though Unit Group is strong.
1114 Other Financial Officers	Very heterogeneous Unit Group, no occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 4163 Economic development officers • 4162 Economists • 1112 Financial and Investment Analysts • 012 Managers in Financial and Business Services • 1113 Securities Agents, Investment Dealers and Brokers
6231 Insurance Agents and Brokers	1233 Insurance Adjusters and Claims Examiners
1434 Banking, Insurance and Other Financial Clerks	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 1231 Bookkeepers • 1453 Customer Service, Information and Related Clerks • 1433 Customer Service Representatives - Financial Services • 1411 General Office Clerks • 1212 Supervisors, Finance and Insurance Clerks
1112 Financial and Investment Analysts	1122 Professional Occupations in Business Services to Management
2171 Information Systems Analysts and Consultants	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 0213 Computer and Information Systems Managers • 2147 Computer Engineers (Except Software Engineers and Designers) • 2174 Computer Programmers and Interactive Media Developers • 2172 Database Analysts and Data Administrators • 1111 Financial Auditors and Accountants • 1122 Professional Occupations in Business Services to Management • 2173 Software Engineers and Designers • 2175 Web Designers and Developers

Table 3: Top Occupations in Financial Services (NAICS 52) and Skills Transferability Possibilities [xiv]

Occupation	Occupations with Skills Transferability
1232 Loan Officers	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 0122 Credit and Loan Managers
1113 Securities Agents, Investment Dealers and Brokers	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 1112 Financial and Investment Analysts • 0121 Financial Brokerage Managers • 1114 Other Financial Officers
1111 Financial Auditors and Accountants	1221 Administrative Officers 1225 Purchasing Agents and Officers 1231 Bookkeepers

Table 3 shows that there are several occupations in the Financial Services sector that loan themselves easily to skills transferability. Many of these occupations are characterized by internal progression through the Occupational Unit Group. This equates with there being advancement opportunities within the Financial Services sector.

Educational Programs and Certifications

The transferability of traditional occupations throughout the Financial Services sector to "green collar" occupations often requires the completion of a degree, diploma or certification program. Education programs and certifications that relate specifically to these occupations are:

- Business Administration
- Customer Service
- Environment and Business
- Environmental Economics
- Environmental Management
- Environmental Professional Certification
- Environmental Studies
- Finance
- Human Resources and Environment, Health and Safety
- Project Management, Environmental
- Thinking Environmentally Certificate

Additional Occupations for Consideration

Additional occupations that are identified as green collar and relate to the Financial Services sector are:

- Recycling Coordinator
- Compliance Promotion Specialist
- Energy Auditor
- Environmental Assessment Analyst
- Environmental Auditor
- Environmental Communications Officer
- Environmental Manager
- Environmental Policy Analyst

Information Communication Technology (ICT)

Industry Overview

The Information Communication Technology (ICT) sector consists of a range of industries. The key industries making up this sector are:[xv]

- Machinery Manufacturing (NAICS 333)
- Computer and Electronic Product Manufacturing (NAICS 334)
- Electrical Equipment, Appliance and Component Manufacturing (NAICS 335)
- Machinery, Equipment and Supplies Wholesaler-Distributors (NAICS 417)
- Publishing Industries—excluding Internet (NAICS 511)
- Telecommunications (NAICS 517)
- Internet Service Providers, Web Search Portals, and Data Processing Services (NAICS 518)
- Rental and Leasing Services (NAICS 532)
- Professional, Scientific and Technical Services (NAICS 541)
- Repair and Maintenance (NAICS 811)

The ICT sector is comprised of industries primarily engaged in producing goods or services or supplying technologies used to process, transmit or receive information. The underlying principles that define the industries within the sector are as follows:[xxvi]

For manufacturing industries products must:

- Be intended to fulfil the function of information processing and communication, including transmission and display; or
- Use electronic processing to detect, measure and/or record physical phenomena or to control a physical process.

For service industries products must:

- Be intended to enable the function of information processing and communication by electronic means.

Industry Presence

In 2006, the Information Communication Technology sector employed 461,255 people across Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas, accounting for 17.91% of the total workforce, as compared to 14.56% across Ontario.[xvii] The table below shows the respective numbers in each of the three regions.

Table 4: Number of People Employed in Information Communication Technology

	Peel Halton	Toronto	York Region Brad WG	Total	Ontario
Information Communication Technology (ICT)	145,445	224,145	91,665	461,255	897,255
Total people employed across all industries	847,305	1,242,215	486,455	2,575,975	6,164,245
Percentage employed in ICT	17.17%	18.04%	18.84%	17.91%	14.56%

Source: Statistics Canada, 2006 Census

There are 897,255 people employed in the ICT sector in Ontario, 51.4% of which are employed throughout Peel-Halton, Toronto and York Region, Bradford West Gwillimbury.[xviii] This means that the sector is one of the most dominant industries across these three Local Board areas and that its workforce represents a substantial portion of the province's entire ICT sector.

Nationally, the ICT sector is a significant industry, employing approximately 822,000 people.[xix] From December 2008 to December 2009, the ICT sector grew by 5.7% in employment across Ontario. In December of 2009, when the national unemployment rate reached 8.5%, unemployment across the ICT sector was only 4.5%.[xx] These statistics show not only the importance of the ICT workforce, but the strength of the sector generally.

The Green Economy and ICT

As all industries continue their transition towards increased sustainability, the demand for green ICT will naturally follow. Currently, the ICT sector as a whole accounts for 2% of all global CO2 emissions and the efficient use of green ICT technologies would allow the sector to help reduce the remaining 98% of emissions through business and consumer use.[xxi] A report released by Forrester shows that between 2007 and 2009, there was a 30% growth in the number of businesses applying environmental criteria to their IT plans.[xxii] This trend, generally, can be seen across the ICT sector.

Green ICT is understood as all information technology solutions, such as hardware, software and services that help to save energy at business organizations. Green ICT also includes such things as environmentally friendly procurement, employee behaviours, management of equipment and much more.[xxiii] Green ICT is an intangible product and service centering around intelligent solutions that focus on sustainability.

The greening of the ICT sector involves improving the efficiencies of the ICT infra structure, developing new and advanced technologies and improving overall efficiencies. The ICT workforce tends to be highly educated and the transition to green will not change this. The sector has seen an increase in secondary school and college educated workers since 2008. The number of people with community college diplomas increased 11.4% and those with Bachelor's degrees increased 3.6%.[xxiv] These numbers demonstrate the demand for highly skilled workers throughout the ICT sector.

