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Project Background

Momentum, in partnership with Thrive: Calgary's Community Economic Development Network, has received financial support from Alberta Employment and Immigration to conduct a study to assess the feasibility of developing a green collar jobs workforce development initiative in Calgary. The study has explored the local potential of green collar jobs in Calgary as well as policy options and training programs to increase access to green collar jobs among disadvantaged people in Calgary.

Green for All and the Apollo Alliance define green collar jobs as entry level, career track employment in industries or businesses that contribute to environmental quality¹. In this study of Green Collar Jobs, five criteria were identified for a job to be considered a green collar job:

- (1) The work tasks performed in the job must be comparable to that of blue collar jobs
- (2) The work activities of the employee must improve the quality of the environment
- (3) The job must be an entry-level position
- (4) The job must pay a living wage (over \$12.25 per hour for 35 hours per week, 52 weeks per year)²
- (5) The job must offer opportunity for career advancement.

Green collar jobs typically require some post-secondary education, but less than a four-year degree, which makes them more accessible for many individuals currently living on low incomes. Green collar jobs represent a combination of both new emerging occupations, such as energy auditors or wind turbine technicians, as well as established occupations such as plumbers and insulators who now require new 'green skills' required for sustainable green building practices or installation of resource-efficient systems.

The Apollo Alliance and Green for All have identified four steps to successfully develop a green collar jobs initiative. These include identifying goals and assessing opportunities; enacting policies and programs to drive investment; training the green collar workforce, and leveraging success to build political support for new initiatives³. This report focuses on the first of these – *identify goals and assess opportunities*.

In the study we have sought to identify the current number of green collar jobs within certain sectors and determine future growth of these jobs. We have also identified promising practices for workforce

¹ Apollo Alliance and Green for All (2008), *Green-collar jobs in America's cities: Building pathways out of poverty and careers in the clean energy economy*

² Living wage of \$12.25 per hour is based on estimates by Vibrant Communities Calgary. Public Interest Alberta defines a living wage in Alberta at \$12.00 per hour or more. During the height of the economic boom in Alberta in 2007, 21.9% of Alberta residents earned less than \$12.00 per hour.

³ Apollo Alliance and Green for All. 2008. "Green Collar Jobs in America Cities: Building Pathways out of Poverty and Careers in the Clean Energy Economy". Accessed at: <http://www.apolloalliance.org/downloads/greencollarjobs.pdf>.

development to effectively increase access to these jobs among lower-skilled job seekers. The study incorporated this approach in two phases of research:

- (1) **Labour Market Analysis** (Phase I) – In this phase, the research team evaluated the growth opportunities for entry-level green collar jobs in Calgary and throughout Alberta. The initial analysis was informed primarily by a set of interviews with employers and industry experts in a select set of industries as well as assessing the growth potential of green collar jobs through the collection of secondary data to illustrate long-term and recent patterns in green collar jobs demand. Table 1 in Appendix A: Methodology contains a list of Calgary employers and key experts participating in interviews.

- (2) **Environmental Scan of Promising Practices for Workforce Development** (Phase II) – This phase of the research explored green workforce development programs in Canada and the United States. The research team contacted twenty-three (23) green jobs training programs in the US and Canada and case studies were developed for six of these programs. The case studies describe the structure and genesis of the program, each program’s objectives, challenges faced by the entity, and keys to its success or failure.

The advisory committee for the study included representatives from several key stakeholders in Calgary. We extend our thanks to each for their time and commitment which have made this report possible.

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Executive Summary

Key Findings and Recommendations

(1) The growing green economy offers a new economic opportunity for Calgary, with potential to create thousands of new green collar jobs.

Using Pinderhughes (2006)⁴ definition of green industries and an analysis of the Canadian Business Patterns Database, the research team estimates that there were about 1,006 green industry establishments in Calgary in 2009 that employ approximately 8,200 workers in Calgary.⁵ There were an additional 15,913 establishments in Calgary employing approximately 69,800 workers that can be considered “possibly green industries,” representing businesses that have the potential to create green collar jobs. Only a portion of jobs in the “possibly green industries” include activities that improve the quality of the environment.

Creation of green collar jobs in Calgary is being driven by multiple emerging and high-growth industry sectors including green construction, renewable energy, environmental remediation, recycling, and other industries responding to demand for environmentally friendly products and services. The number of LEED-certified⁶ green construction projects across Canada has grown from 52 projects in 2004 to 1,747 projects in 2009, effectively doubling every year.⁷ Alberta’s environmental remediation industry has expanded from about 400 workers in the year 2000 to over 1,800 workers in 2008, a compound annual growth rate of 21% per year.⁸ Direct employment in the Canadian solar power sector grew at 31% per year from 2001 to 2007⁹ and employment in the Canadian wind sector is expected to grow at 35% per year from 2006 through 2011.¹⁰

Calgary employers such as Avalon Master Builder (www.avalonmasterbuilder.com), DIRT Environmental (www.dirtt.net), Boyd Solar (www.erhardselectric.com), Ecco Pave (www.eccopave.com) and others are responding to green opportunities within their respective industries and creating local entry-level jobs.

(2) Green collar jobs created by these growth industries include entry-level jobs that provide on-the-job training, new skills development, and opportunities for career advancement while paying a living wage.

⁴ Raquel Pinderhughes, *Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment, A Case Study of Berkeley, California*.

⁵ Estimate made by the author is based upon the number of establishments in each industry within each establishment employment size, as reported in the Canadian Business Patterns database.

⁶ LEED: Leadership in Energy and Environmental Design

⁷ Source: Canadian Green Building Council 2009 Annual Report

⁸ Source: Statistics Canada Survey of Employment Payroll and Hours;

⁹ Source: Canadian Solar Energy Association

¹⁰ Source: Canadian Wind Energy Association

Each of the green industry sectors offers strong new entry-level job creation potential. Approximately 400 to 500 of the 34,000 construction trades workers in Calgary reach retirement age each year, creating new vacancies to be filled with apprentice trades workers.¹¹ There are about 2,000 workers in the remediation industry and a majority of these workers are employed in low-skilled entry level positions.

According to the Political Economy Research Institute at the University of Massachusetts, clean-energy investments create 2.6 times more jobs for people with college degrees or above, 3 times more jobs for people with some college, and 3.6 times more jobs for people with high school degrees or less compared to spending on fossil fuels.¹² The Canadian Wind Energy Association (CanWEA) estimates that 70% of jobs created in the Canadian Wind Industry are for trades workers, labourers and other occupations that offer entry level workers access to new jobs.

When combined with the right support systems, these jobs can play a life-changing role for some of the 143,000 Calgarians who live in poverty.¹³ Workforce development practices used throughout North America have been effective in preparing workers for green collar jobs that offer pathways out of poverty. For example, Warm Up Winnipeg has created jobs in the green construction sector through residential energy and water retrofits for low-income households. In addition to reducing operating costs for Manitoba Housing, the program provides life skills training, job skills training, and cultural training for over fifty program participants and twenty trainees. The program prepares workers for careers in construction trades and gives them the tools to help them more effectively manage money and navigate a successful future.

(3) There is a leadership opportunity available for developing a response to the growing green economy that captures economic potential and reduces poverty.

Calgary has an opportunity to decide what a response to these opportunities might look like and take a pioneering step forward, placing Calgary and Alberta in a leadership position within the Canadian green economy. The City of Calgary, the Province, the non-profit sector, and the educational sector can play a coordinated role in developing a response that builds on the local economic context while improving the quality of life in Alberta. Collaborative action is needed between these sectors to effectively respond to employer needs in a way that reduces poverty.

(4) Measures of success of a green collar jobs workforce development initiative should be developed for both industry and for workers.

Within industry, measures of success could include:

- New job creation;

¹¹ Source: Statistics Canada Survey of Employment Payroll and Hours; analysis by the author based on Calgary Age Cohort Workforce Model Developed for Calgary Economic Development

¹² Pollin, R., Heintz, J. and Garrett-Peletier, H. (2009). *The Economic Benefits of Investing in Clean Energy*. Political Economy Research Institute and the Center for American Progress.

¹³ See Vibrant Communities Calgary Poverty Fact Sheet. Last accessed March 2010 at <http://www.vibrantcalgary.com/think-vibrant/category/vibrant-fact-sheets/>

- Reduced costs (i.e. costs of recruitment and retention of workers, lower operating costs, etc.);
- Improved profitability;
- Improvements to environmental quality; and/or
- Benefits for workers (access to training, career advancement, etc.).

Among workers, measures of success should focus on individual reductions in poverty. A potential model for measurement of poverty reduction may be the Sustainable Livelihoods Framework developed by the Department for International Development (DFID). Measures of success might be organized by the personal assets identified in the framework which enable individuals to move out of poverty. These include:

- Financial assets (i.e. increases in stable income, acquisition of financial knowledge, disciplined financial practices, and increases in savings rates);
- Human assets (increases in employability skills, acquisition of credentials, etc.);
- Physical assets (better housing security, meeting basic needs);
- Personal assets (increased confidence, motivation, and pride in work); and/or
- Social assets (increased social connections).

(5) A green collar workforce initiative should promote public policy that takes a balanced approach to both stimulation of new green collar job opportunities and response to market demand.

The policy and regulatory environment can have a critical and enabling effect on new green collar job growth. Policies should be designed to catalyze sustainable practices that produce multiple benefits for the community. Policies such as Ontario’s renewable energy feed-in tariff have stimulated investment in solar and wind energy and created jobs in design, manufacturing, installation and maintenance of these systems. In addition to increased investment, Ontario has benefited from reduced energy costs for businesses and homeowners that install solar power systems, reduced greenhouse gas emissions, and an opportunity for Ontario solar power component manufacturers to benefit from exports to the United States.

The Toronto Mayor’s Tower Renewal Program (www.towerrenewal.ca) is another example of a policy that produces multiple benefits. The program revitalizes residential housing towers through energy retrofits that lower costs for residents. The policy brings about benefits to the community through reduced energy costs for housing, job creation for retrofits, reduction in carbon emissions, and improved quality of life for residents.

Regulatory changes to environmental remediation can also spur employment growth while removing environmental liabilities. Land Disposal Regulations enacted in Quebec and Ontario have replaced “Dig and Dump” methods that relocate contaminated soil to a landfill without removing the contaminants. These regulatory changes have spurred innovation and development of in-situ remediation techniques that have coincided with increases in employment. In addition, policies requiring public firms to report environmental liabilities on their balance sheet can spur demand for new remediation techniques that help firms remove these long-term future liabilities from their books.

(6) A future green collar job initiative should be designed to realize the full potential of the opportunities including economic, social, and environmental benefits.

Programs such as Detroiters Working for Environmental Justice (www.dwej.org) have developed a pilot program that (1) has economic benefits by training workers in the specific skills needed by local environmental employers, (2) provides social benefits through training in essential skills and technical skills, and (3) provides environmental benefits by transforming the city's 50,000 brownfields into viable and sustainable communities. Within a year, the pilot program has assisted nearly 100 people living in poverty to transition into productive careers that offer a more stable and secure wellbeing.

(7) The next step in the development of a green collar workforce development response is dependent on the organizations involved and those taking a leadership role.

Potential roles for consideration are outlined below, based on observations from the case studies.

Potential Leaders	Potential Roles
Province of Alberta	Most policy-based recommendations for green energy would require action at the provincial level. Potential policy changes include creation of a renewable energy feed-in tariff. Other policies that can spur growth include changes to financial reporting requirements on environmental liabilities. If firms are required to disclose these liabilities, some would take action to remove the liability from their books and this would stimulate growth in green collar jobs for in-situ remediation. Another potential role might be similar to the Michigan Green Jobs Initiative where the state created sector alliances to facilitate partnerships between employers and training providers, increasing access to training and jobs.
City of Calgary	The city, potentially through the Office of Sustainability, might consider city playing a coordination role with community-based non-profit partners, employers, and educators. Also, similar to the Long Island Green Homes initiative, the City could potentially play a unique role in facilitating financing of residential retrofits and oversight/quality control for local contractors performing energy upgrades.
SAIT or Other Educational Institutions	A role similar to the Detroit Workers for Environmental Justice (DWEJ) might be appropriate. In this case study, the educational provider, Dillard University, established curriculum and training processes that were implemented with community-based partners who offered complementary services to support a sustainable reduction in poverty.
Momentum or Other Community-Based Programs	Momentum or other community-based programs could deliver a program/service similar to Detroiters Working for Environmental Justice (DWEJ) in which individuals in the community receive pre-employment training as environmental technicians or similar occupations. Direct partnerships with employers would increase the ability of workers to meet the needs of employers and successfully integrate into the labour force. Development of a program similar to Warm Up Winnipeg that combines on-the-job training and mentoring is another potential option.

Potential Leaders	Potential Roles
Industry & Entrepreneurs	Employers may consider forming direct recruiting partnerships with educational or community-based groups that train workers in the specific skills required for entry level jobs. This may directly benefit employers by lowering costs of recruiting and increasing the pool of skilled workers from which to select. Entrepreneurial opportunities similar to Warm Up Winnipeg or the Evergreen Cooperative Laundry may also be adapted as for-profit businesses that have a triple-bottom line.

In the case studies that we reviewed, collaborative efforts among stakeholders produced the best results in both supporting growth of green collar jobs and effectively reducing poverty.

The Green Economy

Growth of the green economy has the potential to positively impact both the environment and the labour market in Alberta. The green economy addresses the interdependence of human economics and the natural environment by promoting energy efficiency and renewable energy generation while providing new job opportunities. Due to increasing focus on growth of the green economy, it is no longer necessary for business owners, consumers and governments to choose between a robust economy and a healthy environment. The green economy improves environmental quality through reduction of waste, reduction in demand for natural resources, reduction in energy demand, and recycling of materials. The trends in waste reduction, recycling, and other sustainable practices are evident across the economy and in practically all industries.

Estimates of Green Collar Jobs in Calgary

The first study of green collar jobs was performed in Oakland, California in 2006. A set of *green industries* were identified that include businesses that directly contribute to improvements in the quality of the environment while offering green collar jobs that pay a living wage. An analysis of this set of industries in Calgary reveals that these businesses have been relatively resilient during the recession. During the 2008-2009 period, the number of business establishments operating in green industries declined by 0.8%, while the total number of establishments in Calgary declined by 4.5%. Green industry establishments likely employ about 8,153 workers in Calgary¹⁴ and the number of workers employed by these industries grew slightly by about 0.6% during the 2008-2009 recessionary period.

In addition to the green industries, there are also a number of industries that have a potential to offer green collar jobs, but not *all* jobs in these industries could be considered *green*, in the sense that they contribute to improving quality of the environment. These “possibly green industries” with the potential to create green collar jobs include sectors like construction, energy, agriculture, and other industries, all of which have a segment of green businesses that offer “green” services like construction

¹⁴ Estimate made by the author is based upon the number of establishments in each industry within each establishment employment size, as reported in the Canadian Business Patterns database.

of energy efficient new homes, deployment of renewable energy systems, or use of sustainable agricultural practices. There were 15,913 such business establishments in Calgary in 2009 that fall into what we consider to be “possibly green industries” and these businesses employ approximately 69,800 workers in Calgary (see Figure 1.2). The number of establishments in the “possibly green industries” declined by 4.2% during the 2008-2009 recessionary period, which is slightly better than the 4.6% decline experienced in the “not green industries” category. Employment in “Possibly Green Industries” has increased at an annual average rate of 2.0% from 2004 to 2009 but declined by 4.2% during the 2008 to 2009 period--much of which may be attributed to declines in construction-related employment during the recession.