The ICT sector is vitally important to the green economy. In fact, the growth of the sector is parallel with that of the green economy. Because of the nature of the green ICT sector, as demands for improved sustainability practices and products increases, consumer demands for products and services in the ICT sector generally, will also increase. Therefore, ensuring we understand the transitions throughout this sector and the occupational shifts will be key to ensuring it remains one of the driving employers in Ontario's workforce.

Key Occupations

ICT occupations span a wide range of skill and education levels. In this sector there are opportunities for those who have minimal formal education as well as those with bachelor`s or master`s degrees. Of the ten occupations listed below, one is a management level occupation, five are skill level *A* occupations, one is a skill level B and three are skill level *C*.[xxv] The table indicates that the majority of occupations in the ICT industry are skills level *A*, requiring a university level education.

The following Table shows the top occupations based on the number of people employed in the ICT sector:

Table 5: Top Occupations in ICT by the Number of People Employed

Occupation	Peel Halton	Toronto	York Region Brad WG	Total	% of Total
2171 Information Systems Analysts and Consultants	7,080	11,975	5,685	24,740	5.36%
1111 Financial Auditors and Accountants	5,385	8,885	4,380	18,650	4.04%
2174 Computer Programmers and Interactive Media Developers	3,985	9,000	3,995	16,980	3.68%
0611 Sales, Marketing and Advertising Managers	5,430	7,860	3,415	16,705	3.62%
4112 Lawyers `and Québec Notaries	1,945	10,935	1,875	14,755	3.20%
1122 Professional Occupations in Business Services to Management	2,580	6,225	1,810	10,615	2.30%
7321 Automotive Service Technicians, Truck and Bus Mechanics and Mechanical Repairers	4,055	4,155	2,165	10,375	2.25%
1411 General Office Clerks	3,360	4,415	2,055	9,830	2.13%
6421 Retail Salespersons and Sales Clerks	3,675	4,115	1,845	9,635	2.09%
1453 Customer Service, Information and Related Clerks	3,305	4,670	1,500	9,475	2.05%
Total - All Occupations	**145,445**	**224,145**	**91,665**	**461,255**	---

Source: Statistics Canada, 2006 Census

Skills Transferability

In order to determine the transferability of occupations within the ICT sector, the Matrix of Skills Transferability (Appendix A)[xxvi] was applied to the top occupations in the sector, matching them with occupations where skills transferability exists. A few of the below occupations are characterized by internal progression, while others provide several direct transfer occupations..

Table 6: Top Occupations in the Information Communication Technology sector with Skills Transferability Possibilities

Occupation	Occupations with Skills Transferability
2171 Information Systems Analysts and Consultants	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 0231 Computer and Information Systems Managers • 2147 Computer Engineers (Except Software Engineers and Designers) • 2174 Computer Programmers and Interactive Media Developers • 2172 Database Analysts and Data Administrators • 1111 Financial Auditors and Accountants • 1122 Professional Occupations in Business Services to Management • 2173 Software Engineers and Designers • 2175 Web Designers and Developers
1111 Financial Auditors and Accountants	1221 Administrative Officers 1225 Purchasing Agents and Officers 1231 Bookkeepers
2174 Computer Programmers and Interactive Media Developers	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 2281 Computer Network Technicians • 2172 Database Analysts and Data Administrators • 5421 Graphic Designers and Illustrators • 2171 Information Systems Analysts and Consultants • 2173 Software Engineers and Designers • 2283 Systems Testing Technicians • 2175 Web Designers and Developers
0611 Sales, Marketing and Advertising Managers	Management level occupation, internal progression though Unit Group is strong.
4112 Lawyers and Québec Notaries	4211 Paralegal and Related Occupations
1122 Professional Occupations in Business Services to Management	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 4163 Business Development Officers and Marketing Researchers and Consultants • 4162 Economists and Economic Policy Researchers and Analysts • 1112 Financial and Investment Analysts • 1111 Financial Auditors and Accountants • 2141 Industrial and Manufacturing Engineers • 1114 Other Financial Officers
7321 Automotive Service Technicians, Truck and Bus Mechanics and Mechanical Repairers	7316 Machine Fitters

Table 6: Top Occupations in the Information Communication Technology sector with Skills Transferability Possibilities

Occupation	Occupations with Skills Transferability
1411 General Office Clerks	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 1441 Administrative Clerks • 1422 Data Entry Clerks • 1414 Receptionists and Switchboard Operators • 1413 Records Management and Filing Clerks • 1241 Secretaries (Except Legal and Medical) • 1211 Supervisors, General Office and Administrative Support Clerks
6421 Retail Salespersons and Sales Clerks	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 6611 Cashiers • 6622 Retail stock clerks • 6211 Sales clerk supervisors
1453 Customer Service, Information and Related Clerks	No occupations were found where direct transfers exist, however occupations with significant overlap between the skills and knowledge required are: • 1452 Correspondence, Publication and Related Clerks • 1433 Customer Service Representatives in Banks and other Financial Institutions • 6433 General Ticket and Information Agents • 1414 Receptionists and Switchboard Operators • 6421 Retail Salespersons and Sales Clerks • 1213 Supervisors, Library, Correspondence and Related Information Clerks • 6434 Ticket and Information Clerks (except airline)

Educational Programs and Certifications

The transferability of traditional occupations throughout the ICT sector to "green collar occupations" often requires the completion of a degree, diploma or certification program. Education programs and certifications that relate specifically to the ICT industry are:

- Environmental Engineering
- Environmental Management
- Environmental Professional Certification
- Environmental Studies
- Project Management, Environmental
- Sustainable Resource Systems
- Thinking Environmentally Certificate

Additional Occupations for Consideration

Additional occupations that are identified as green collar and relate to the ICT sector are:

- Compliance Promotion Specialist
- Energy Auditor
- Environmental Assessment Analyst
- Environmental Auditor
- Environmental Manager

i See endnote [5]
ii See endnote [6]
iii See endnote [6]
iv See endnote [5]
v Joel Makower. The Slow Rise of Green Financial Services. BusinessGreen. October 4, 2007.
vi United Nations Environment Programme Finance Initiative. Green Financial Products and Services: Current Trends and Future Opportunities in North America. August 2007.
vii See endnote [23]
viii See endnote [22]
ix See endnote [23]
x See endnote [23]
xi See endnote [23]
xii See endnote [23]
xiii Human Resources Skills Development Canada, 2006, National Occupational Classification System (NOC). NOC is a tool classifies occupations with a four-digit code according to skill type and skill level.
xiv Human Resources Skills Development Canada, 2003, Matrix of Skills Transferability. The Matrix of Skills Transferability compares 4 digit occupations to one another based on the potential transferability of skills and knowledge between the occupations.
xv See endnote [5]
xvi See endnote [5]
xvii See endnote [6]
xviii See endnote [6]
xix Information and Communications Technology Council (ICTC). 2009 Trends Special Report: ICT Labour Force Weathered the Economic Storm Better than Most sectors. 2009.
xx See endnote [38]
xxi See endnote [9]
xxii Christopher Mines. Market Overview: The Recession Dents Green IT's Global Momentum. July 2009.
xxiii See endnote [9]
xxiv See endnote [38]
xxv See endnote [31]
xxvi See endnote [32]