Figure 1.2 Industry and Occupation Categories for Green Collar Jobs

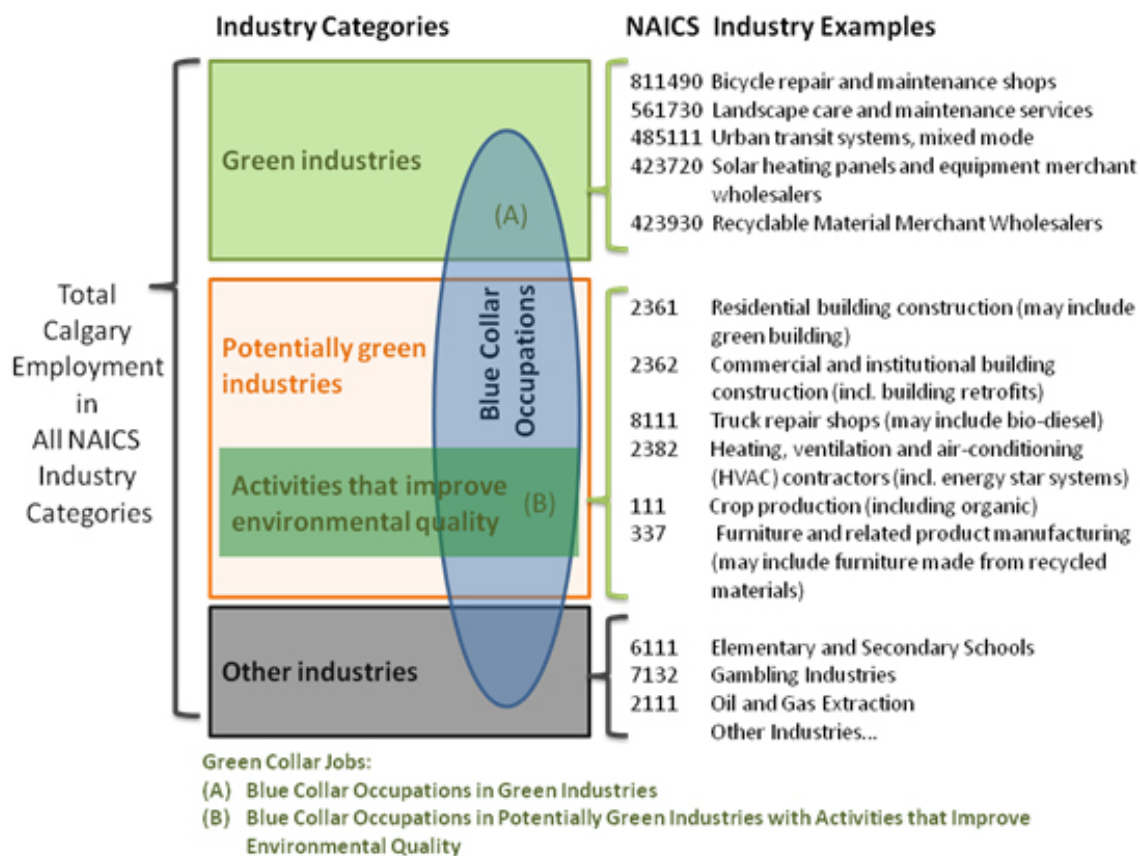


Table 1 Estimated Employment in Calgary in Green Industries, Possibly Green Industries, and Not Green Industries: 2004, 2008 and 2009

	2004	2008	2009	CAGR* 2004-08	Growth 2008-09
Green Industries	6,850	8,103	8,152	4.3%	0.6%
Possibly Green Industries	75,168	81,411	78,033	2.0%	-4.2%
Not Green Industries	660,811	683,775	675,141	0.9%	-1.3%

Source: Canadian Business Patterns Database, RDA Global Analysis

*Compound Annual Growth Rate (CAGR)

Calgary Green Collar Jobs by Sector

Construction Sector

Experts we spoke with expected practically all construction trades to have a green component to their work in the future. This means that there will be a change in the skills needed for entry-level positions. Workers employed as insulation installers and exteriors/siding installers must understand new installation techniques that can ensure that a home is air-tight and a moisture barrier is in place. Proper installation of exteriors/siding and insulation play the most important role in the overall energy efficiency of the structure. While demand is growing for entry-level workers with these skills and knowledge, demand is also growing for workers in more advanced energy-efficiency occupations such as blower-door testers and energy auditors. Overall in the construction industry, experts we spoke with expect that employment in the sector will grow in step with general economic growth in Alberta; however the industry faces significant labour shortages due to retirements of older workers. New workers with new skills will be needed to replace retirements from some 400-550 current trades workers in Calgary who will reach age 65 each year.¹⁵ In total, the construction sector offers perhaps one of the largest opportunities for green collar jobs with over 46,000 construction trades workers employed in Calgary in 2009.

Environmental Remediation Industry

The remediation industry offers a unique opportunity in Alberta related to oil and gas drilling in the province. There are about 1,800 workers employed in Alberta's remediation industry. The industry in Alberta experienced strong double-digit growth in the early 2000s, but growth in recent years has been relatively flat. Practices within the sector include a mix of environmentally friendly remediation as well as remediation practices that do not improve environmental quality, but rather move environmental liabilities to a less sensitive location. Future changes in regulations on remediation or disclosure of financial liabilities may drive growth for in-situ remediation practices that reduce the contamination of soil and water. Experts we spoke with within the industry estimate that about 60% of Alberta's remediation jobs are in the field, many of which are entry-level jobs offering a living wage.

Renewable Energy

The green energy sector also depends on construction trades workers for installation of green energy systems. Several of the jobs directly involved in the renewable energy sector are niche occupations that require some specialized training. For example, Lethbridge College offers specialized training through the International Wind Energy Academy that trains workers for jobs in turbine maintenance. This sector is experiencing tremendous growth right now and offers excellent opportunities for green collar job expansion even though fewer than 1,000 Albertans currently work in it.

Recycling Industry

The recycling industry plays a vital role in sustainable business practices, offering a variety of jobs. Fragmentation of the industry creates an opportunity for entrepreneurial firms to grow within particular

¹⁵ Analysis by the author, performed previously to facilitate workforce planning at Calgary Economic Development.

market niches. These firms create green collar jobs and have relatively low barriers to entry. Smaller entrepreneurial firms in the sector frequently offer opportunities for advancement, and firms we spoke with pay wages of \$15 per hour or more. Some jobs within the sector, however, do not pay a living wage, such as jobs for collector and sorters as some large recycling operators.

In addition to the sectors mentioned above, a number of green manufacturers have emerged in Alberta, including DIRTT Environmental Solutions (with 300 production employees in Calgary), Bio-Cycle (a drywall recycling firm manufacturing agricultural products), and others. Future growth in eco-friendly manufacturing will be driven by a combination of market demand for green products, lower operating costs through eco-efficiency improvements, and changes in regulation. At a macro-level, manufacturing jobs throughout North America have been in structural decline for over 30 years; however new green manufacturing businesses offer opportunities for workers displaced by continual downsizing of the manufacturing labour force. Future green collar job growth will likely be created to install and maintain eco-roofs and sustainable landscaping, although these opportunities are relatively new and near-term growth is somewhat uncertain. Table 3 presents an overview of green collar jobs in the six sectors studied: green construction, environmental remediation, renewable energy, recycling, green manufacturing and sustainable landscaping and gardening.

Table 2 Green Collar Jobs Examples in Key Calgary Industry Sectors

Business Sector	Type of Services	Entry Level Green Collar Jobs	Advanced Green collar Jobs	Estimated Potential Green Collar Jobs
Green Construction	Installation of siding and insulation and other construction activities in the residential and commercial construction sector.	Insulators, installers of siding, carpenters, roofers, and other trades.	Energy auditors, blower door testers, junior site managers, site managers, and other occupations.	There 34,000 construction trades workers in Calgary, all of which will have a green component to their work going forward. Between 400 and 550 of these workers will reach retirement age each year.
Renewable Energy	Construction and assembly of wind turbines; Manufacturing and installation of solar power systems; Installation of geothermal HVAC systems.	Construction trades, heavy equipment operators, roofers, HVAC technicians, and drilling technicians.	Wind turbine maintenance technicians; Master plumbers and other construction trades.	Experts estimated the combined solar, wind and thermal industry in Alberta at about 1,000 workers today. Double-digit growth in these jobs is expected in the future.
Environmental Remediation	Clean-up and removal of contaminated soil and water, much of which is related to the Alberta energy sector.	Laborours, equipment operators	Drivers, site supervisors, junior technicians	Nearly 2,000 workers are employed in the remediation industry in Alberta. Under current conditions, experts expect 3% to 5% job growth per year.
Recycling	Construction debris collection and recycling. Collection and recycling of other materials in over 23 materials categories.	Truck swampers, materials sorters, equipment operators	Drivers	Total employment is difficult to estimate due to fragmentation of the industry. RDA Global estimates over 2,000 workers are employed in the sector across Alberta (based on expert input).
Green Manufacturing	Manufacturing of eco-friendly products. Example: DIRTT Environmental- manufacturer of modular walls that reduce construction waste.	Machine operators	Production line managers and supervisors	There are 46,800 workers employed in the manufacturing sector in Calgary. Green manufacturing represents a key growth area within manufacturing, although it is difficult to estimate how many of these workers are employed in green manufacturing. There are about 300 workers in the production floor at DIRTT in Calgary.

Business Sector	Type of Services	Entry Level Green Collar Jobs	Advanced Green collar Jobs	Estimated Potential Green Collar Jobs
Sustainable Landscaping and Gardening	Green Roofs, Eco-Friendly Landscaping, Organic gardening	Landscape helpers, roofers	Crew supervisors	The green roof and sustainable landscaping industry is in its infancy in Alberta, but offers strong growth potential. We estimate there are perhaps 100-300 workers employed in the sector today, based on interviews.

Promising Practices for Workforce Development

In recent years, there has been an emergence of green collar workforce development initiatives that connect unemployed or underemployed workers with growing green collar jobs opportunities. The Apollo Alliance (www.apolloalliance.org) has identified seventy-seven (77) green collar jobs initiatives that have been formed in the US to prepare workers for green collar jobs. One such example is the Bronx Environmental Stewardship Training (BEST)¹⁶ program which uses a variety of training projects including green-roof installation, asbestos removal, and urban forestry training to prepare workers for green collar jobs. The program has achieved a long-term success rate with 85% percent of participants employed at the four-year-mark after graduation.¹⁷ The City of Chicago has administered a green collar jobs training program for the last twelve years that provides training in five separate tracks: landscaping, weatherization, environmental remediation, electronics recycling and household hazardous waste handling.¹⁸ The GreenCorps Chicago program regularly graduates 40 participants from its program, many of whom are ex-offenders, and over the duration of the program approximately 80% of participants have gained steady employment in their field of training. A similar program in Oakland, California, the Oakland Green Jobs Corps, trained and graduated its first class of 40 students in 2009 into positions in California’s green energy sector.

Several green collar jobs training initiatives have recently launched in Canada with similar objectives to the American programs. Examples include the Brandon Energy Efficiency Program (BEEP) operated by the Brandon Neighbourhood Renewal Corporation which provides skill training to individuals who learn to retrofit existing buildings for greater energy efficiency. In Manitoba, the Warm Up Winnipeg program operated by Building Urban Industries for Local Development (BUILD) also trains workers to perform energy and water retrofits through a hands-on 3-year work and training program that combines environmental stewardship with poverty reduction for individuals living on low-incomes. Similar initiatives include Sustainable Works (www.sustainableworks.org) in Edmonton, Choices for Youth (www.choicesforyouth.ca) in St. Johns, Newfoundland, and the Mayor’s Tower Renewal Initiative (www.towerrenewal.ca) in Toronto.

¹⁶ Sustainable South Bronx is the parent organization operating the BEST Program. See www.ssbx.org

¹⁷ <http://www.greenforall.org/resources/sustainable-south-bronx-green-jobs-not-jails>

¹⁸ <http://www.greenforall.org/resources/greencorps-chicago>

A green jobs workforce development program can hold great promise for some of the 143,000 Calgarians who live in poverty.¹⁹ Among individuals living below LICO, 32 percent are recent immigrants; 21 percent are visible minorities; 27 percent are single-parent homes, and 30 percent are Aboriginal.²⁰ Green collar jobs offer key opportunities to these historically disadvantaged demographic groups, including on-the-job training, upward career mobility, and living wages.

To identify goals and evaluate alternatives for future workforce development of green collar jobs, a scan of green workforce development programs in Canada and the United States was performed. The scan reviewed twenty-three (23) green jobs training programs in the US and Canada who were contacted to identify promising practices for green collar workforce development. Out of these contacts, case studies were developed for six of these programs.

Many of the emerging green collar workforce development programs are unique, with successful models building on the context of the local economy. No two green collar workforce development programs are exactly alike. Programs we contacted ranged from large-scale state-level workforce development programs to local grass-roots start-ups that were formed to provide a local solution to a local problem. Some programs only provide training, others directly employ workers while providing on-the-job training, others train entrepreneurs to start new green businesses, and some have experimented with new models for workforce development. Many of the entities that we reviewed were formed with the expressed goal to help low income people get jobs that pay a living wage and offer opportunity for career advancement. Some have achieved this goal while others have struggled or failed. The case studies offer an introduction to a diverse range of green collar training programs and a precursory analysis of the characteristics that affect these organizations' success. Each program presents challenges and keys to success that should be considered in developing a green collar jobs workforce development strategy.

The programs covered in the case studies include:

Long Island Green Homes, a program operated by the Town of Babylon in Long Island, New York that has helped over 400 residents to make energy efficiency retrofits to their homes.

Warm-Up Winnipeg, a program that helps low income people and people living in public-owned housing retrofit their homes to reduce water and energy costs. The program also doubles as a workforce development program by providing training for 50-plus disadvantaged workers.

Detroiters Working for Environmental Justice (DWEJ), a grass-roots environmental advocacy group that partnered with Dillard University to train workers in a broad range of disciplines as environmental technicians. Training is offered through a 12-week training course. The program was developed to train workers to address environmental remediation for contaminated sites in and around Detroit.

¹⁹ See Vibrant Communities Calgary Poverty Fact Sheet. Last accessed March 2010 at <http://www.vibrantcalgary.com/think-vibrant/category/vibrant-fact-sheets/>

²⁰ Note that percentages do not sum to 100% because of overlapping demographics. For instance, immigrants who are single parents are counted in two categories.

Springfield Green Worker Cooperative & BuilderSupply²¹ – The organization provides business training and education preparing individuals to launch or operate an employee-owned business that improves the quality of life and quality of the environment in Springfield. The organization also raises funds to start new cooperatives.

Evergreen Cooperative Laundry (ECL)—ECL is a worker-owned cooperative that operates LEED-certified commercial laundry facilities that pay wages that are 25% higher than competitors. Higher wage rates are possible partially because of lower energy costs for the LEED-certified facilities. The cooperative doubles as a workforce development program where workers learn financial management skills and life skills that improve their lives and performance at the cooperative.

Michigan Green Jobs Initiative, a state-level program that brings together employers, educational partners, and other stakeholders to develop training curriculum to prepare workers that meet employer needs.

Looking at each program through the lens of the Sustainable Livelihoods Framework, Warm Up Winnipeg and DWEJ are programs that have achieved the greatest reductions in poverty at an individual level. These programs also have a solid business model that lowers costs for employers or lowers burdens on taxpayers. Both programs have positive impacts on the environment either by reducing energy waste or by transforming contaminated sites into sustainable communities. Both programs benefit from a coordinated effort by several partners, each playing roles that together offer multiple benefits to the community.

Evergreen Cooperative Laundry shares many similarities with Warm Up Winnipeg and places an emphasis on development of essential skills, literacy, and financial management skills. In addition, workers benefit from ownership in the firm where they work, which encourages job stability for the worker while lowering turnover costs for the business. A weakness of the program may be a lack of opportunity for advancement.