Emerging Green Careers

Green Careers are becoming an increasingly important component of the workforce. This is in part influenced by Ontario's Green Energy Act, which aims to position the province as North America's renewable energy leader. A recent report suggests that 90,000 net new jobs per year can be created in Ontario by increasing investment in building Ontario's green economy.[65]

In 2011, the number of individuals employed in environmental occupations in Canada is expected to reach over 570,000, an increase of 8.1% since 2006. Employment in the environment sector in Canada is expected to grow at approximately 6.6% over this same period.[66] Meeting the demand for workers to fill these green careers is a labour market challenge that Canada must meet to remain competitively positioned.

Employers across all environmental sectors are deeply concerned about the hiring, training, re-training and retention of qualified people to fill green jobs. In order to effectively plan for the workforce demands associated with the green economy, Ontario must have a solid understanding of the green jobs that will arise. This calls for strategic planning, policy development and data-driven workforce development.

In the previous section, the key occupations in each key sector based on the number of people employed throughout the Peel-Halton, Toronto and York Region, Bradford West Gwillimbury Local Board areas were profiled. There are additional emerging green occupations that may not yet have a strong presence throughout local industry, but may provide future employment opportunities. These occupations help describe the direction of the green economy and what occupations may emerge. ECO Canada, an organization devoted to outreach in the environmental sector and directed to employers, practitioners, educators, and students, was established in 1992 as part of Canada's Sector Council Initiative. ECO Canada has compiled a list of the top 15 key environmental occupations:

- Environmental Engineer
- Environmental Technician/Technologist
- Biologist
- Agrologist
- Chemist
- Civil Engineer
- Geoscientist
- Lab Technician/Technologist
- Project-Program Coordinator
- Project-Program Manager
- Conservation Technician/Technologist
- Environmental Educator
- Geomatics Technician/Technologist
- Hydro-geologist
- Land Use Planner

Emerging Green Careers

These occupations can be matched with NOC codes to gain an understanding of the number of employees working in these occupations and the industries in which they are employed. Table 13 below shows the top 15 ECO environmental careers matched with their respective NOC codes and the number of people employed in that occupation in each of the three key regions (Peel-Halton, Toronto and York Region, Bradford West Gwillimbury).

Table 13: ECO Canada Environmental Careers and the Number of People Employed

Green Careers	NOC Codes Included	Peel Halton	Toronto	York Region Brad WG	Total
Environmental Engineer	2131	2,245	3,410	1,715	7,370
Environmental Technician/Technologist	2231	360	525	250	1,135
Biologist	2121	645	1,035	285	1,965
Agrologist	2123	55	40	15	110
Chemist	2112	1,700	2,230	875	4,805
Civil Engineer	2131	2,245	3,410	1,715	7,370
Geoscientist	2113	290	285	105	680
Lab Technician/ Technologist	3212	1,360	1,730	490	3,580
	2211	1,815	1,345	765	3,925
	2212	215	180	90	485
	3218	20	25	20	65
Project/ Program Manager/ Coordinator	0711	2,915	3,760	2,640	9,315
	0211	1,480	1,205	1,060	3,745
	0212	450	670	215	1,335
Conservation Technician/Technologist	2223	10	35	30	75
Environmental Educator	4121	930	6,325	645	7,900
	4122	1,590	7,140	975	9,705
	4131	3,695	7,325	2,245	13,265
Geomatics Technician/Technologist	2254	55	80	40	175
	2255	210	315	135	660
Hydro-geologist	2113	290	285	105	680
Land Use Planner	2153	460	1,005	280	1,745
	2231	360	525	250	1,135

Source: Statistics Canada, 2006 Census

Combining all three regions, the total number of people employed in occupations directly related to the top 15 green jobs is 81,225.[67] The environmental sector in Canada is growing at a rate 60% faster than the overall growth rate of Canada's workforce. Since 54% of environmental employees in management positions in Canada are 45 years of age or older[68] this workforce is rapidly aging and planning for new hires is critical.

Determining the labour force needs of these occupations is important to understanding and informing future demand. Table 14 below pairs each of the above occupations with its top industry of employment for Ontario.

Table 14 indicates that the top industries of employment for these green occupations are Professional, Scientific and Technical Services (NAICS 54), Public Administration (NAICS 91) and Manufacturing (NAICS 31-33). 60% of these occupations are classified under Natural and Applied Sciences careers, meaning that the majority of green careers are found in this occupational stream. In terms of skill level, three of the occupations are considered management level; nine are skill level A occupations and eight are skill level B occupations.

All of the occupations above require some level of post-secondary education.[69] This emphasizes the importance of increasing the availability of environmentally related education programs to meet the demands of green jobs.

Table 14: ECO Canada Environmental Careers and the Top Industries of Employment

Green Careers	NOC Codes	Total People Employed in Ontario	Top Industry of Employment	Percentage Employed in Top Industry
Environmental Engineer	2131	14,990	Professional, scientific and technical services (NAICS 54)	50.3%
Environmental Technician/Technologist	2231	3,455	Professional, scientific and technical services (NAICS 54)	44.0%
Biologist	2121	523	Public administration (NAICS 91)	32.6%
Agrologist	2123	880	Agriculture, forestry, fishing and hunting (NAICS 11)	26.7%
Chemist	2112	7,805	Manufacturing (NAICS 31-33)	44.3%
Civil Engineer	2131	14,990	Professional, scientific and technical services (NAICS 54)	50.3%
Geoscientist	2113	2,145	Professional, scientific and technical services (NAICS 54)	46.2%
Lab Technician/ Technologist	3212	7,960	Health care and social assistance (NAICS 62)	88.7%
	2211	10,090	Manufacturing (NAICS 31-33)	43.0%
	2212	1,910	Professional, scientific and technical services (NAICS 54)	39.5%
	3218	240	Health care and social assistance (NAICS 62)	79.2%
Project/ Program Manager/ Coordinator	0711	21,555	Construction (NAICS 23)	80.7%
	0211	8,570	Manufacturing (NAICS 31-33)	44.7%
	0212	2,905	Professional, scientific and technical services (NAICS 54)	33.4%
Conservation Technician/Technologist	2223	1,245	Public administration (NAICS 91)	42.2%
Environmental Educator	4121	19,885	Educational services (NAICS 61)	99.9%
	4122	24,250	Educational services (NAICS 61)	92.8%
	4131	31,205	Educational services (NAICS 61)	60.5%
Geomatics Technician/Technologist	2254	810	Professional, scientific and technical services (NAICS 54)	64.2%
	2255	1,855	Public administration (NAICS 91)	48.2%
Hydro-geologist	2113	2,145	Professional, scientific and technical services (NAICS 54)	46.2%
Land Use Planner	2153	3,515	Public administration (NAICS 91)	60.3%
	2231	3,455	Professional, scientific and technical services (NAICS 54)	44.0%