The Michigan Green Jobs Initiative tackles job creation and skills training on a macro level through sector alliances that facilitate partnerships between employers and educational providers and by offering tuition reimbursement for workers undergoing training in a growing green industry. The organization sits within the state's department of Energy, Labor, and Economic Growth which has formed a coordinated policy effort to create green jobs in Michigan through the Michigan Economic Development Corporation (MEDC). MEDC has attracted investment by businesses that have created over 50,000 jobs related to automotive battery manufacturing (mainly for hybrid electric vehicles), 21,000 jobs in solar power manufacturing and 5,000 jobs in wind power manufacturing. By enacting policy that both creates jobs and equips the workforce to transition into new jobs with new skills, Michigan Green Jobs Initiative has stimulated growth in the green economy which already represented more than 109,000 jobs in Michigan in 2009.²² A potential weakness of the program is the lack of

²¹ This case study presents several negative characteristics of a green collar workforce development program. The name of the organization and its location has been changed in the case study to keep the organization identity confidential.

²² See Michigan Green Jobs Report 2009. Last accessed May 2010 at http://www.michigan.gov/documents/nwlb/GJC_GreenReport_Print_277833_7.pdf

specific goals or measures for reduction in poverty and low emphasis placed on measurements of outcomes for workforce training.

Long Island Green Jobs programs highlights the visionary and entrepreneurial role that a municipality can have in creating opportunities in the green economy while saving money for residents through energy efficiency. The creativity and determination of the town leadership made residential energy retrofits possible and accessible to all residents, however the program does not double as a workforce training program and the jobs that are created lack the benefits that are possible through a triple-bottom line approach.

While the Springfield Green Worker Cooperative & Builder Supply offered a good service for recycling of construction waste, the program had disappointing results both in economic and social terms. The program serves as an example of the importance of planning, experience, leadership in a green jobs workforce development program.

Among the case studies and the other programs contacted, we make a few key observations regarding keys to success:

- (1) **All three components of the triple bottom line- people, planet, and profits- must be considered in the planning and design of the program if it is going to effectively achieve benefits at all levels.** While the Long Island Green Homes program has an innovative and successful business model, the jobs created do not necessarily pay a living wage and the program has not made measurable reductions in poverty.
- (2) **Employer relationships and involvement is critical to the success of most green collar jobs training programs.** Practically all successful programs that we contacted viewed relationships with employers as a critical component of success. Some training programs were highly selective in choosing the employers that they worked with, preferring to work with a small set of 10 to 20 employers who offered living wages and career advancement.
- (3) **Residential weatherization and retrofitting programs are most successful when city governments have a leadership role.** Municipal government is uniquely positioned to play an influential coordination role for financing of retrofits and quality assurance for contractors. Two of the successful residential retrofit models reviewed were possible only through strong public sector leadership. Leaders in these governments were focused on reducing government energy expenditures and on reducing energy costs for homeowners. The strong emphasis on cost reduction was critical to the success of the program, but in order for the program to work, it required direct government leadership.
- (4) **Many of the green collar workforce development programs were successful because of partnerships between governments and powerful non-profit partners.** These partner organizations recognized the financial, social, and environmental benefits that the training program offered and used their influence to help give the green collar initiative a start.

Successful programs for green collar workforce development in the case studies are generally built upon coordinated interdependencies between diverse stakeholders.

- (5) **Grass-roots programs that aim to create green collar jobs through start-up ventures are most successful when they are run by seasoned and experienced entrepreneurs with 20+ years of business experience.** Any new business start-up is difficult and those that aim for a triple bottom line find that the experience of the leadership is particularly critical. Successful start-ups we reviewed had spent considerable time developing and testing their business plan and making extensive preparations to effectively execute the plan.

- (6) **Many green collar jobs in green landscaping, remediation, or green construction can be seasonal or temporary. Green collar jobs training programs that teach a complimentary set of diverse 'green skills' enable workers to find jobs in a broad set of fields at all times during the year.** When combined with employer relationships, this training approach can be highly effective.

While these key findings can help improve the chances of success of any green collar workforce development program, we encourage readers to draw their own conclusions as well. The case studies offer ideas that can be copied, modified, combined, and improved upon. We also attempt to identify key pitfalls to avoid. However the case studies cannot identify every potential pitfall or every key to success. Not all green collar workforce programs are successful and programs should be developed in a thoughtful and cautious manner. The social development goals, the partners involved, the experience of the leadership, the planning, the training program, and the business model all play critical roles in the program's success.

Conclusions

Growth of the green economy and green collar jobs in North America is in some ways analogous to the Information Technology Revolution of the 1990s. As the IT industry grew, it brought two key changes to the labour force. First, it created new jobs to design, install, and manage IT systems. Second, it brought about changes to a large number of existing jobs that increasingly required computer skills. The revolution grew rapidly through the late 1990s, and after the dot-com bust of 2000-2001 the sector continued to grow--both as a stand-alone sector, and within all traditional industries. The green economy has the potential to follow a similar path and Calgary has an opportunity available to lead in the development of a green economy that makes economic benefits available to all people. Actions taken now to develop of a green collar workforce can effectively reduce poverty, foster industry growth, improve the quality of Alberta's environment, and create a sustainable and just future for all Calgarians.

Labour Market Analysis

The Calgary Context

“When The City of Calgary celebrated Alberta’s 100th birthday, it launched a vision for what a sustainable and environmentally friendly Calgary would look like 100 years from now, engaging thousands of citizens and getting commitments from dozens of organizations to take up the new challenge.”

- *Imagine Calgary*

The values expressed in the imagineCalgary 100 year plan were developed through an extensive survey and citizen engagement process that collected input from over 18,000 Calgary citizens who expressed a strong desire to see a sustainable and environmentally-friendly future for Calgary. The imagineCalgary plan calls for a range of environmentally-friendly development practices including the development of renewable energy resources, sustainable agricultural practices for foods, eco-efficient housing, and personal and business practices that result in zero waste. The plan also calls for stewardship of the natural environment including specific plans to protect climate, air quality, water, and native biodiversity of plants and animals. imagineCalgary’s environmental goals are complimented by social development goals as well. Notably, by 2036, the plan calls for:

- Ninety-five percent (95%) of entrants in trades-related programs will complete their programs and ninety eight percent (98%) of graduates are employed in their fields of study within six months of graduation.
- All adult immigrants to Calgary have the opportunity to integrate into the economy through employment or entrepreneurial activity at the same participation or success rate as other Calgarians.
- Ninety-five percent (95%) of all people living in Calgary are at or above Statistics Canada’s Low-income Cut-off (LICO) rates; there is no child poverty.
- All children of low-income families who are residents of Calgary have the opportunity to complete post-secondary education or appropriate training to enable them to fully participate in the economy.

The process undertaken by the City of Calgary to develop this vision is but one expression of the growing Green Economy, a macro-level trend toward sustainable business practices that emphasize a triple-bottom line: people, planet, and profits.

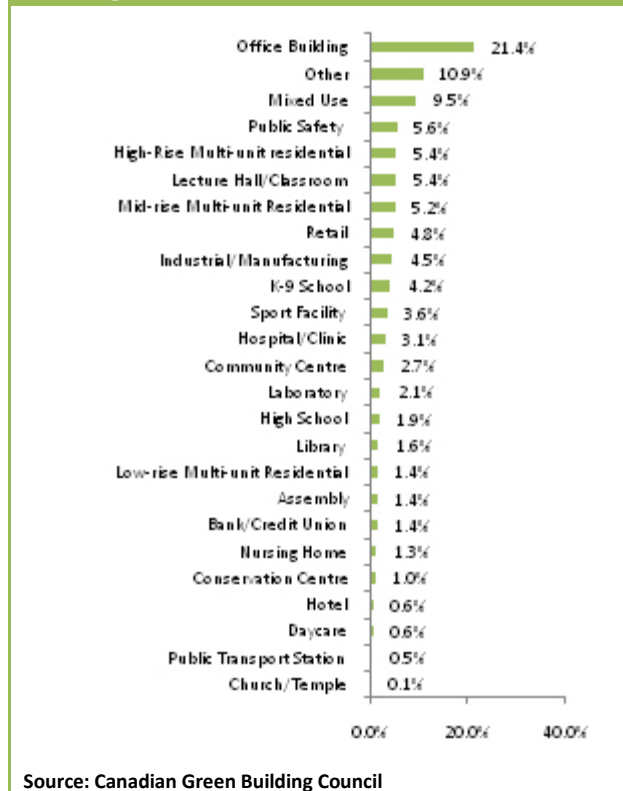
The Growing Green Economy

There are many expressions of the growing Green Economy. The green economy improves environmental quality through reduction of waste, reduction in demand for natural resources, reduction in energy demand, and recycling of materials. The trends in waste reduction, recycling, and other sustainable practices are evident in practically all industries.

Within the construction sector, commercial developers are increasingly adopting practices for LEED construction (Leadership in Energy and Environmental Design), an ecology-oriented building certification program for construction projects. The Canadian Green Building Council (CaGBC) estimates that LEED-certified projects now represent a 21.4% share of the office space construction, a 9.5% share of the mixed use construction market and a 5.6% share of the public safety structure construction market. Green building practices are beginning to penetrate practically all types of construction.

The green energy sector in Canada has experienced double-digit annual growth in renewable energy generation capacity for the past decade. Direct employment in the Canadian solar power sector grew at 31% per year from 2001 to 2007²³ and employment in the Canadian wind sector is expected to grow at 35% per year from 2006 through 2011.²⁴

Estimated Market Penetration in Green Buildings Q4 2009



Demand for renewable energy has been driven by both financial drivers and public policy. Energy policy in Ontario has created a feed-in tariff to sell renewable electricity to the grid at fixed prices, spurring investment in new renewable systems and manufacturing facilities for renewable energy components. Ontario Power Authority announced in April, 2010 that 694 renewable energy projects have been announced in the province in the first six months of the Feed-In Tariff Program, attracting \$9 billion in private sector investment and creating 20,000 direct and indirect jobs.²⁵ The City of Calgary has also made renewable energy a priority: by 2012, Enmax will supply 100% of all the City of Calgary's electricity through renewable energy resources.

²³ Source: Canadian Solar Energy Association

²⁴ Source: Canadian Wind Energy Association

²⁵ See Ontario Power Authority News Release April 8, 2010. Last Accessed May 2010 at: http://fit.powerauthority.on.ca/Storage/100/10986_Apr_8_News_Release_FINAL.pdf

There is tremendous job creation potential within the green economy. Trends in adoption of sustainable business practices are changing the types of activities performed by workers throughout the workforce and driving growth in green collar jobs. The American Solar Energy Society, for instance, estimates that the renewable energy and energy efficiency sector will support 37 million jobs in the US by 2030, up from 9 million jobs in 2007.²⁶ Strong near-term growth in the US is being kick-started by the US federal government, which is currently investing over \$11 billion USD through the American Recovery and Reinvestment Act of 2009 to improve the energy efficiency of homes and buildings. While these trends affect demand for workers at all skill levels, the green economy has the potential to generate very strong job growth in blue collar jobs.

Green Collar Jobs in Calgary and Alberta

Using Pinderhughes definition of green industries, the research team estimates that there are about 1,006 green industry establishments in Calgary in 2009. These correspond to the “green industries” box in Figure 1.2. Green industry establishments have been relatively resilient during the recession. During the 2008-2009 period, the number of these establishments declined by 0.8%, while the total number of establishments in Calgary declined by 4.5%. Green industry establishments likely employ about 8,153 workers in Calgary²⁷ and the number of workers employed by these industries likely grew by about 0.6% during the 2008-2009 recessionary period.

The “possibly green industries” category in figure 1.2 represents industries that have the potential to create green collar jobs, however just a portion of jobs in these industries include activities that improve the quality of the environment. The list of industries in this segment includes construction industries, green energy, agriculture, and other industries. There are 15,913 establishments in this category in 2009 that employ approximately 69,797 workers in Calgary. The number of establishments in the “possibly green industries” category declined by 4.2% during the 2008-2009 recessionary period, which is slightly better than the 4.6% decline experienced in the “not green industries” category. Employment in “possibly green industries” has increased at an annual average rate of 2.0% from 2004 to 2009 and employment declined by 4.2% during the 2008 to 2009 period--much of which may be attributed to declines in construction during the recession.

²⁶ See Colorado and US Green Collar Jobs report, last accessed March 2010 at http://www.ases.org/images/stories/ASES/pdfs/CO_Jobs_Rpt_Jan2009_summary.pdf

²⁷ Estimate made by the author is based upon the number of establishments in each industry within each establishment employment size, as reported in the Canadian Business Patterns database.

Figure 2.2 Industry and Occupation Categories for Green Collar Jobs

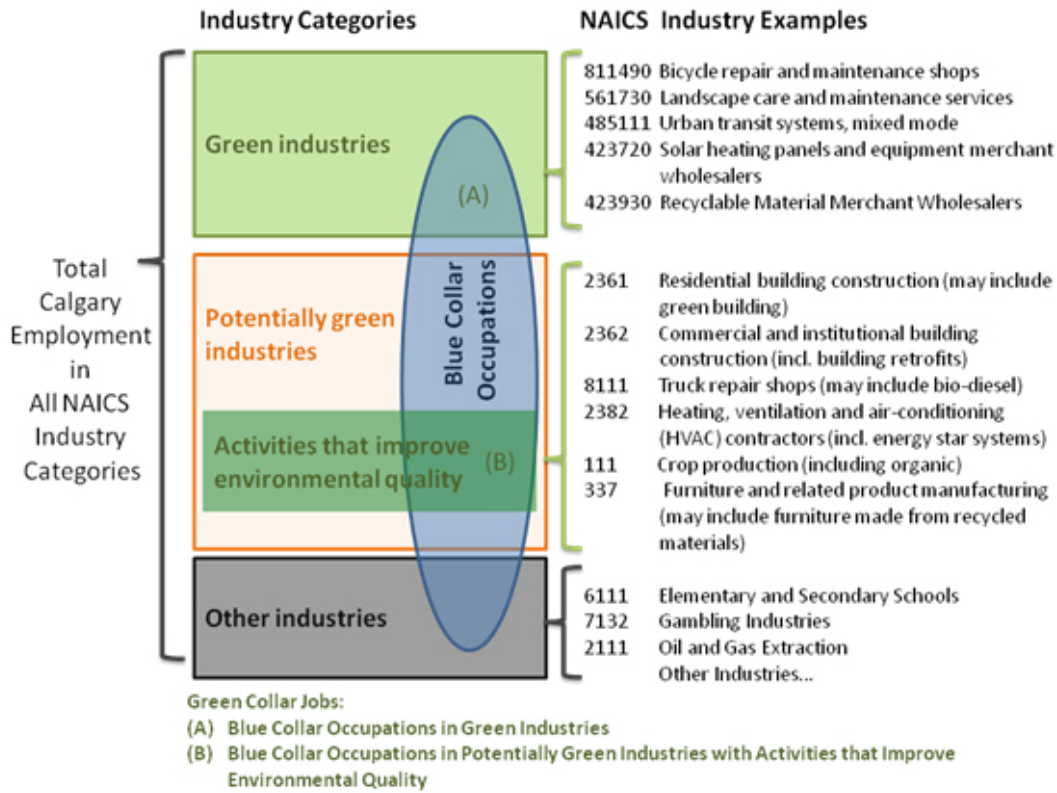


Table 3 Business Establishments in Calgary in Green Industries, Possibly Green Industries, and Not Green Industries: 2004, 2008, and 2009

Category	2004	2008	2009	CAGR 2004-08	Growth 08-09
Green Industries	899	1,014	1,006	3.1%	-0.8%
Possibly Green Industries	14,414	16,605	15,913	3.60%	-4.2%
Not Green Industries	82,862	98,417	93,866	4.4%	-4.6%

Source: Canadian Business Patterns Database

Table 4 Estimated Employment in Calgary in Green Industries, Possibly Green Industries, and Not Green Industries: 2004, 2008 and 2009

	2004	2008	2009	CAGR 2004-08	Growth 08-09
Green Industries	6,850	8,103	8,152	4.3%	0.6%
Possibly Green Industries	75,168	81,411	78,033	2.0%	-4.2%
Not Green Industries	660,811	683,775	675,141	0.9%	-1.3%

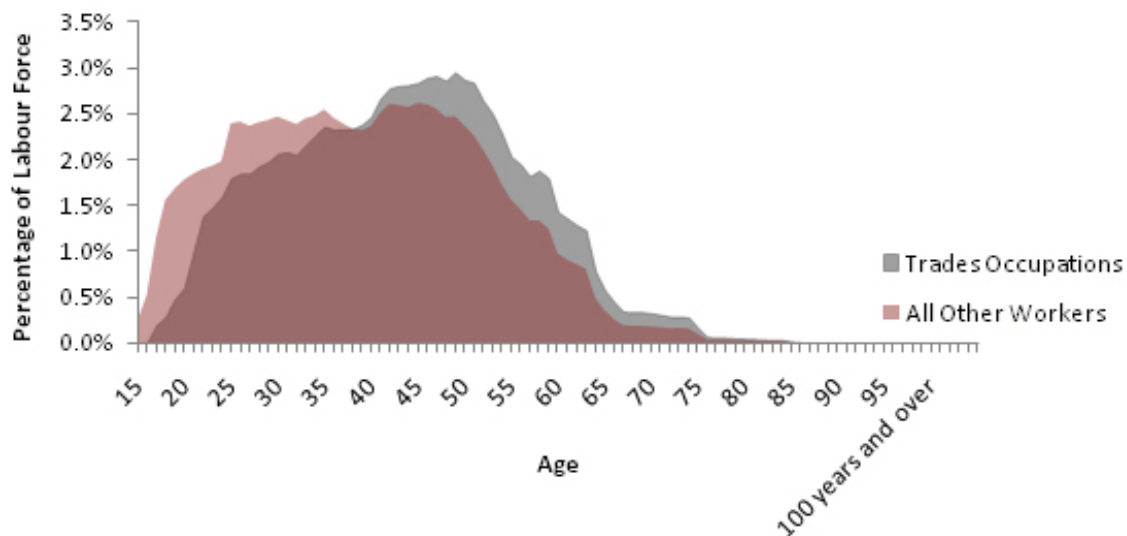
Source: Canadian Business Patterns Database, Estimation of employment by RDA Global

Green Construction

In 2009, there were about 46,000 construction trades workers and contractors employed in Calgary.²⁸ Demand for trades workers in the building construction sector is largely driven by economic growth and population growth, both of which have a positive outlook over the next decade as the world emerges from the 2007-2009 recession.