Source: Statistics Canada, 2006 Census

About five percent of all Canadian college graduates graduated from an environmentally related program in 2005. Between 2002 and 2005, the number of graduates from environmentally related programs increased by approximately 12.6% compared to 15.7% across all programs.[70]

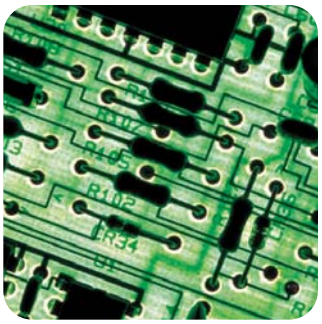
Many of the environmentally related programs are experiencing increases in enrolment and graduation numbers, City/Urban, Community and Regional Planning/Architecture and Related Services experienced the largest increase in graduates with a growth rate of 111.1% from 2002 to 2005. Biology Technician/ Biotechnology Laboratory Technician programs experienced an increased graduate growth rate of 91.2% from 2002 to 2005.[71]

While many programs are thriving and seeing increases in graduates, several others are not well known, promoted or attended. Promoting these programs and demonstrating their relevance through labour market research will, in part, address the gap in qualified workers to meet the supply and demand challenges of the green economy. In some cases, short-term bridge training may be sufficient to help with employee transition from a more traditional to a green career.

Appendix B outlines in detail these emerging educational degree and diploma programs for colleges and universities across the Greater Toronto Area, as well as additional programs and certifications available.

The following is a brief list of the types of programs available.

- Architectural Science/Technology
- Building Renovation/Retrofitting
- Chemical Engineering
- Civil Engineering
- Conservation
- Electrical Engineering
- Energy Auditor
- Environmental Management
- Environmental Practitioner
- Environmental Studies
- Industrial Engineering
- Lean Manufacturing
- Mechanical Engineering
- Renewable Energy
- Sustainability
- Urban and Regional Planning
- Various Trades Apprenticeships



References

Business Council of British Columbia. (2009, May). Charting the Green Economy. *Environment & Energy Bulletin*.

Doyle, K. (2008, February). How do we define the green-job economy?

ECO Canada. (2008). *College Graduation Trends for Environment-related Programs, 2002-2005*. Environmental Careers Organization Canada.

ECO Canada. (2007). Labour Market Transition: A Remedy for Labour Shortages in the Environment.

Global Citizen Centre. (2009). *The Global Citizen Centre*. Retrieved October 30 2009, from Utilizing the Green Economy: *www.globalcitizencenter.org*

Green For All. (2009). *Green Collar Jobs Overview*. Retrieved October 2009, from Green For All: *www.greenforall.org*

Jones, V. (2008). *The Green Collar Economy*. New York: HarperCollins.

Kelly, M. (2008, March). *The Emerging Green Economy*. Retrieved September 2009 , from CBC News : *www.cbc.ca/news*

MacDougall, G. (2009, October 9). *Just Green Jobs: Transitioning towards an environmental economy*. Retrieved September 2009, from The Dominion: *www.dominionpaper.ca*

Ministry of Economic Development and Trade. (2009, September 25). Powering the Green Economy. Ontario, Canada. Retrieved from Government of Ontario.

Ministry of Economic Development and Trade. (2009, October). Sports Equipment Going Green. Ontario.

Ministry of Energy and Infrastructure. (2009, September 30). Ontario Unveils Plan To Improve Air Quality In Southwest GTA. Ontario.

Ministry of Research and Innovation. (2009, October 16). Investment In Biofuel Research Is Paying Off. Ontario.

Ministry of Research and Innovation. (2008, April). Ontario Innovation Agenda. Ontario.

Sankey, D. (2009, November 6). Green jobs blooming in skilled trades. *The Calgary Herald*.

Statistics Canada. (2006). *2006 Census*.

Statistics Canada. (2009). Canadian Business Patterns.

Statistics Canada. (2007). Environment Industry. *Business Sector*.

Statistics Canada. (2002). *North American Industry Classification (NAICS)*. Retrieved October 2009

Statistics Canada. (2009, June). *The National Occupational Classification*. Retrieved October 2009, from *www5.hrsdc.gc.ca/NOC*

United Nations Environment Programme. (2008). Background Paper on Green Jobs. United Nations Environment Programme.

United Nations Environment Programme. (2008). *Green Jobs: Towards decent work in a sustainable, low carbon world.*

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 & 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
	2146 Aerospace engineers
	2232 Mechanical engineering technologists and technicians
	2233 Industrial engineering & manufacturing technologists & technicians
	2253 Drafting technologists and technicians
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

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
PROFESSIONAL - NATURAL AND APPLIED SCIENCES	
2141 Industrial and manufacturing engineers	2132 Mechanical engineers 2233 Industrial engineering & manufacturing technologists & 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
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 & 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) Z216 Mathematicians, statisticians and actuaries
2163 Computer programmers	216 Mathematicians, statisticians and actuaries
PROFESSIONAL - NATURAL AND APPLIED SCIENCES	
3111 Specialist physicians	2221 Biological technologists,technicians biological technologists, 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, technicians biological technologists, technicians 3211 Medical laboratory technologists and pathologists' assistants 3212 Medical laboratory technicians
3113 Dentists	3221 Denturists 3222 Dental hygienists and dental therapists

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
PROFESSIONAL - NATURAL AND APPLIED SCIENCES	
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
3132 Dieticians 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

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
PROFESSIONAL - SOCIAL SCIENCE, EDUCATION, GOVERNMENTS, ETC.	
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, program officers	Very heterogeneous unit group, unable to identify transferability
4161 Natural & applied science policy researchers, consultants, 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, marketing researchers & consultants
4163 Economic development officers, marketing researchers, 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
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	