The trades labour force is comprised of a significant number of older workers and will likely face dramatic shortages as the aging labour force retires. Currently, each year, there are about 400 construction trades workers in Calgary that reach age 65 and will consider retirement from the labour force. By 2020, this figure will rise to about 550 construction trades workers per year.²⁹ The retirements of these workers will drive future demand for construction trades workers.

Figure 5 Age Distribution of Calgary Labour Force: Trades Workers vs. All Other Workers (2009 Estimate)



Source: Statistics Canada; RDA Global

Experts interviewed observed that SAIT can't open enough spaces for people wanting to enter trades apprenticeship programs and is trying to expand student capacity in all trades specialties. The construction industry has itself contributed \$10 million in fundraising for trades occupations training

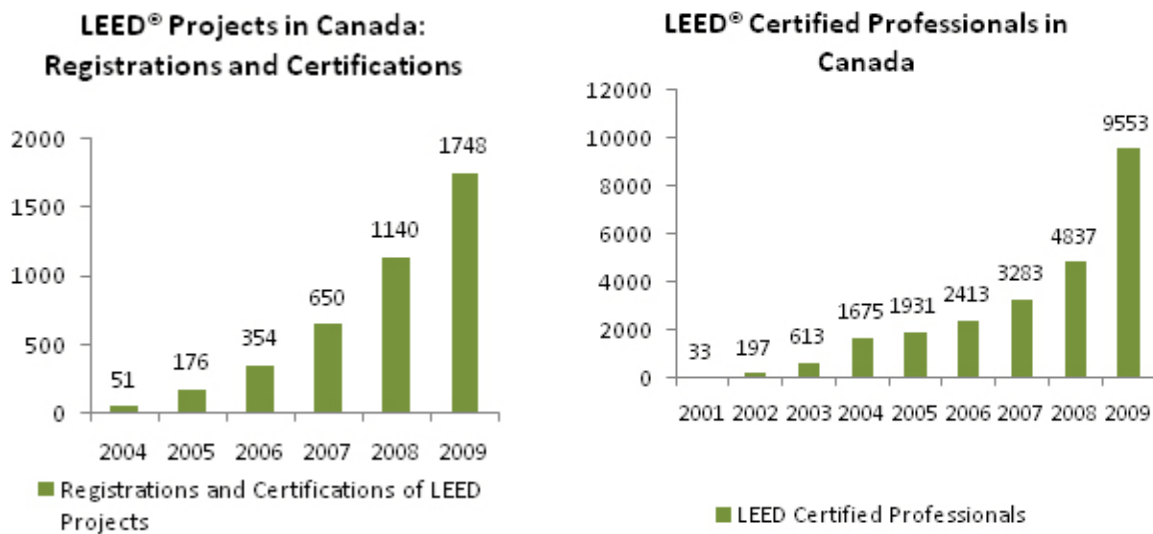
²⁸ Source: Statistics Canada Labour Force Survey, special aggregation.

²⁹ Source: Own calculations based on a cohort advancement model developed using 2001 and 2006 census data and more recent labour force survey statistics.

spaces at SAIT. Each of the green construction informants for this study mentioned that increases in training for trades workers is a top priority to support ongoing growth of the construction sector.

Growth in Green Building Practices

Green building practices are becoming increasingly important within the construction sector. The trend toward these practices is most observable in the growing number of building projects that are registered or certified using LEED building practices. The growing demand for LEED practices has driven demand for LEED-certified professionals who are able to design eco-friendly buildings. The number of LEED certified professionals in Canada has grown from a mere 33 professionals in 2001 to over 9,500 professionals in 2009. The growing adoption of green building practices has driven the number of LEED certified professional in Canada to roughly triple during the 2007-2009 recession period.



Source: Canadian Green Building Council 2009 Q4 Report

Demand for energy efficient residential construction is being aided by a provincial rebate for energy-efficient new homes. All Albertans who take possession of a new EnerGuide labelled single-family or multi-family row home (excluding stacked multi-family construction) on or after January 1, 2009 are eligible for one of the following rebates:

- \$1,500 for new homes that meet or exceed EnerGuide³⁰ 80;
- \$3,000 for new homes that meet or exceed EnerGuide 82; or
- \$10,000 for new homes that meet or exceed EnerGuide 86.

In addition to green construction practices for new buildings, there is growing demand for residential and commercial retrofits of existing buildings to increase the energy efficiency of the structure. The national ecoENERGY retrofit program offered grants through March 2010 to partially offset the costs of purchase and installation of energy efficient upgrades, thereby driving demand for home and

³⁰ See NRCAN EnerGuide for more details on ratings:
<http://oee.nrcan.gc.ca/residential/personal/new-homes/upgrade-packages/energguide-service.cfm?attr=4>

commercial building renovations. The program required an energy efficiency audit to be performed both before and after renovations and the popularity of the program has driven dramatic growth in the number of certified energy auditors that can perform such audits. In 2009, there were 1,770 energy auditors in Canada certified by the ecoENERGY program, up from 1,007 energy auditors in 2008, the first year of the program. In Alberta, the number of advisors grew from 49 in 2008 to 95 in 2009.

Table 6 Energy Advisors certified under the NRCan EcoENERGY Program

Province/Territory	Number of Certified Energy Advisors in 2008	Number of Certified Energy Advisors in 2009	Growth 2008-2009
Alberta	49	95	94%
British Columbia	108	179	66%
Manitoba	30	47	57%
New Brunswick	60	85	42%
Newfoundland	5	13	160%
Nova Scotia	61	83	36%
Ontario	521	1,031	98%
PEI	9	14	56%
Quebec	100	131	31%
Saskatchewan	47	62	32%
Territories	14	15	7%
Indeterminate	0	15	N/A
Total	1,004	1,770	76%

Source: Natural Resources Canada ecoENERGY Program

Green Collar Construction Jobs

“All blue collar [construction] jobs are going to have a green aspect to them going forward.”

- Donna Moore, Executive Officer, Canadian Home Builders Association – Calgary Region

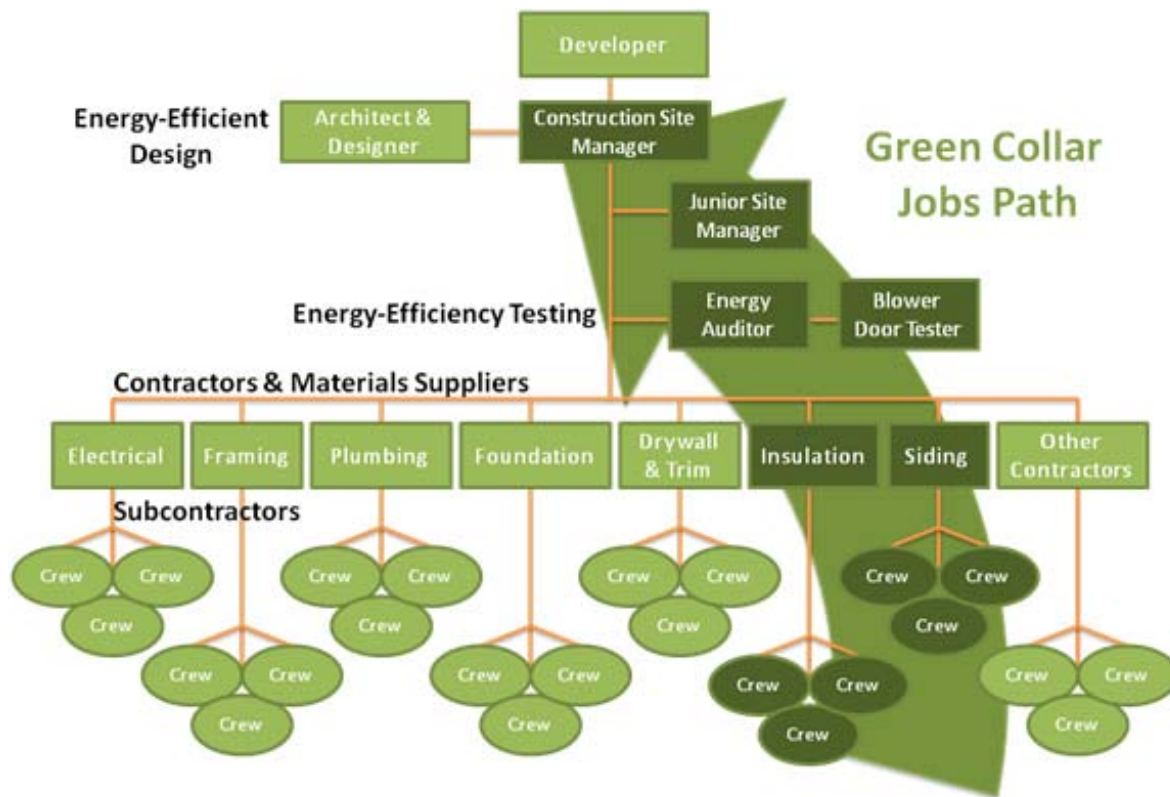
Green building design by architects and designers is affecting the types of materials used in construction and also the way in which trades workers install these materials throughout the construction process. The trend toward green building practices is affecting the skills and knowledge required by all essentially all construction tradespersons. While design changes are changing the *skills* required of all workers, there are also a few entirely new occupations that are being created in the green construction sector (namely energy auditors and blower door testers). Informants indicated the changes in building technology would drive demand for workers who have a combination of traditional technical trade skills and knowledge of new green construction practices, but that the technology changes would not create demand for a whole new type of workforce. For instance plumbers may need additional training in grey water reuse for landscape irrigation and electricians may need to understand how to install smart electrical systems that better manage electricity usage in a home. Even laborers will need to be able to sort construction debris so that each type of waste may be recycled.

While all construction trades will have demand for new green construction skills, there were a few key green collar occupations that hold the greatest potential for growth. Specialized skills are needed for the following green collar construction jobs:

- (1) Insulation installers
- (2) Siding and exteriors installers
- (3) Blower-Door Testers
- (4) Energy Auditors
- (5) Site Managers and Junior Site Managers

Green building practices are driven by green design principles that are implemented in the architectural design of the structure. Proper implementation of the green design is controlled by the construction site manager and junior site manager. Workers in these two occupations play a critical quality control role, ensuring that all green aspects of the construction are completed properly by all contractors, suppliers, and subcontractors. The overall energy efficiency of the structure is most strongly affected by two key steps in the construction process: (1) insulation of the structure and (2) siding or material used for the exterior of the structure that provides a moisture barrier. The proper installation of insulation and siding materials is critical for ensuring that the structure is air-tight and dry. Proper installation of siding is particularly critical to protecting the long-term durability of the structure. Figure 2 illustrates a potential Green Collar Jobs Path within the residential construction and remodeling industry. The dark green objects in the figure represent the occupations that have skills requirements that are most critical to green construction.

Figure 3 Residential Construction & Remodelling Industry Organization



Green Collar Jobs Roles in the construction process:

- (1) **Insulation installers (insulators):** The insulation of the building plays perhaps the most important roles in the overall energy efficiency of the structure. Developers emphasized that insulation installers must understand both how to properly install insulation and why they do it in this way. This knowledge is critical to ensure that the insulation installation is properly performed and the building is air-tight when construction is complete. Developers indicated that they felt that installers often lacked critical knowledge for energy-efficient installation practices. The Thermal Insulation Association of Alberta (TIAA) has been instrumental in the creation of an insulator apprenticeship program that has been offered at NAIT since 1972. A comparable program was also offered at SAIT but is now closed. Developers noted that SAIT does offer an R-2000 training course for construction site managers and builders; however this training is not targeted toward insulation installers and is not extensive enough to prepare workers to properly install blown insulation. Most experts we spoke with expected that insulators would earn a living wage and offer excellent entry-level opportunities. Proper insulation installation training and product knowledge would offer upward mobility for workers who desire to become a journeyman insulator, a blower door tester, energy auditor, junior construction site manager, or other related career paths.
- (2) **Siding Installers:** Proper installation of siding ensures that a moisture barrier is in place to keep the interior of the structure dry and extends the lifespan of the structure. The Siding

Contractors Association of Alberta sets professional standards for installation of siding; however, siding installation is not currently a formal trade. All experts we spoke with indicated that siding installers earn a living wage and that the field offers entry level positions. As with insulators, skills and knowledge gained in the industry would offer advancement opportunities for workers that are similar to that of insulators.

- (3) **Blower Door Testers:** Blower door testing and guided air sealing is one of the most cost-effective energy efficiency measures applied in single-family buildings. Sophisticated blower door testing protocols and systems now also allow practitioners to use this strategy on multi-family buildings as well as single family homes. The training requirements for blower door testers can typically be completed in a three-day course (two days of classroom training and one day of field work). Experts estimated that there are currently only a handful of perhaps ten (10) blower door testers employed in Calgary and expected that the demand for these workers would grow significantly to perhaps 50 or more workers over the next 10 years, offering a specialized niche green collar job opportunity. Blower door testers typically work in conjunction with energy auditors and would have opportunities to move into energy auditor positions as they gain skills. Most experts thought that blower door testers would earn a living wage (estimates ranged from \$15-\$20 per hour).
- (4) **Energy Auditors:** For homeowners that have applied for ecoENERGY grants to improve the energy efficiency of their homes, an energy audit is required both before and after renovations are in order to measure improvements in energy efficiency. As mentioned earlier, there were about 95 ecoENERGY certified energy auditors working in Alberta in 2009, up from 45 in 2008. Most experts expected that the demand for these workers in the future would grow in step with local economic growth that drives demand for home renovations. Entry level wages for energy auditors were estimated by experts to range from \$14 to \$25 per hour in Calgary. A certified energy auditor is not an entry level position. To become a certified ecoENERGY energy auditor, applicants must complete a training course, pass an exam administered by Natural Resources Canada, and have some experience in construction or home inspection. However, the position has relatively low barriers to entry and would constitute a natural next step progression within the green collar construction jobs path. Energy auditors who own the proper equipment may become self-employed energy auditors and can earn significant income in excess of \$75,000 per year.
- (5) **Site Managers and Junior Site Managers:** There has not historically been a well-defined career path for site managers. Experts we spoke with indicated that these workers typically begin working for a developer/builder as a construction helper, move to becoming a junior site manager, and with experience can become a senior site manager. The site manager and junior site manager is responsible for inspecting the quality of work performed by contractors and subcontractors and ensuring that green building principals have been properly followed and all green aspects of the structure are properly constructed or installed.

Developers and builders in Alberta have been very instrumental in the development of a new training curriculum for site managers through the Alberta New Home Warranty Program. The program operates the Professional Home Builders Institute (www.phbia.com) that is in the

process of launching a new \$1.5 MM site manager training program that will be offered online. Workers who begin working as a junior site manager or helper could enter this new three year apprenticeship program to gain the qualification and experience needed to become a site manager. Builders we spoke with estimated that entry level wages for helpers would range from \$14 to \$20 per hour and junior site managers could earn from \$18 to \$25 per hour. The position offers advancement potential to a site manager and could offer lateral mobility for workers who want to move into other types of construction management (commercial site managers), subcontracting, or other career paths.

Opportunity for Unemployed or Underemployed Workers in Green Construction

Generally speaking, each expert we spoke with in the green construction sector thought that the apprenticeship training program for construction trades offers good access to the labour force and green collar jobs opportunities. The Professional Home Builders Institute offers training for site managers through an online training program that could, in the future, be customized to offer training modules on proper installation of insulation and siding. The organization president, Helen Webster, expressed openness to the opportunity to explore training partnerships that could assist with more targeted training for these green collar workers.

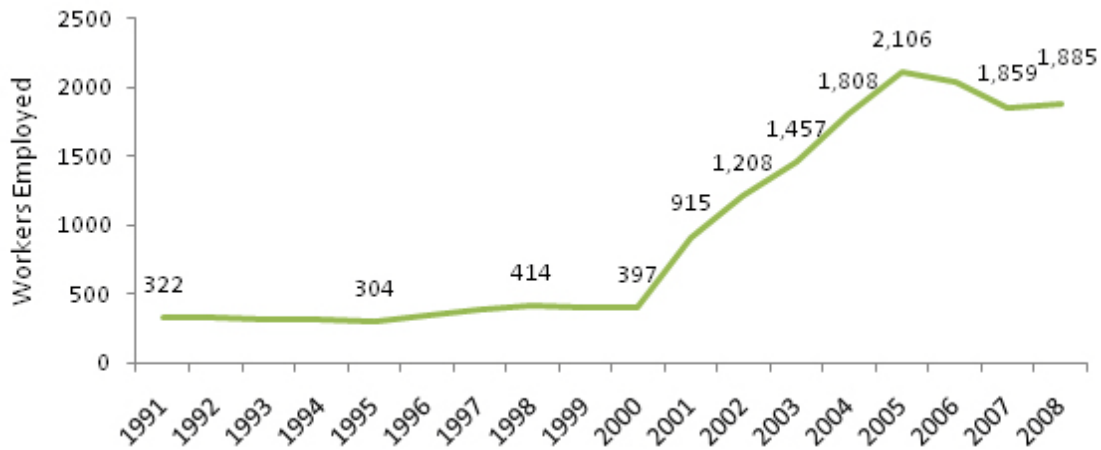
Participants in our interviews noted several successful job training models for green collar construction jobs that should be further explored. Warm-Up Winnipeg (www.warmupwinnipeg.ca) was recommended as one of the strongest programs for workforce development within the green construction sector. The program effectively prepares workers for careers in construction trades while performing water use and energy retrofits. In 2010, the organization anticipates completing over 2,000 water retrofits, 400 energy retrofits, and expanding their private home business while providing jobs and training for over 50 disadvantaged workers.

Environmental Remediation

Environmental remediation is a necessity for much of Alberta's oil and gas industry. The industry employment was flat through the 1990s but grew dramatically in the early 2000s as conventional oil and gas development and oil sands development accelerated, growing from about 400 workers in 2000 to over 2,100 workers in 2005. Since that time, the remediation industry employment has remained in the 1,800 – 2,000 worker range.

Demand for environmental remediation in the oil and gas sector is driven by requirements for remediation of soil contamination. In addition to clean-up of sites, regular site monitoring is mandatory for remediated sites, insulating the remediation industry somewhat from economic cycles.

Figure 4 Employment in Alberta's Remediation Industry



Source: Survey of Employment Payroll and Hours, Statistics Canada

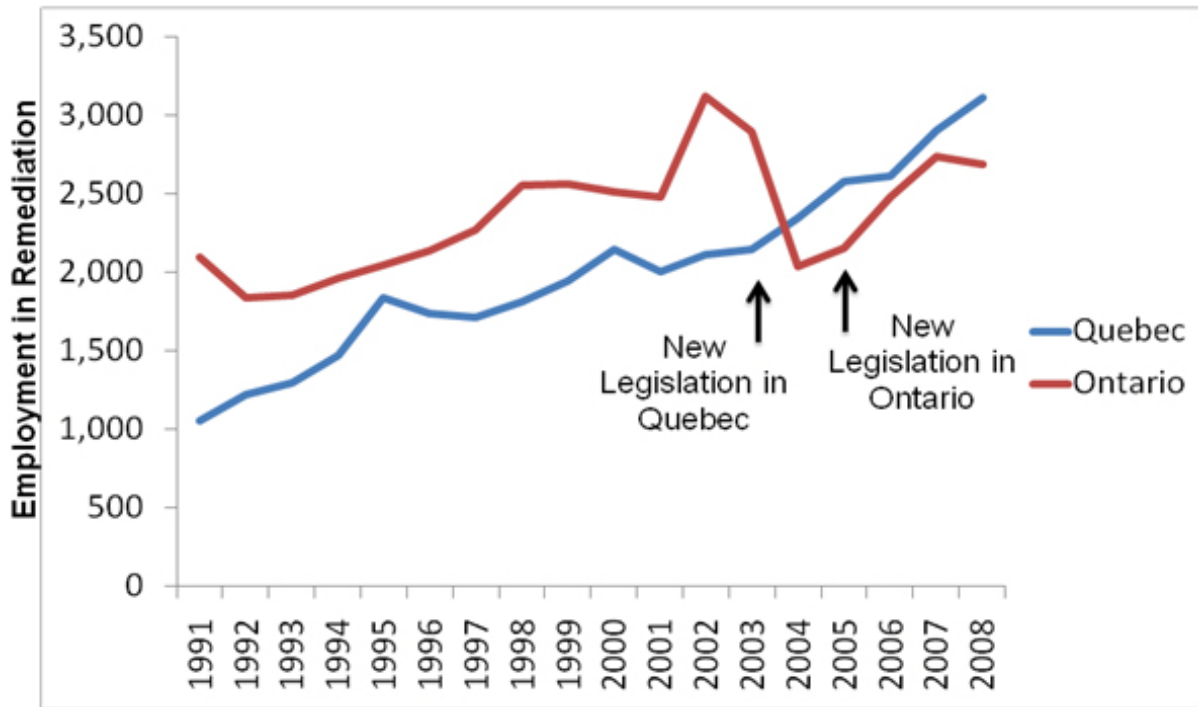
When our team spoke with business operators in the remediation industry, most participants we spoke with did not view the industry as a whole as particularly “green.” The customers for remediation services are primarily oil and gas firms that have polluted the environment. It was explained that for many oil and gas junior firms, cost controls were vital to the early success of the firm and as a result, many small oil and gas firms do only the minimum remediation activities required. Remediation of oil and gas sites in Alberta was described as falling into two categories of activities:

- (1) **“Dig and Dump”**: In this practice, contaminated soil is loaded onto a truck using heavy equipment and then transported to a landfill. The soil is not cleaned, but rather simply moved to a less sensitive location. The liability for the contaminated soil remains with the firm causing the pollution, even if the soil is being stored in a landfill.
- (2) **In-Situ Remediation (techniques that remove contaminants)**: There are a variety of in-situ processes that can be used to remove or reduce the concentration of contaminants in soil. These processes are more costly than “Dig and Dump”; however, if the contaminants are removed, a firm may get rid of future environmental liability for the contamination, with the approval of regulators.

The second of the two types of techniques is perhaps more “green” as it has a greater potential to truly improve the quality of the environment. Experts we spoke with indicated that in-situ remediation represented, at most, 25% of the remediation market. Industry leaders observe that in-situ remediation generates more jobs than the “Dig and Dump” technique and also spurs technology innovation to offer ever improving processes for remediation. In-situ remediation is in relatively low demand because of higher near-term remediation costs; however there are some firms that prefer to invest in the greener remediation option to improve public perception and reduce their environmental liabilities. Most remediation firms offer a mix of the two services, although there are some firms that now refuse to offer “Dig and Dump” services.

It was noted that “Dig and Dump” is an accepted method of clean-up in Alberta, but it is not permitted in Quebec or Ontario. In these jurisdictions, Land Disposal Regulations have been enacted that force firms to take action to remove contaminants from contaminated soil. The result has been that remediation companies develop and offer more technologies to deal with the problem. Both provinces experienced growth in employment in the remediation industry following the implementation of new Land Disposal Regulations.

Figure 5 Environmental Remediation Employment in Ontario and Quebec



Source: Survey of Employment Payroll and Hours, Statistics Canada

Experts we spoke with felt that there were perhaps two ways to increase demand for greener in-situ remediation in Alberta. One is through tougher Land Disposal Regulations that prohibit “Dig and Dump” practices. The other strategy suggested was to require public firms in Canada to disclose their environmental liabilities on their balance sheet in their public financial reporting. Unlike the US, oil and gas firms in Canada are not currently required to disclose environmental liabilities on their books. If these liabilities were known, it would potentially place financial pressure on firms with large liabilities to more effectively reduce their liability through more effective remediation measures. There are some firms, such as Shell, that currently voluntarily report their liabilities as a way of encouraging the same practice throughout the industry. Still, the majority of firms do not disclose their environmental liabilities and changes in disclosure requirements would likely spur growth in the in-situ remediation industry.

Within site remediation, about 60% of all jobs are considered field worker jobs and there is demand for two levels of entry-level green collar jobs in the field:

- (1) **A Labourer:** There are no set educational prerequisites for these workers. Workers must be reliable and able to work outside in all weather conditions. Entry level labourers earn between \$10 and \$15 per hour.

- (2) **Equipment Operators:** There is about one week of training required for these workers to begin work in site remediation, comprised of five classes including:
 - a. First Aid - 2 day course
 - b. Transportation of hazardous materials - 1/2 day course
 - c. H2S-Alive training - 1 day course
 - d. Confined Space Entry-- working in a closed area or in a hole -1 day course
 - e. WHMIS-- Workplace Hazardous Material Information System. - 1 day course

With training, equipment operators in remediation can earn \$15 to \$20 per hour starting wages.

Beyond these two entry level positions, there is opportunity for advancement. Workers who gain experience and attain additional education can advance to become a technician. Remediation technicians perform a broad set of tasks including core sampling, field equipment instrumentation and operation, worksite management and coordination and other tasks. With significant experience as a technician and additional management education, field technicians may advance to become a site project manager.

The skills gained by a green collar worker in the remediation industry are also transferable to other construction trades. It was mentioned, in particular, that safety training for an equipment operator would be highly attractive to employers looking for a welder's helper or similar entry level for trades.

Renewable Energy

The renewable energy industry in Canada has experienced double-digit growth over the past decade. The solar, wind, and thermal renewable energy sectors, in particular, have seen tremendous investment with electric generation capacity within these three sectors increasing at an annual rate of 26% per year between 2000 and 2009. Currently there is over 1.1 million KW of renewable energy capacity in place in Canada.

Canadian Energy Generation Capacity for Solar, Wind and Geothermal Energy 1980-2009

(KW Capacity X 1,000)	1980	1990	2000	2009	Annual Average Growth 1990-2000	Annual Average Growth 2000-2009
Wind	-	20	124,107	1,045,567	164%	27%
Solar	405	417	2,121	43,150	20%	40%
Earth and Geothermal	387	492	9,754	30,266	39%	13%
Total	792	929	135,982	1,118,983	74%	26%

Source: CIEEDAC Renewables Database

Wind Energy

Worldwide capacity for wind electricity generation reached 159,213 MW in 2009, out of which 38,312 MW were added in 2009, a 31.7% growth rate during the global economic recession.³¹ The global wind sector employed 550,000 persons worldwide in 2009. World Wind Energy Association estimates that industry employment will double to 1 million workers globally by 2012. The Canadian Wind Energy Association estimates that the total employment in Canada's wind industry will grow by 35% annually from 2006 through 2011 and reach 5,300 workers by 2011 (up from 1,200 workers in 2006). Trades, labourers and similar occupations in the wind energy will grow to 3,700 full-time-equivalent workers by 2011, growing at an annual growth rate of 42% per year.

Employment Estimates for the Canadian Wind Industry 2006-2011

Occupation	2006	2011	Average Annual Growth 2006-2011
Management and Supervisors	230	700	25%
Engineers and Scientists	240	600	20%
Trades	190	1,300	47%
Other occupations	190	600	26%
Labourers (assembly etc.)	270	1,800	46%
Other support staff	90	300	27%
Total employment	1,200	5,300	35%

Note: Employment expressed in terms of Full-Time Equivalents, or FTE; Source: Canadian Wind Energy Association (CANWEA), 2007

The Pincher Creek Area in Southwestern Alberta is the site where the majority of wind generation capacity is being developed. There are currently about 600 MW of installed wind capacity in Alberta and experts we spoke with estimate that this should double in the next 4 to 5 years to 1,200 MW of capacity. The growth in capacity is due to both increasing number of wind turbines installed and the growing

³¹ Source: World Wind Energy Association 2009 Annual Report

generation capacity of turbines.³² Experts thought that the doubling of wind generation capacity would equate to about a 65% increase in the number of workers required in the industry. Although experts expected that 1,200 MW of new capacity would come online in the next few years, it was noted that there are over 5,000 MW of capacity in potential wind farms where petitions have been filed for approval (over eight times as much capacity as is currently installed in Alberta). The main factor limiting growth of the industry presently is the availability of transmission lines that the Province is installing to connect wind turbines to the grid.

Experts estimated that there are perhaps 300-400 workers directly employed in the wind industry in Alberta currently (not including sub-contractors). No official statistics on the number of workers employed in Alberta could be identified. The total employment generated by the Alberta wind industry is difficult to estimate because construction of turbines involves the manufacturing of the materials, construction of the turbine, maintenance of the turbine, and even construction of roads that go to the wind turbines.

The main green collar jobs in the wind energy sector include:

- (1) **Wind turbine maintenance technicians:** Experts estimated that there are about 50 such workers employed in Alberta at present and this should grow to about 85 workers over the next few years. Most of these workers are employed by Vestas, the largest global wind turbine manufacturer. Experts we spoke with indicated that wind turbine technicians would earn between \$30,000 and \$40,000 per year.
- (2) **Construction Trades:** Crane operators, electricians, and other trades occupations are needed to construct the bases used in a wind farm. These jobs are temporary in the sense that they are needed only during the construction process; however given the pipeline of projects proposed in Alberta, these jobs will remain in long-term demand as the industry grows. Crane and heavy equipment operators in Alberta have starting wages near \$21 per hour³³ and most other construction trades have similar entry level wages.