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations		Occupations Where Skills Transferability Exists	
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
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, valuators 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, technicians geological, mineral technologists and technicians		
2213	Meteorological technicians		
2221	Biological technologists & 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 & industrial engineering	2231	Civil engineering technologists and technicians
		2232	Mechanical engineering technologists and technicians
		2233	Industrial engineering & manufacturing technologists & technicians
		2234	Construction estimators

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
TECHNICAL - SCIENCE AND APPLIED SCIENCES	
223 Technical occupations in civil, mechanical & industrial engineering	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 & manufacturing technologists & technicians	2253 Drafting technologists and technicians
2234 Construction estimators (NOC only)	Eliminate Unit Group NOC only
2241 Electrical & electronics engineering technologists & technicians	2242 Electronic service technicians (household and business equipment) 2243 Industrial instrument technicians and mechanics 2244 Aircraft instrument, electrical & avionics mechanics, technicians & 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
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	

National Occupational Classification System • Skills Transferability Matrix 2003

NOC	Occupations	Occupations Where Skills Transferability Exists
TECHNICAL - HEALTH OCCUPATIONS		
3219	Other medical technologists & 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
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	

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations		Occupations Where Skills Transferability Exists	
TECHNICAL - ART, CULTURE, RECREATION & SPORT			
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
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 & supervisors, metal forming, shaping & erecting trades		Eliminate Unit Group. Very heterogeneous group; internal progression
7215	Contractors and supervisors, carpentry trades		Eliminate Unit Group. Very heterogeneous group; internal progression

National Occupational Classification System • Skills Transferability Matrix 2003

NOC	Occupations	Occupations Where Skills Transferability Exists	
SKILLED - TRADES & TRANSPORT OPERATORS			
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		
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

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
SKILLED - TRADES & TRANSPORT OPERATORS	
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	
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

National Occupational Classification System • Skills Transferability Matrix 2003

NOC	Occupations	Occupations Where Skills Transferability Exists
SKILLED - TRADES & TRANSPORT 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
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 & process operators, mineral & metal processing	Eliminate unit group. Very heterogeneous group; internal progression

National Occupational Classification System • Skills Transferability Matrix 2003

NOC Occupations	Occupations Where Skills Transferability Exists
SKILLED - PRIMARY INDUSTRIES	
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

Appendix B: Environmentally Related Education Programs

Environmentally Related Degree Programs

Program	Length	Credential
Ryerson		
Architectural Science	4 years	Bachelor of Architectural Science
Chemical Engineering	4 years, 5 year Co-op	Bachelor of Engineering
Civil Engineering	4 years, 5 year Industrial Internship Program	Bachelor of Engineering
Electrical Engineering	4 years, 5 year Industrial Internship Program	Bachelor of Engineering
Geographic Analysis	4 years	Bachelor of Arts in Geographic Analysis
Industrial Engineering	4 years, 5 year Industrial Internship Program	Bachelor of Engineering
Mechanical Engineering	4 years, 5 year Industrial Internship Program	Bachelor of Engineering
Urban and Regional Planning	4 years	Bachelor of Urban and Regional Planning
Applied Digital Geography and GIS Certificate		Certificate in Applied Digital Geography and GIS
Architectural Preservation and Conservation Certificate		Certificate in Architectural Preservation and Conservation
Certificate in Sustainability		Certificate in Sustainability (CKSS)
Environmental Engineering Science Certificate		Certificate in Environmental Engineering Science
Environmental Public Health Leadership Certificate		Certificate in Environmental Public Health Leadership
University of Toronto		
Botany	4 years	Bachelor of Science
Chemical Engineering	4 years	Bachelor of Engineering
Chemistry	4 years	Bachelor of Science
Civil Engineering	4 years	Bachelor of Engineering
Earth Systems: Physics & the Environment	4 years	Bachelor of Science
Environment & Health	4 years	Bachelor of Science
Environment and Behaviour	4 years	Bachelor of Science
Environment and Energy	4 years	Bachelor of Science
Environment and Science	4 years	Bachelor of Science
Environment and Society	4 years	Bachelor of Arts
Environmental Biology	4 years	Bachelor of Science
Environmental Chemistry	4 years	Bachelor of Science
Environmental Engineering	4 years	Bachelor of Engineering
Environmental Ethics	4 years	Bachelor of Arts
Environmental Geography	4 years	Bachelor of Arts
Environmental Geosciences	4 years	Bachelor of Science
Environmental Policy and Practice	4 years	Bachelor of Arts
Forest Biomaterials Science	4 years	Bachelor of Science
Forest Conservation	4 years	Bachelor of Arts
Forest Conservation Science	4 years	Bachelor of Science
Geographic Information Systems	4 years	Bachelor of Arts
Geography	4 years	Bachelor of Science
Geology	4 years	Bachelor of Science
Industrial Engineering	4 years	Bachelor of Applied Science Degree
Innis Environmental Studies Programs	4 years	Bachelor of Arts Degree/Bachelor of Science
Materials Engineering	4 years	Bachelor of Applied Science Degree
Mechanical Engineering	4 years	Bachelor of Applied Science Degree
Mineral Engineering	4 years	Bachelor of Applied Science Degree
Past Environments	4 years	Bachelor of Science
Physical and Environmental Geography	4 years	Bachelor of Science
Sustainable Energy	4 years	Bachelor of Engineering
Toxicology and The Environment	4 years	Bachelor of Science
Zoology	4 years	Bachelor of Science

Environmentally Related Degree Programs

Program	Length	Credential
York University		
Biotechnology	4 years	Bachelor of Science
Conservation Ecology	4 years	Bachelor of Science
Ecosystem Management	4 years	Bachelor in Environmental Studies
Environmental and Health Studies	4 years	Bachelor of Arts
Environmental Science Program	4 years	Bachelor of Science
Environmental Studies Program	4 years	Bachelor of Environmental Studies Degree
Geography	3 years	Bachelor of Arts Degree
Geomatics Engineering	4 years	Bachelor of Applied Science
Urban Studies	4 years	Bachelor of Arts
Geographic Information Systems & Remote Sensing Certificate	1 year	Certificate in GIS and Remote Sensing
Meteorology Certificate	1 year	Certificate in Meteorology
Urban Ecologies Certificate	1 years	Certificate in Urban Ecologies
Urban Studies Certificate	1 years	Certificate in Urban Studies

For more information on any of the programs above please visit the University websites:
Ryerson - *www.ryerson.ca*
University of Toronto - *www.utoronto.ca*
York University - *www.yorku.ca*