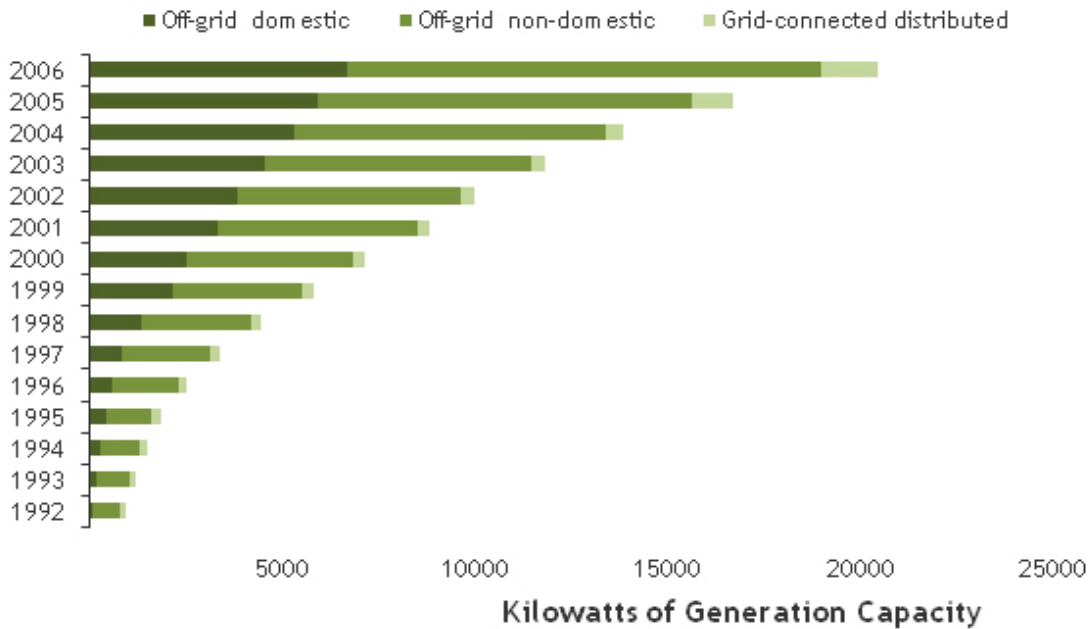
Solar Power

Solar power may be grouped into two categories: Photovoltaic (PV) power and Solar Thermal Energy (used to heat water, pools, etc.). About 95% of employment in the industry is concentrated in the PV sector. The PV solar sector can be divided into two sub-categories as well: grid-connected solar power and off-grid power. Historically, the vast majority all solar power installed in Canada has been off-grid.

³² Turbines being installed today have a generation capacity of 3 to 3.5 MW. Those installed three years ago that had generation capacity of about 900 KW.

³³ See Alberta Wage and Salary Survey: <http://alis.alberta.ca/WAGEinfo>

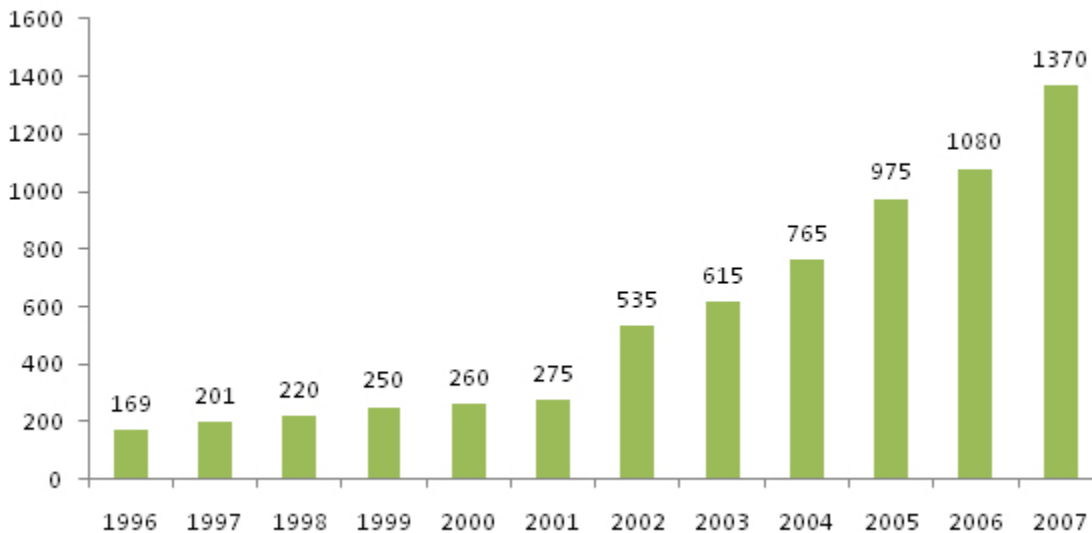
Cumulative Installed PV Power in 3 sub-markets in Canada 1992-2006



Source: Canadian Solar Industries Association

The growth of the solar PV industry in Canada has been driven by ongoing declines in the cost of solar panel manufacturing. As materials costs decline, there is growing demand for workers to install solar panels. The Canadian Solar Power Industry (CANSIA) estimates that there are 1,370 full-time equivalent workers employed in Canada’s PV solar industry in 2007, up from 271 workers in 2001.

Figure 6 Full-Time Equivalent Employment in PV Solar Industries in Canada



Source: Canadian Solar Industry Association Labour Force Study 2009

Experts we spoke with had difficulty estimating the number of workers employed in the solar power industry in Alberta and no official statistics on employment in the sector could be identified. Estimates ranged from 100 to 300 workers currently working in the sector in Alberta. The jobs created by the sector in Alberta are primarily jobs in solar power design and installation, but not in manufacturing of solar power panels and components.

Growth in the industry is aided by feed-in tariffs put in place in some jurisdictions (notably Ontario) that allow homeowners with solar power generation to sell electricity back to the grid at a fixed price, thereby greatly offsetting their energy costs. Alberta does not currently offer a feed-in tariff and most experts we spoke with saw this as a factor that is limiting investment in solar generation technology in Alberta. Experts we spoke with expected sales in Alberta's solar sector to grow at about 10% per year in the current environment. The feed-in tariff program in Ontario has enticed Sustainable Energy Technologies, an Alberta-based solar power firm, to invest in a large scale solar module production facility in Ontario that will employ as many as three hundred workers within two years. Entry level workers at the planned production facility will earn about \$15 per hour.

Currently the main green collar jobs in Alberta's solar industry are in installation of PV solar power. There is not a trades designation for installation of solar power systems. Installation of the solar power system affects two key construction trades:

- (1) **Roofers** who install the panels; and
- (2) **HVAC & Electrician Trades** who implement the related systems

The proper installation of solar systems requires specialized training in the system being installed that augments the training required in the trade. Some of the experts we spoke with emphasized that improper installation of solar systems was a systematic problem throughout the industry. It was felt that firms often cut costs of home installations by using unqualified lower-cost workers who do not have proper training on the system being installed. When asked if a training program for workers would be beneficial, experts indicated that job placement would be difficult at this point. Participants felt that demand for workers will not grow dramatically unless there are significant increases in energy prices or an effective feed-in tariff is put in place.

It is worth noting that the feed-in tariff in Ontario has encouraged significant development of Ontario's solar manufacturing industry with Kitchener-based Canadian Solar Inc. developing a manufacturing facility that will employ 500 workers beginning in mid-2010.³⁴ Our contact at Alberta-based Sustainable Energy Technologies indicated that it would not be a problem to open a solar manufacturing facility in Alberta if a feed-in tariff were put in place. Such a policy should follow the pattern set forth in Ontario that contains regulations that materials be manufactured within the province.

³⁴ See <http://www.thestar.com/business/article/733995--new-ontario-solar-plant-to-create-500-jobs>

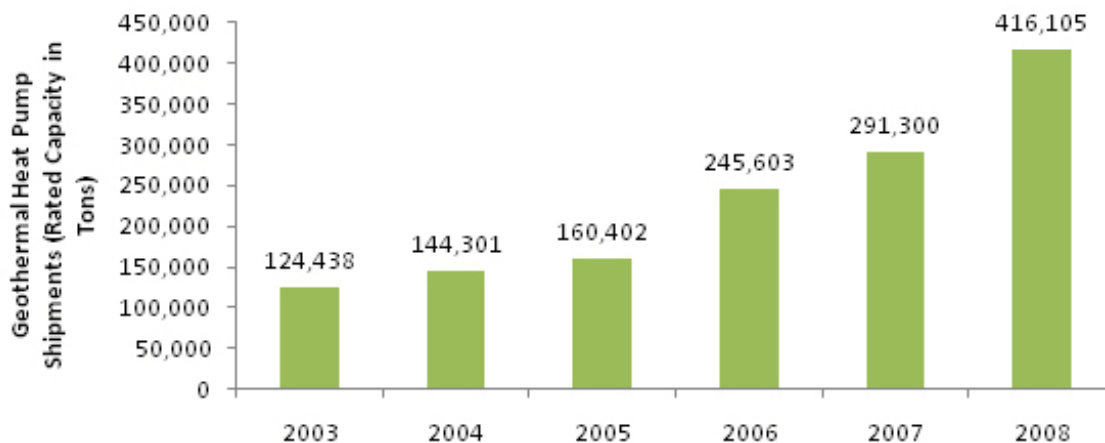
Geothermal Heating and Cooling

Geothermal is a renewable technology that uses the constant temperatures of the earth to provide heating and cooling. Geothermal energy is used in more than 20 countries to generate electricity, including Iceland, USA, Japan, Italy, Indonesia, New Zealand, Mexico, the Philippines, Kenya, Costa Rica, and Nicaragua. Iceland generates 17% of its electricity, and 87% of its heating from geothermal energy.³⁵

Geothermal energy can be used to provide both electricity and heat. The majority of the geothermal market in Alberta is for residential and commercial geothermal heating. The participants in our interviews focus on design and installation of geothermal heating for new mid-sized to larger homes. Our informants were aware of eight firms in the geothermal heating industry in Edmonton and three in the Calgary area. They estimated that there were perhaps 200-300 workers in the industry in Alberta at the present time.

Industry growth is not well-tracked in official statistics in Canada. One indication of growth of the market is growth in shipments of heat pumps from heat pump manufacturers in the USA. Shipments of heat pumps for geothermal heat have increased from 124,438 tons of rated capacity in 2003 to over 416,000 tons of rated capacity in 2008, an annual growth rate of 27% per year. Production of heat pumps in the US grew by 43% from 2007 to 2008.

Figure 7 Geothermal Heat Pump Shipments in the United States



Source: Energy Information Administration (EIA), Form EIA-902, "Annual Geothermal Heat Pump Manufacturers Survey."

Participants in our interviews indicated that the industry in Alberta was experiencing very strong double-digit growth up until the recent recession. The cost of fossil fuel energy is the main driver affecting demand for geothermal heating systems, which can cost about double that of a conventional heating

³⁵ See Canadian Geothermal Energy Association Facts and Figures

system. Even with relatively low energy prices, it was anticipated that growth of the industry in Alberta would average over 10% per year over the next decade.

There were three green collar jobs identified in the construction and installation of a geothermal heat system. These include:

- (1) **A drilling technician:** These workers drill wells for the geothermal system to access heat stored under the earth's surface. Water well drillers are the workers typically accessed for drilling to install a geothermal system. Wages for drillers in Alberta start at \$12 per hour and average \$22 per hour.³⁶ Workers in the field must have training on operation of well drilling equipment and safety training but there is no special training needed for installation of the geothermal system. Our informant in this sector anticipated that most workers could be trained for entry level work within a matter of days.
- (2) **An Excavator:** This worker operates a backhoe or similar heavy equipment used in installation of the geothermal system. Training requirements for the job are similar to a drilling technician and wages for heavy equipment operators in Alberta begin at \$17 per hour.
- (3) **A Plumber:** The plumber installing the system must have completed a three day course by the Canadian GeoExchange Coalition in order to pull the permit for the project. Installation of the system must be supervised by a master plumber but an apprentice plumber would do a significant part of the installation. Plumbers in Alberta receive starting wages of about \$14 per hour. Average wages for plumbers with experience are \$31 per hour in Alberta.³⁷

Recycling

The recycling industry has operated for decades in Alberta and is comprised on a complex mix of operators who process used materials into new products. This prevents waste of potentially useful materials and reduces consumption of fresh raw materials. Employment in the recycling industry in Canada is not well tracked and is difficult to estimate due to the fragmentation and complexity of the sector. The Canadian Association of Recycling Industries estimates that there are perhaps 2,000 firms operating in the sector in Canada, although no official statistics are available.³⁸ Most recycling experts we spoke with noted that many segments of the recycling industry are sensitive to commodity prices and most recyclers have been adversely affected by the recession; however, despite recent declines, the experts we spoke with anticipated that the industry would continue to grow in the long term.

Recyclable materials include many kinds of glass, paper, metal, plastic, textiles, and electronics. The structure of the industry differs by the type of material being recycled. Key players in the industry

³⁶ Source: Alberta Wage and Salary Survey

³⁷ Source: Alberta Wage and Salary Survey

³⁸ Source: <http://www.cari-acir.org/en/industry.html>

include collectors, sorters, wholesalers and manufactures who design processes to reuse collected materials. Provincial and municipal organizations play a key role in the industry.

A key player in the recycling industry in Alberta is the Alberta Recycling Management Authority (www.albertarecycling.ca), a not-for-profit association responsible for managing Alberta's tire, electronics and paint recycling programs. These programs collect advance fees from the sales of tires, paint and electronics in Alberta and these fees are used as incentives for private processors to recycle these materials at the end of their useful lives. The tire recycling processors participating in the program have been strongly affected by the drop in commodity prices during the recession and have made significant cuts to their workforce. The advance fees collected for recycling of tires have been insufficient to subsidize the tire recycling industry.

The provincial electronics program has not been as strongly affected by the recession. There are six private processors of used electronics in Alberta, of which four are manual disassemblers. It was not expected that the number of processors will grow in the future but employment at the disassembler processors was expected to remain stable. Workers who are employed as dissemblers in these four plants earn about \$12 per hour and have some limited opportunity for advancement.

The City of Calgary employs about 300 workers as collectors in the city's Blue Cart recycling program. About 40 to 50 workers are employed in the sorting of materials. Workers in this large program earn about \$12 per hour as starting wages. Workers are hired through a contractor and if they are later hired directly by the City, their wages increase. Although there is high replacement demand for workers, the Blue Cart program manager we spoke with does not anticipate significant expansion of the program in the future.

The majority of the remaining employment in the recycling industry is highly fragmented. Green Calgary operates a consulting practice to help firms reduce waste and increase recycling. The organization found that a lack of information on available recyclers was the most important barrier for firms in their efforts to reduce waste and recycle. To meet this need, the organization maintains an online database of recycling operators in Calgary who operate in 23 materials categories:

- Aggregate Recyclers
- Battery Recyclers
- Construction Reuse
- Curbside Recyclers
- Deconstruction & Services
- Drywall Recycler
- Electrical Refurbishes
- Electronics Recyclers
- Electronics Reuse
- Fluorescent Tube & Ballast Recyclers
- Glass Recyclers
- Haulers
- Ink & Toner Cartridge Recyclers
- Metal Recyclers
- Organic Recyclers/ Compost Facilities
- Paint, Oil & Chemical Recyclers
- Pallet Refurbishers
- Paper & Cardboard Recyclers
- Plastic Recyclers
- Shingle Recyclers
- Textile & Carpet Recycler
- Used Furniture Reuse
- Wood Recyclers

Many of the businesses tracked by Green Calgary were described as “two guys and a truck” who collect recyclable materials from businesses sell the materials to recyclers who use the materials in subsequent processes. It was felt by participants in our interviews that there was some good potential for new business start-ups within the recycling sector, however many workers lacked the training needed to develop and execute an effective business plan. Nevertheless, some smart and effective models were identified.

Case Study: Clean Earth Recycling

One such case study is Clean Earth Recycling (www.cleanearthrecycling.com). Clean Earth is not truly a recycler, but rather a hauler with a green twist. The firm collects construction and demolition waste such as scrap drywall and wood. The collected materials are diverted from a landfill and hauled to Bio-Cycle (www.bio-cycle.ca). Bio-Cycle crushes the drywall into recycled gypsum--an additive to soil that improves drainage and has other agricultural benefits. The product is supplied to local farmers to help them grow their crops in a more environmentally sustainable way. When the material is used as an additive, farmers can experience improvements in total crop yield. Livestock producers also use the stripped paper from drywall sheets as animal bedding. A chemical reaction between gypsum and the ammonia in urine ties up the ammonia in the form of ammonium sulfate, reducing odor and damage to the environment that can be caused by livestock urine runoff. Gypsum bedding is pH neutral, soluble, and penetrates soil without incorporation.

During construction, an average of 700-1000 kilograms of drywall goes to waste for the average household built. Virgin drywall comprises up to 10% of landfill space in Alberta. Bio-cycle’s goal is to reclaim as much of that waste as possible. The demand for the recycled gypsum from drywall has not been affected by the recession. Bio-Cycle could process 100% of all drywall scrap in Alberta and British Columbia and still not have enough to meet the demand for the product.

Currently the firm grows mainly through a growing number of contracts with builders and developers. The cost to builders to recycle materials is currently about 5% higher than the cost of sending materials to a landfill. Demand for recycling of materials is being driven by an agreement between the Government of Alberta, the Alberta Construction Association and the Canadian Home Builders’ Association-Alberta that is intended to eliminate construction waste from landfills. In the future, it is anticipated that permit levees will be required when permits are issued for construction. The levee amount will be refundable if the builder proves that a portion of the materials are recycled. This would effectively mean that a builder constructing a 1,100 square foot deck would pay a levee of \$1,100 for a permit. When the builder submits proof of recycling of the construction debris, the levee would be returned. As the program is implemented over the next two years, it is expected to spur growth of the construction materials recycling sector in Alberta.

In the future, Clean Earth expects to expand into other forms of construction debris recycling including recycling of asphalt, PVC pipe, and roof shingles.

Clean Earth and similar construction materials recyclers offer three key green collar jobs:

Truck Swampers: Swampers operate a small crane to load bags of construction debris to a truck, earning \$16 to \$18 per hour. The position is an entry-level position after completion of a one-day crane operation course. All further training is provided on the job.

Sorters: When the construction debris goes to the Bio-Cycle site, a sorter separates materials, earning \$15 per hour.

Drivers: Drivers assist the truck swampers in addition to driving the truck to transport materials. Working as a driver requires a three-week training course to obtain a Class 1 license to operate a tractor trailer. The cost of the course and certification is about \$1,000. Clean Earth pays \$23-\$25 per hour for drivers.

Clean Earth offers all workers opportunities to advance to a crew superintendant as the company grows.

Green Manufacturing

The manufacturing industry has been declining in North America for the past three decades. Between 2004 and 2008, 322,000 manufacturing jobs were lost in Canada³⁹, driven by outsourcing of manufacturing processes to countries with low labor costs and ongoing gains in efficiency. The recent recession has compounded this trend with Alberta alone losing nearly 19,000 jobs in the manufacturing sector in between 2008 and 2009.⁴⁰ The growth in new green manufacturing businesses offers opportunities for workers displaced by continual downsizing of the manufacturing labour force.

It is difficult to estimate the number of workers employed by manufacturing firms that use eco-friendly processes; however most experts we spoke with saw green technology and green products as a key growth area for all manufacturing industries. It was felt that consumer demand for environmentally friendly processes and products would drive ongoing innovation throughout the manufacturing sector, effectively increasing the number of jobs that fall within our green collar jobs definition. DIRTT Environmental Solutions is a Calgary-based manufacturer who has moved quickly to capture opportunities in the green economy.

Case Study: DIRTT Environmental Solutions

DIRTT Environmental Solutions is one of Alberta's fastest growing firms and is a manufacturer of an eco-friendly modular wall product that are an alternative to conventional construction. The firm is currently ranked 7th in the Alberta Ventures Fast-Growth 50 and has grown from \$20 million in sales in 2007 to over \$100 million in sales in 2009.

³⁹Source: Labour Force Survey, Statistics Canada

⁴⁰ Source: Survey of Employment, Payroll, and Hours, Statistics Canada

DIRTT's custom walls are produced in their production facility and generate dramatically lower levels of waste compared to conventional construction. The walls are movable, allowing for flexible redesign of a space without a need for extensive remodeling. The walls themselves are also constructed in an environmentally-friendly manner. The firm uses a water-based paint that does not require firing ovens to heat the paint, which in-turn reduces energy costs of production. Improvements are constantly being made to reduce waste and many of these improvements are identified by green collar workers on the production floor. The costs of construction using DIRTT's walls is comparable to that of conventional construction, however the amount of waste and the overall environmental footprint caused by DIRTT's walls is dramatically lower than that of conventional construction.

Demand for environmentally responsible construction, in particular in the public sector in the US, has driven very strong demand for DIRTT's custom walls. Julie Pithers, communications manager for DIRTT, mentioned that over 70% of the firm's new business comes from government buyers in the US who have a mandate to reduce the environmental footprint of construction in public buildings.

The firm is based in Calgary and employs 540 people. Of these workers, about 300 work on the factory floor in Calgary. These jobs are all entry-level green collar jobs. The firm prefers to hire workers with some level of carpentry training and hires women graduating from the Calgary YWCA's 16-week pre-employment carpentry training program for unemployed women. Workers enrolled in the SAIT carpentry program are also considered good candidates as new hires.

It is worth mentioning though that the growth of the industry could be aided by better training and more knowledge of modular wall construction and design. It was felt that there is push-back from the traditional construction sector on use of the product, in part because construction schools do not introduce the use of modular walls as a new and profitable way to build.

Sustainable Landscaping and Gardening

The landscaping, gardening, green roofs, and green agricultural products sector offers some examples of green collar jobs that are growing in Alberta. At present, these areas offer limited green collar job opportunities but may offer good opportunities in the future.

Eco-Roofs

Eco-roofs have been a key driver of green collar workforce growth in New York City through the Sustainable South Bronx Green Roofs Program. The Alberta Eco-Roof initiative has promoted growth of green roofs in Calgary, however at present it is estimated that there are perhaps 12 green roofs currently in Calgary. All of these roofs are commercial. Experts we spoke with noted that there is strong interest in green roofs in the residential sector; however there are no products available for the residential sector at this point.

There are two main types of green roofs: (1) Extensive Roofs: these are shallow, light-weight roofs; and (2) Intensive Roofs: these can support trees. Shallow extensive eco-roofs have greater potential to be adopted; however the shallow depth is a problem in Alberta. Chinook winds can dry out these roofs as temperatures can change by 30 degrees in an hour. As a result, intensive roofs are recommended for Alberta.

Green roofs cost about double the cost of a conventional roof to install, however the City of Calgary offers a density bonus for installation of a green roof in some areas of Calgary, making a green roof an attractive option for developers on some projects. Prior to the economic recession, Calgary was the 3rd fastest growing city in Canada for installation of green roofs, according to Green Roofs for Greener Cities; however some of the planned green roofs in downtown Calgary have been put on hold for the moment.

Green Collar jobs in green roofs can be divided into two types of activities: “black arts,” (traditional roofing installation) and “green arts” (traditional landscape design activities). Workers managing the construction of green roofs require a full understanding of the systems for installing and maintaining a green roof. A green roof professionals program is offered Green Roofs for Healthy Cities which covers all aspects of installation, drainage, plants and soil, and other topics, covered in four courses. SAIT and NAIT have offered seminars on the topic and a number of universities are offering programs on green roofs. As with all roof-level work, safety training is essential for all workers.

Green Landscape and Gardening

In our interviews we spoke with two small business owners (Eco Yards and EnviroPerfect Solutions) who operated landscape and related services that use environmentally friendly materials and promote organic and sustainable gardens that incorporate plants that are native to the area. Both business owners have seen demand grow for their services over the last few years, however the majority of the market remains dominated by large lawn care and landscaping firms that do not specialize in sustainable landscaping solutions.

It was felt that the growth of the sustainable landscape and gardening sector is hampered by lack of public awareness of alternatives and by relatively higher costs. One participant commented, “The biggest challenge is that this province is a bunch of red necks!” It was mentioned that the level of regulation of the industry is low. Several dangerous chemicals have been banned; but alternative forms of these chemicals can be reintroduced to the market and these chemicals may be as harmful as those banned.

The clients of Eco Yards tend to be larger high-end homes where homeowners want a sustainable alternative to traditional landscaping. EnviroPerfect Solutions has experienced some growth in the agricultural sector where farmers are using some sustainable farming practices that improve crop yields and reduce time needed to let land recover after farming use. Both experts we spoke with anticipated moderate growth of the industry in the future.

Green Collar Jobs created in the sector included primarily labourers who would have the opportunity to advance to becoming a project manager or work in sales and marketing if the worker possessed a sales acumen. Wages earned by entry-level labourers range from \$10 to \$15 per hour and the work is seasonal. Retaining reliable workers was seen as a significant challenge for both business owners we interviewed.

Conclusions from Labour Market Analysis

Changes in consumer demand and investor preferences are driving adoption of sustainable business practices within industry and government. New practices will require workers to learn new 'green' skills, much in the same way that the IT revolution required new technical skills. New high-growth green business opportunities will emerge and new businesses will be formed to capture these opportunities. Case studies are already evident in Calgary as demand has skyrocketed for environmentally-friendly building practices and innovators develop eco-friendly products manufactured in Alberta. While it is difficult at this point to predict all the impacts that the green economy may have on all jobs, there is clearly new green collar job demand emerging within many industries.

In the near-term, green construction offers the largest demand for green collar workers. With over 46,000 construction trades workers in Calgary, this industry is the largest studied in Phase I. An older construction trades workforce will drive demand for workers to replace those retiring. Within green construction, there will be demand for new skills across the labour force as workers adapt to new green building techniques and technologies, in particular within the insulation, siding, and other trades related to energy efficiency.

Environmental remediation has seen tremendous growth in Alberta and offers perhaps the second-largest near-term growth opportunity for green collar jobs. Future regulatory changes to land disposal regulation or environmental liability disclosures have the potential to accelerate growth in remediation jobs, if these changes occur. Without these changes, experts we spoke with expected the sector to grow, at a rate similar to growth of the Alberta economy.

Niche business start-up opportunities exist in recycling industry and within manufacturing that offer opportunities to entrepreneurs. As with high-tech start-ups, it is difficult at this point to predict what types of start-ups will occur in the future, however, it is likely that ongoing new business formation will drive new green collar job creation.

The renewable energy sector is the fastest-growing segment studied and is clearly creating new jobs. In the near-term the number of jobs created will not be as many as some other larger sectors. In the long-term, the renewable energy sector offers strong job creation potential. Regulatory changes such as two-way timed metering or renewable energy feed-in tariffs also have the potential to accelerate growth in green collar jobs in renewable energy, if these are enacted in Alberta. Even without these changes, experts expect the renewable industries sectors to grow at double-digit or high single-digit growth rates, similar to the last decade.

Beyond the sectors studied in this feasibility study, there is growth potential for green collar jobs in many industries such as water conservation, public transit systems, organic food, alternative fuels, electric transit vehicles, and other sectors. Every expert we spoke with in the course of this feasibility study thought that green collar jobs will grow over the next decade. If energy prices increase in step with a global economic recovery, it is likely that industry will continue to invest in research and development to improve energy efficiency, further creating potential for green collar jobs creation.

Most green collar employers we spoke with expressed that they are having difficulty attracting and retaining green collar workers and expressed a desire for more workforce training and development to meet their specific green skills needs. In the construction sector alone, employers have raised \$10 million in funding for trades training at SAIT and builders have led a \$1.5 million investment in site manager training through the Alberta New Homes Warranty Program. Pre-apprenticeship training is needed for many demographic groups to gain access to the training needed to succeed in green collar jobs.

Case Studies of Promising Green Collar Workforce Development

Promising Practices for Workforce Development

Green collar workforce development is emerging in different forms across North America as both large organizations and local communities take action to capture new opportunities created by the green economy. In recent years, green collar workforce development has been popularized by initiatives such as the Green-Collar Jobs Campaign in Oakland, California. The campaign advocates for a green economy that provides economic opportunity for all people, including low-income communities and communities of color. The campaign promotes the creation of high-quality, career-track, hands-on jobs in industries such as renewable energy, water and energy efficiency, green building, habitat restoration, sustainable agriculture, and other industries. The campaign's training program, Oakland Green Jobs Corps, has effectively created "green pathways out of poverty" for 70 low-income adults in Oakland who graduated from the program's first class in 2009. Inspired by the Oakland model, other organizations are creatively combining strategies for worker training, employer partnerships, and green industry investment to create green collar jobs, prepare workers for new careers, and bring about real reductions in poverty.

The local context for each green collar workforce development program is different. In Chicago, efforts to create green collar jobs have emerged out of the Chicago Climate Action Plan, which was released in 2008 (www.chicagoclimateaction.org). The plan calls for multiple strategies for reducing carbon emissions, including strategies to make buildings more energy efficient. It has spurred formation of multiple partnerships throughout the Greater Chicago Area that provide training and other forms of support to help unemployed people begin work in green industries. In Milwaukee, a green collar workforce development has grown out of employer demand for skilled workers in the manufacturing sector. The Wisconsin Regional Training Partnership (WRTP) has formed partnerships with over 150 employers to provide specialized training to prepare workers for entry-level positions among employers who pay a living wage. The Sustainable South Bronx responded to market demand for green roofs in New York City by launching a private company, SmartRoofs LLC, to install and maintain green roofs while providing workforce training.⁴¹ Observations from programs such as those in Oakland, Chicago, Milwaukee, and New York offer valuable insights that can inform a successful strategy for green collar workforce development.

In Phase II of this study, the research team has developed six case studies of organizations that have taken different approaches to green collar workforce development. The case studies highlight the successes and shortcomings of different programs and make observations that may help to guide a well-

⁴¹ See <http://www.ssbx.org/index.php?link=31>

designed green collar workforce development strategy. The criteria considered for selection of case studies included:

- (1) The success of the program in creating access to green collar jobs for low-income people;
- (2) The use of innovative or original ideas that contribute significantly to the success of the program;
- (3) The green industry sectors targeted by the program (Are they comparable to sectors showing strong green collar jobs growth in Alberta?); and
- (4) The willingness of leaders in the organization to participate in the case study interview process.

The programs selected as case studies were those for which certain aspects of the program matched the above criteria (we did not require that programs match all criteria to be selected). The case studies describe the structure and genesis of the program, each program’s objectives, challenges faced by the entity, and keys to its success or failure.

The case studies can be evaluated based on the economic, social, and environmental benefits that they produce in the community. Table 6 provides a summary of the findings regarding the ability of each program to meet certain objectives. A discussion of the key findings from the case studies is outlined in the executive summary. While these findings can help improve the chances of success of any green collar workforce development program, we encourage readers to draw their own conclusions as well. The case studies offer ideas that can be copied, modified, combined, and improved upon and also identify key pitfalls to avoid. Not all green collar workforce programs are successful and programs should be developed in a thoughtful and cautious manner. The social development goals, the partners involved, the experience of the leadership, the planning, the training program, and the business model all play critical roles in the program’s success.

Table 7 Evaluation of Green Collar Workforce Development by Success Criteria

Success Criteria	Long Island Green Homes	Warm-Up Winnipeg	Springfield Green Worker Cooperative & BuilderSupply	Evergreen Cooperative Laundry	Michigan Green Jobs Initiative	Detroiters Working for Environmental Justice (DWEJ)
Does the program respond to industry demand?	No. The program responds to consumer demand for lower energy costs and creates a response to this demand.	No. The program reduces costs for Manitoba Housing through energy retrofits. The program is designed to train workers for trades occupations in green construction, but does not have a formal connection with industry.	No. The program is a business venture responding to demand for construction materials.	No. The program is a business venture that responds to market demand for laundry services.	Yes. The program exists to form partnerships between employers and training and educational organizations. The needs of employers drive most of the outcomes for the program.	Yes. Relationships with a few select local environmental employers are maintained to ensure that workers receive training that meets the needs of employers. Employer relationships also provide a job placement pipeline for graduates.