Environmentally Related Degree Programs

Program	Length	Credential
Centennial		
Architectural Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Biomedical Engineering Technology	3 years	Advanced Diploma
Biotechnology Technician Industrial Microbiology Program	2 years	Diploma
Electro-Mechanical Engineering Technician/Technology	2 years (technician)	
	3 years (technology)	Diploma/ Advanced Diploma(3 years)
Electronics Engineering Technician/Technology	2 years (technician)	
	3 years (technology)	Diploma/ Advanced Diploma(3 years)
Energy Systems Engineering Technician/Technology	2 years (technician)	
	3 years (technology)	Diploma/ Advanced Diploma(3 years)
Environmental Protection Technician/Technology Diploma Program	2 years (technician)	
	3 years (technology)	Diploma/ Advanced Diploma(3 years)
Mechanical Engineering Technology – Industrial	3 years	Diploma
Mechanical Engineering Technician/Technology – Design	2 years	Diploma
Mechanical Technician – CAD/CAM	2 years	Diploma
Environmental Studies Preparation Certificate	N/A	Certificate
Electric Apprenticeship	N/A	Apprenticeship
Refrigeration & Air Conditioning Apprenticeship	N/A	Apprenticeship
George Brown		
Architectural Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Building Renovation Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Civil Engineering Technology	3 years	Advanced Diploma
Construction Engineering Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Construction and Environment - Regulations & Compliance	4 years	Degree
Construction Science and Management	4 years	Bachelor`s Degree
Electromechanical Engineering Technician	2 years	Diploma
Heating, Refrigeration and Air Conditioning Technician/Technology Program	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Mechanical Engineering Technology	3 years	Advanced Diploma
Construction Trades and Techniques	N/A	Certificate
Construction and Maintenance Electrician Apprenticeship	N/A	Apprenticeship
Construction Millwright	N/A	Apprenticeship
Plumber	N/A	Apprenticeship
Refrigeration and Air Conditioning Systems Mechanic	N/A	Apprenticeship
Residential Air Conditioning Systems Mechanic	N/A	Apprenticeship
Humber		
Architectural Technology	3 years	Advanced Diploma
Civil Engineering Technology	3 years	Advanced Diploma
Electrical Engineering Technology - Control Systems	3 years	Advanced Diploma
Electronic Engineering Technology	3 years	Advanced Diploma
Environmental Systems Engineering Technology - Energy Management Program	3 years	Diploma
Environmental Technology	3 years	Diploma
Heating, Refrigeration and Air Conditioning Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Landscape Technician Program	2 years	Diploma
Sustainable Energy & Building Technology	3 years	Diploma
Electronics	N/A	Certificate

Environmentally Related Degree Programs

Program	Length	Credential
Environmental Education	N/A	Certificate
Environmental Studies: An Interdisciplinary Approach	N/A	Certificate
Home Inspection	N/A	Certificate
Horticultural Science	N/A	Certificate
Landscape Design	N/A	Certificate
Refrigeration and Air Conditioning	N/A	Certificate
Roof Consultant	N/A	Certificate
Thinking Environmentally	N/A	Certificate
Arborist	N/A	Apprenticeship
Construction Boilermaker	N/A	Apprenticeship
Electrician: Construction and Maintenance	N/A	Apprenticeship
Electrician: Industrial	N/A	Apprenticeship
Horticultural Technician	N/A	Apprenticeship
Plumber	N/A	Apprenticeship
Urban Arboriculture -Tree Care	1 year	Certificate
Seneca		
Building Systems Engineering Technician	2 years	Diploma
Chemical Engineering Technology	3 years	Advanced Diploma
Civil Engineering Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Electronics Engineering Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Environmental Landscape Management	2 years	Diploma
Environmental Site Remediation	4 years	Bachelor's Degree
Environmental Technician/Technology	2 years (technician)	Diploma
	3 years (technology)	Advanced Diploma
Mechanical Engineering Technology – Building Sciences	3 years	Advanced Diploma
Electro Mechanical Design	1 year	Graduate Certificate
Environmental and Site Investigation	1 year	Graduate Certificate
Green Business Management	1 year	Graduate Certificate
Building Environmental Systems		
Photovoltaics Energy (CANSIA Certificate)	N/A	Certificate
Sheridan		
Architectural Technician/Technology	2 years regular	Diploma
	3 years Co-op	Advanced Diploma
Chemical Engineering Technology – Environmental	3 years	Advanced Diploma
Electromechanical Engineering Technician/Technology	2 years regular	Diploma
	3 years Co-op	Advanced Diploma
Electronics Engineering Technician/Technology	2 years regular	Diploma
	3 years Co-op	Advanced Diploma
Environmental Science Technician	2 years	Diploma
Mechanical Engineering Technician/Technology	2 years regular	Diploma
	3 years Co-op	Advanced Diploma
Mechanical Engineering Technician/Technology – Design and Drafting	2 years regular	Diploma
	3 years Co-op	Advanced Diploma
Environmental Control	N/A	Graduate Certificate
Quality Assurance - Manufacturing & Management	1 year	Graduate Certificate
Building Environmental Systems Operator (Class 1 and Class 2)	N/A	Certificate
Horticultural Studies	N/A	Certificate

Environmentally Related Degree Programs

Program	Length	Credential
Sheridan		
Wastewater Collection	N/A	Certificate
Water Distribution and Supply	N/A	Certificate
Water Distribution and Wastewater Collection	N/A	Certificate
Welding Techniques	N/A	Certificate
Home Inspection Training	N/A	Recognition of a Home and Property Inspector
Construction and Maintenance Electrician	N/A	Apprenticeship
Industrial Electrician	N/A	Apprenticeship
Industrial Mechanic Millwright	N/A	Apprenticeship
Construction Millwright	N/A	Apprenticeship

For more information on any of the programs above please visit the University websites:

Centennial - *www.centennialcollege.ca*
George Brown - *www.georgebrown.ca*
Humber - *www.humber.ca*
Seneca - *www.senecac.on.ca*
Sheridan - *www.sheridanc.on.ca*

Additional Programs and Certificates

- **Certificate in Environmental Practice**
  www.royalroads.ca
  The Certificate in Environmental Practice provides professional development, educational upgrading, and additional academic qualifications relevant to employment in the Canadian environment sector. It is designed for mid-career environmental practitioners, college graduates/university graduates, recent and potential immigrants to Canada. The Certificate is comprised of core courses, offered by Royal Roads University, and elective courses offered by over 25 Canadian colleges and universities. Elective courses are based on one of 10 concentration streams. Each concentration stream is a reflection of work undertaken in the environmental sector and the occupational standards for the environment industry. Royal Roads University is the administrative body for the CCEE and is responsible for program admissions and course coordination.
- **Canadian Certified Environmental Practitioner certification (CCEP)**
  www.cecab.org
  Provides practitioners with a formal recognition of their unique environmental expertise. CCEP certification is available exclusively to experienced practitioners who have five or more years of relevant career experience, and who meet or exceed the criteria set out in the National Occupational Standards (NOS) for environmental employment. CCEP has two phases: self-evaluation and validation both completed online.
- **Canadian Environmental Practitioner-in-Training certification (CEPIT)**
  www.cecab.org
  Provides an opportunity for emerging practitioners to focus their career development and build success in the environmental field. CEPIT is available to recent graduates, newcomers to Canada, and those with fewer than five years of environmental work experience. Students pursuing post-secondary studies can also apply for CEPIT during their final year. CEPIT has two phases: self-evaluation and validation both completed online.
- **Certified Environmental Auditor - CEA**
  www.cecab.org
  The Certified Environmental Auditor designation was developed in accordance with national and international standards, with a special emphasis on the auditing activities as described in ISO 19011.
- **Certified Environmental Sustainable Forest Management Auditor - CEA(SFM)**
  www.cecab.org
  The Certified Sustainable Forest Management Auditor designation recognizes individuals who are competent to carry out sustainable forestry management audits to standards such as CSA Z808.
- **Certified Environmental Assessor of Sites (CEAS)**
  www.cecab.org
  Recognizes individuals who have fulfilled the AAC competency requirement to carry out Phase I Site Assessments, in accordance with the CSA Z768 standard. In addition to the work experience and education requirements, CEAS applicants are required to be familiar with and apply the AAC Body of Skills and Knowledge for Certified Environmental Site Assessors.

- Environmental Management Systems Auditor - EMSA
  www.cecab.org
  The Environmental Management Systems Auditor certification program is intended for auditors who are involved in auditing organizations against the ISO 14001 standard. Individuals with EMS (A) designations have demonstrated their competence to be a contributing member of an EMS audit team.

- Environmental Management Systems Lead Auditor – EMSLA
  www.cecab.org
  The Environmental Management Systems Lead Auditor certification program is intended for auditors who are involved in auditing organizations against the ISO 14001 standard. Individuals with EMS (LA) designations have demonstrated their competence to lead an EMS audit team or conduct audits by themselves.

- Land Use Planning Coordinators
  www.beahr.com
  The Land Use Planning Coordinator Training Program is a four-week program intended to develop the skills needed to assist land use planners in the development of a land use plan. Students learn and develop basic skills in the following areas:
  - Basics of land use planning history and techniques
  - How to develop a community vision and goals
  - How to gather biophysical and cultural information
  - Mapping fundamentals
  - How to identify and assess land use options
  - How to implement a land use plan
  - How to develop monitoring and evaluation techniques for a land use plan

- Environmental Professional - GHG Quantifier
  www.eco.ca
  Practitioners in this area quantify, assess and report emissions and emissions reductions that result from the activities of organizations, entities, facilities or GHG emissions reduction projects. Within this area, practitioners can be certified in the following specializations:
  - Inventory Quantification
  - Project Quantification

- Environmental Professional - GHG Verifier
  www.eco.ca
  Practitioners in this area act as the independent party that evaluates how a GHG inventory has been established and/or reported against program criteria and/or a specific protocol that states expectations of greenhouse gas accounting principles. Within this area, practitioners can be certified in the following specializations:
  - Quantification
  - Auditing
  - Team Lead

Endnotes

1 Global Citizen Centre, 2009, *www.globalcitizencenter.org* (October 20, 2009).

2 Van Jones, 2008, *The Green Collar Economy*, New York: Harper Collins.

3 Statistics Canada, 2003 and 2009, *Canadian Business Patterns Data (CBP)*. CBP data reflect counts of business establishments and locations by: 9 employment size ranges, including "indeterminate"; geography groupings: province/territory, census division, census subdivision, census metropolitan area and census agglomeration; and industry using the North American Industry Classification System.

4 Statistics Canada, 2007, *North American Industry Classification System (NAICS)*. NAICS is a numeric system that provides common definitions of the industrial structure of Canada, Mexico and the United States, and facilitates economic analysis.

5 Human Resources Skills Development Canada, 2006, *National Occupational Classification System (NOC)*. NOC is a tool classifies occupations with a four-digit code according to skill type and skill level.

6 Statistics Canada, 2006, Census, *www.statcan.gc.ca*. The Statistics Canada census provides a statistical portrait of Canada and its people. The most recent census was on May 16, 2006.

7 Human Resources Skills Development Canada, 2003, *Matrix of Skills Transferability*. The Matrix of Skills Transferability compares 4 digit occupations to one another based on the potential transferability of skills and knowledge between the occupations.

8 Human Resources Skills Development Canada, National Occupational Classification System (NOC), 2006, *www5.hrsdc.gc.ca/NOC* (October, 2009).

9 Ministry of Research and Innovation. *Investment In Biofuel Research Is Paying Off*. 16 October 2009

10 Global Citizen Centre. *The Global Citizen Centre*. 2009. October 30, 2009. *www.globalcitizencenter.org*.

11 See endnote 2

12 United Nations Environment Programme. *Background Paper on Green Jobs*. United Nations Environment Programme, 2008.

13 Ministry of Economic Development and Trade. 2009

14 Business Council of British Columbia. *Charting the Green Economy*. Environment & Energy Bulletin May 2009.

15 See endnote 5

16 See endnote 4

17 See endnote 3

18 An indeterminate employer is one that does not maintain employees on a payroll but may employ contract workers, family members or business owners.

19 See endnote 4

20 See endnote 6

21 See endnote 5

22 See endnote 7

23 Derek Sankey. November 6, 2009. *Green Jobs Booming in Skilled Trades*. The Calgary Herald

24 See endnote 13

25 See endnote 4

26 See endnote 3

27 See endnote 19

28 See endnote 14

29 ECO Canada, 2007. *Labour Market Transition: A Remedy for Labour Shortages in the Environment*.

30 See endnote 13

31 Ministry of Economic Development and Trade, 2009

32 Ministry of Energy and Infrastructure. 2009

33 Robert Pollin and Heidi Garrett-Peltier. 2009. *Building the Green Economy: Employment Effects of Green Energy Investments for Ontario*.

34 See endnote 13

35 See endnote 33

36 See endnote 33

[37] Based on the National Occupational Classification system the skills levels of occupations are as follows: level A occupations require a university education, level B occupations require a college education or apprenticeship training, level C occupations require secondary school and on-the-job training and level D occupations require on-the-job training

[38] See endnote [4]

[39] See endnote [3]

[40] Most studies have occurred in the United States and European Union

[41] United Nations Environment Programme. 2008. *Green Jobs: Towards decent work in a sustainable, low carbon world.*

[42] See endnote [39]

[43] Government of Ontario, The Ministry of Energy and Infrastructure. 2009. Ontario Invests In Greening Its Office Space. May 20, 2009. *http://ogov.newswire.ca/ontario/GPOE/2009/05/20/c5784.html?lmatch=&lang=_e.html*

[44] See endnote [30]

[45] LEED Certification was developed by the *U.S. Green Building Council (USGBC)* and provides a suite of standards for environmentally sustainable construction.

[46] Toby A.A. Heaps. Corporate Knights. 2009. Green Provincial Report: Analysis. *http://www.corporateknights.ca/magazine-issues/81-2009-earth-day-issue/374-green-provinces.html*

[47] Statistics Canada, 2006, Census, *www.statcan.gc.ca*. The Statistics Canada census provides a statistical portrait of Canada and its people. The most recent census was on May 16, 2006.

[48] See endnote [35]

[49] See endnote [4]

[50] See endnote [3]

[51] See endnote [3]

[52] Tyler Hamilton. August 27, 2009. *Wind turbines to generate some 200 jobs in Windsor.* The Toronto Star.

[53] Roxul Insulation makes environmentally-friendly wool insulation

[54] Government of Ontario, Office of the Premier. *McGuinty Government Supports Roxul Plant Expansion, New Jobs*. June 10, 2009. *http://www.news.ontario.ca/opo/en/2009/06/investing-in-green-tech.html*

[55] See endnote [34]

[56] See endnote [35]

[57] See endnote [4]

[58] See endnote [3]

[59] ECO Canada, 2007. *Labour Market Transition: A Remedy for Labour Shortages in the Environment.*

[60] Business Council of British Columbia. May, 2009. *Charting the Green Economy*. Environment & Energy Bulletin

[61] Statistics Canada. 2007. *Environment Industry. Business Sector.*

[62] Agriculture and Agri Food Canada. 2009. *Opportunities for Canadian Agri-Food Exporters in the United States*. March 2009. *http://www.ats.agr.gc.ca/amr/4531-eng.htm*

[63] Ministry of Economic Development and Trade. September 25, 2009. *Powering the Green Economy.* Ontario, Canada. Retrieved from Government of Ontario, *www.gov.on.ca*

[64] See endnote [35]

[65] Business Council of British Columbia. May, 2009. *Charting the Green Economy*. Environment & Energy Bulletin

[66] ECO Canada. 2008. *College Graduation Trends for Environment-related Programs.* 2002-2005. Environmental Careers Organization Canada

[67] Statistics Canada, 2006, Census, *www.statcan.gc.ca*. The Statistics Canada census provides a statistical portrait of Canada and its people. The most recent census was on May 16, 2006.

[68] K. Doyle, February. 2008. *How do we define the green-job economy?*

[69] See endnote [35]

[70] See endnote [59]

[71] See endnote [5]

Summary

The green economy is affecting a wide array of industries and having dramatic effects on in-demand occupations. Some traditional jobs are being phased out while other are remaining and/or transforming into green collar occupations. It is evident that this is creating surging demands on the labour force.

Employers across all environmental sectors are deeply concerned about the hiring, training, re-training and retention of qualified people to fill emerging "green" jobs. Having a solid understanding of these jobs will allow for effective planning for the work-force demands associated with the green economy. The occupations and industries profiled in this report provide a snapshot of how to transfer skills sets from occupations related to industries that are decreasing in strength to industries and occupations that are predicted to expand. Conducting relevant research such as this on emerging occupations and trends is vital to ensuring that these labour force demands are met. Facilitating this transformation as quickly and efficiently as possible is imperative to guaranteeing the green economy continues to thrive and bring new jobs and opportunities to Ontario's communities.

Change is inevitable. The push towards a greener economy is coming from many forces and will resonate in many sectors. The advertising sector was challenged with creating the ads for the David Suzuki campaign to change light bulbs, the Toronto Transit Commission expansion resulted in hundreds of new jobs helping to move 1.5 million commuters each day, adopting recycling and organics programs created more jobs than dumping garbage in landfills. In the construction sector alone, one of the GTA's most prominent industrial sectors, building to LEEDs standards will be commonplace. In the United States by 2008, more than 1 billion square feet of construction was done to LEEDs standards. The venture capitalists that led the Internet boom are now leading the "cleantech" boom. Ontario already has some of the largest solar farms on the continent, is Canada's leader in wind energy and smart-meter deployment and continues to raise the bar on energy efficiency and conservation. There are hundreds of examples that are pointing the way to a greener future in the Greater Toronto Area. The Ontario government is investing in a number of green strategies to ensure Ontario's future prosperity. This report is part of that future, working differently, working together will bring renewed prosperity to Ontario.

Peel Halton Workforce Development Group

www.peelhaltonworkforce.com

PEEL HALTON

Toronto Workforce Innovation Group

www.workforceinnovation.ca

TORONTO

Workforce Planning BOARD
OF YORK REGION & BRADFORD WEST GWILLIMBURY

www.wpboard.ca

YORK REGION

Disclaimer: This booklet is written as a source of information only. The information contained in this booklet should by no means be considered a substitute for the advice of qualified professionals. All efforts have been made to ensure the accuracy of the information as of the date of printing. The Peel-Halton Workforce Development Group, Toronto Workforce Innovation Group and the Workforce Planning Board of York Region and Bradford West Gwillimbury expressly disclaim responsibility for any adverse effects arising from the use of the information contained herein.

Funded By: This brochure is funded by the Government of Ontario. The views expressed in this brochure do not necessarily reflect those of the Government of Ontario.

Copyright and Intellectual Property: All materials including, but not limited to, documents, raw data, research, processes, technology, programs and inventions conceived or produced in the performance of this agreement shall belong to the Ministry. The intellectual property (including copyrights, patents, trademarks, industrial designs, know-how and trade secrets) in them shall also belong to the Ministry.

The Local Board will own all materials, if any, created or developed with funding under the Agreement ("the Materials"). The recipient grants to the Ministry a perpetual, irrevocable and royalty-free licence to use any of the Materials for any purpose except commercial gain.

EMPLOYMENT ONTARIO

Peel Halton Workforce Development Group

Toronto Workforce Innovation Group

Workforce Planning BOARD
OF YORK REGION & BRADFORD WEST GWILLIMBURY