Success Criteria	Long Island Green Homes	Warm-Up Winnipeg	Springfield Green Worker Cooperative & BuilderSupply	Evergreen Cooperative Laundry	Michigan Green Jobs Initiative	Detroiters Working for Environmental Justice (DWEJ)
Does the program create entry-level jobs?	Yes. Contractors participating in the program offer on-the-job training for new hires. However the wage levels for entry-level workers are below a living wage.	Yes. Workers entering the program have multiple barriers to employment that are overcome through a comprehensive training program that mentors workers while they gain technical trades skills through on-the-job training.	No. The program is intended to create entry-level jobs through the cooperative; however the requirements of these workers were not appropriate to entry-level workers lacking sales and management skills.	Yes. A strong work ethic is the key prerequisite to begin work. Business plans call for over 50 employees by the end of 2010, the majority of which are entry-level workers.	No. The program is focused on re-training of workers and development of new technical skills and competencies. Job creation is not a goal of the program-- rather the program responds to training needs for employers with open positions.	No. The program trains workers to begin work in a variety of entry-level jobs as environmental technicians. The program does not have a goal of job creation. This role is performed by local employers partnering with the program.
Does the program help workers get access to jobs that pay a living wage?	No. Living wages are not a specific objective of the program. Entry level workers have the potential to quickly earn higher wages, although most new workers likely earn low hourly wages.	Yes. Work is performed in teams that are highly efficient, allowing workers to complete a high number of residential retrofits per day. Workers are paid a living wage and are also paid during weekly training occurring each Friday.	No. The program lacks controls for sustainability of the business and wages paid to workers can not be supported by current revenues.	Yes. Workers earn a living wage.	Uncertain. The program is broad and includes a diverse set of jobs, some of which may not offer living wages.	Uncertain. The program prepares workers for careers in industries that experience seasonal fluctuations in demand. Cross-training in multiple disciplines is designed to mitigate these cycles, but no measures exist to track wages of workers.
Do jobs related to the program offer potential for career advancement?	Yes. Workers can gain experience through employment with a contractor. Most contractors offer advancement opportunity.	Yes. Skills gained in residential retrofits practices prepare workers for careers in trades occupations. Graduates of the program may also advance to work in the private sector company operated by the organization.	No. Workers do not have potential for career advancement.	No. A few management opportunities exist for workers however most workers have little opportunity for advancement.	Yes. The program promotes retaining of workers to begin a new career.	Yes. Workers have multiple career paths within environmental disciplines.
Does the program provide skills training?	Yes, but indirectly. Workers get on-the-job work skills training.	Yes. Workers receive multiple levels of training to improve personal financial management, obtain a drivers license, gain work skills, essential skills, and cultural training.	Yes. Entrepreneurship skills are taught, but are the program is not successful.	Yes. Workers receive multiple levels of financial management training and work skills training.	Yes. The program provides technical training.	Yes, the program provides technical training as well as multiple other supports to increase success of program participants.

Success Criteria	Long Island Green Homes	Warm-Up Winnipeg	Springfield Green Worker Cooperative & BuilderSupply	Evergreen Cooperative Laundry	Michigan Green Jobs Initiative	Detroiters Working for Environmental Justice (DWEJ)
Does the program improve access to affordable housing?	Not directly. It lowers costs of living through lower energy costs.	Not directly. It lowers costs of living through lower energy costs.	No.	No.	No.	No.
Does the program promote improved educational attainment/literacy?	No. Education and literacy are not goals of the program.	Yes, through the trades training program.	Not directly. Graduates receive a certificate for completing the program and additional ongoing support.	Yes. The program promotes development of essential skills including literacy.	Yes. The program provides access to training grants for qualified applicants.	Yes. Students receive training in skills as an environmental technician and complete several certifications.
Are there measurable reductions in poverty at the individual level?	No. This is not a goal of the program.	Yes. No long-term measurements are made by the organization, but participants overcome multiple barriers to employment and continue successful careers with improved life management practices after the program.	No. The program provides work for unemployed individuals, but no measures of poverty reduction are observed.	Yes. Workers earn a stable living wage and learn financial management techniques. Employees learn behaviours that promote greater job and income stability.	No. The program does not make such measurements. The target demographic is unemployed persons, not necessarily those living in poverty.	Yes. Participants overcome multiple barriers to employment. Ongoing case management and supports in the program help increase successful transition out of poverty.
What partnerships are essential to the program's success?	The city takes a leadership role that makes the program possible.	Partnerships between Manitoba Housing, the City of Winnipeg, and funding partners are essential to the program's success.	The partnership between the non-profit organization and the worker cooperative is unsuccessful.	Partnerships with the Cleveland Foundation were essential to secure low-cost financing and contracts with hospitals are central to the business plan.	The program forges multiple relationships between a diverse set of employers and educational/training programs.	Partnerships with local employers guide the training curriculum. A partnership with Dillard University provided start-up support for the program.
What risks exist for the financial model of the workforce development program?	The business model is rooted in profitability of the program. The program itself is dependent on strong political support and leadership from the public sector.	The program depends on contracts with governments. Cuts to the ECOenergy program can affect future growth of the private sector branch of the organization.	The program is dependent on grant funds and donations.	The financial risks are the same as that of any business. No special risks exist.	The programs are funded by grants from the US Federal Government. Many of these are one-time grants.	The program is dependent on donations and grants.
Number of positive marks on criteria for success:	3	6	1	5	4	5

Long Island Green Homes Program

Websites: www.ligreenhomes.com; www.thebabylonproject.org

Synopsis

The Long Island Green Homes Program is a self-financing residential retrofit program for upgrading the energy efficiency of existing homes in the Town of Babylon. The program enables residents to make their homes greener and healthier at little or no out-of-pocket cost. Often, residents will save money immediately from making these improvements.

History of the Program

The Town of Babylon with a population of 220,000 people is located in Long Island, New York. In 2006, under the leadership of the town administrator⁴² Steve Bellon, the town performed a greenhouse gas inventory. It was determined that 35% of the town's carbon footprint was attributed to residential housing. Since addressing the residential carbon footprint is critical to overall reductions in greenhouse gas emissions, the town created a new staff position of sustainability director, who was commissioned to reduce greenhouse gas emissions in residential housing.

The new sustainability director, Dorian Dale, recognized that financing the cost of residential retrofits was the most important barrier to residential energy retrofitting investment. Dale contacted several energy services companies (or ESCOs), to explore their interest in developing a residential retrofit program for homeowners in the Town of Babylon. ESCOs he spoke with, such as Johnson Controls, typically approach municipalities, schools, and other large facility operators with an offer to evaluate and retrofit their facilities. The ESCO performs an evaluation of the facilities and identifies retrofits that, if performed, can have a financial return on investment through future energy savings. The ESCO then subcontracts the installation of more energy-efficient retrofits into the facilities. Many ESCOs also provide financing for retrofits, allowing a facility operator to repay for the cost of the retrofit through the energy cost savings that occur as a result of the retrofit. Dale sought an ESCO partner who would be able to provide such financing for Town of Babylon residents.

ESCOs that Dale contacted were reluctant, however, to enter the residential market for several reasons. First, large ESCOs he spoke with were used to working directly with public entities. A typical retrofitting project for a city may earn the ESCO revenues in excess of \$3 million. By comparison, to earn \$3 million on residential retrofits, the ESCO might need to retrofit between 300 and 400 homes, all for different customers. In addition, most ESCOs that provide financing typically do so for public entities where credit evaluation is relatively straightforward. These larger ESCOs did not have experience in consumer credit and thus were reluctant to enter a new and potentially risky market.

Dale also approached the local electric utility provider, Long Island Power Corporation (LIPC). LIPC had participated in a pilot project for residential retrofits for low-income housing. The pilot program

⁴² The town administrator is an elected position, similar to a mayor.

financed the cost of the retrofit through a pay-as-you-save (PAYS) program. As the name implies, the PAYS program allowed residents to repay the cost of the retrofit through the energy savings achieved by the retrofit. In a report from the pilot project, LIPC touted the benefits of PAYS programs, however, when approached, LIPC decided not to participate in a large-scale residential retrofitting program. LIPC stated that the additional complexity caused by adding an additional line item to residential billing would be too costly for the organization. More importantly, LIPC informally commented that the only recourse that LIPC might have to collect from a homeowner who did not repay the cost of the renovation would be to disconnect electric service to the home. LIPC officials expressed concern regarding the negative publicity that could occur in such a case.

As Dale continued to search for a financing method, it was determined that the Town of Babylon could itself finance the cost of a residential retrofit through a standard municipal mechanism known as a *benefit assessment*. Benefit assessments have a long history in New York State and apply to work performed by a public entity for a private purpose. The benefit assessment is charged to the private entity to pay for a benefit offered by the town. The benefit assessment is not a loan or a gift to a private entity, but rather an assessment made to a private entity that serves a public interest. In New York State, benefit assessments had previously been used to resurface a building façade, which was performed in the public interest. It was determined that a residential retrofit would serve a similar public benefit, by reducing carbon waste generated through energy leakage. Most importantly, a benefit assessment would allow the town to collect fees from a homeowner for the cost of a residential retrofit.

The Town of Babylon's waste collection and disposal operation had traditionally been a revenue stream for the town, with fees for waste collection exceeding the costs of waste disposal. This was achieved through efficient management of waste collection and removal, a municipal waste-to-energy plant, and other measures. As a result, the town had access to a large solid waste reserve fund. The town expanded their definition of solid waste to include energy waste, based on the carbon content of the wasted energy production. This allowed the town to access the solid waste reserve fund to pay for a residential retrofit that could be repaid to the city through a benefit assessment.

With access to a large solid waste reserve fund, and a mechanism in place to provide a benefit and benefit assessment to residents, the Town of Babylon launched a pilot project to retrofit 250 homes. The pilot program was a success, and currently the town has enabled over 400 residential retrofits which have been financed through the use of about \$3.5 million in funding through the solid waste reserve fund.

The Program

The Town of Babylon created the first Benefit Assessed Clean Energy program in the US. Similar to property assessment programs that revert to a property tax, the benefit assessment allows homeowners to effectively repay the cost of a residential retrofit through the energy cost savings that the retrofit achieves. The town bills residents for the cost of the benefit on a monthly basis as a line-item in the

municipal waste and water billing. The additional costs related to the benefit are set to equal the amount of savings that homeowners achieve through lower energy usage.

The town attributes the success of the program to three key benefits that the city offers to homeowners through the program:

- (1) Cost – A homeowner wishing to participate in the program is effectively able to make up to \$12,000 in home retrofits with little out-of-pocket expense. The retrofit begins with an energy audit for \$250, paid by the resident. If the resident decides to go forward with the changes recommended by the energy auditor, the \$250 is applied toward the costs of the retrofit.
- (2) Comfort- Homeowners find that an energy efficient home is a comfortable one. Heat loss during the winter can make an inefficient home cold and drafty. Likewise, in summer months, an inefficient home is unable to retain cool air. Homeowners implementing the retrofit often find that their homes are more comfortable than before.
- (3) Convenience- The town provides a turn-key service for the retrofit. Contractors performing the work must be approved by the town to provide the service. This gives the town significant leverage over the contractor to ensure that the work is performed properly and meets the town's and homeowner's quality standards. The convenience of pre-arrangement of the financing cost allows homeowners to implement a low-hassle renovation.

The typical home can repay the cost of the retrofit within eight to nine years. After the benefit assessment is repaid, the line-item disappears from the resident's bill, passing on future savings to the homeowner. The program effectively makes it easy for a homeowner to reduce energy waste without high up-front costs, without the hassle of finding a qualified contractor, and without the headaches of going to the bank to get a loan for the retrofit.

Program Return on Investment

The program creates jobs for local contractors who perform the energy audits, the installation of insulation and siding repair, the installation of new HVAC equipment, and other activities. The program has so far created about 40 new local direct jobs.⁴³

The average payback period for a home is 8.5 years on renovations with a 25 year life-span for the retrofit. This allows homeowners to benefit from nearly 17 years of energy cost savings. The average home in the program achieves annual energy cost savings ranging from a \$1,030 to \$3,600 per year, depending on the size of the home.

⁴³ Job creation is expressed in full-time equivalent jobs. Analysis by RDA Global using the IMPLAN Input-Output model.

Future of the Program

The Town of Babylon has over 65,000 households living in single family and multi-family units. To move the program to a larger scale, the Town is currently engaged in a process of developing a market-based model to finance more residential retrofits. Just as solid waste management became a revenue stream for the town, the town is seeking models that could allow the municipality to earn higher revenues through residential retrofits. A model being explored is one in which the town owns, operates, and services the residential energy efficiency measures. The savings in energy efficiency through proper maintenance would go to the town and residents would pay a fee for the service. The town is currently in talks with Equilibrium Capital, based in Portland Oregon, a potential private sector partner in the project. While details of the proposed program have yet to be determined, the town is optimistic that a market-based model may allow more residents to benefit from a more comfortable and less wasteful home.

Challenges

Labor unions have complained that the work is not benefiting union workers. The town has certified several contractors to perform the retrofits; however, contractors using unionized labor are typically not able to perform the work in a cost-competitive manner. The town requires code compliance and performs inspections to ensure that all work is performed properly, however, use of union labor is not a requirement for the program. Starting wages for entry level workers can begin below a living wage but most workers are able to progress to higher (living) wages within a few months, if they show responsibility and conscientiousness in their work.

Dale also identified problems that other cities have experienced in launching a program similar to that of the Town of Babylon. It was felt that there was an institutional reluctance within the administration of other cities to propose similar programs. Entrepreneurial and innovative leadership among locally elected officials was seen as critical to successfully implementing a new program. According to Dale, “unless the guy in the big chair really wants it to happen, it won’t happen.”

Program Keys to Success

- (1) The program could not have been possible without the leadership from the city nor without the city’s direct involvement in the program. The town administrator was highly influential in the creation of the program. Without top-level support, the program may never have materialized. In addition, the city has an advantage over other private sector entities, including the electric provider, because the benefit assessment may be passed on with a property if it is sold. This gives the city a unique advantage to recover costs of the retrofit.
- (2) At each stage in the process, the town has made a point of engaging all stakeholders in the program. This includes banks, contractors, labor unions, town officials, the electric provider, and residents. The engagement has offered all partners an opportunity to identify any potential gaps in the program, express any concerns, and propose value-added solutions.

(3) The business model for the retrofit program was solid from the beginning. A results-oriented model is absolutely required for the program to be sustainable.

To learn more about municipal Pay-as-you-save programs, visit www.paysamerica.org.

Detroiters Working for Environmental Justice

About Detroit Workers for Environmental Justice

Since 1994, DWEJ has been a voice for environmental justice in Michigan. Historically, the organization was not a job-training organization, but rather a community environmental awareness organization. Environmental hazards such as lead-based paint, asbestos, and other contaminants found in low-income housing in Detroit prompted the organization to begin an educational program for residents to combat environmental hazards in their homes. DWEJ has empowered residents to take a meaningful role in the decision-making process surrounding environmental concerns in their communities. Over 5,000 residents have participated in the group's environmental awareness programs. Training programs equip residents to address environmental hazards in the home when environmental remediation is not feasible due to high costs. In addition, the organization has successfully advocated for the closure of incinerator plants and other operations that cause environmental contamination.

About the DWEJ Green Jobs Training Program

The organization's experience in environmental remediation led them to form DWEJ's Green Jobs Training Program in 2008. The Green Jobs Training Program is focused on building a green collar workforce to transform the city's 50,000 brownfields into viable and sustainable communities or assets for Detroit. The program is a state-certified 12-week training course in which participants receive training in remediation techniques, environmental assessment, energy assessment, deconstruction/recycling, green landscaping and other related skills. The program has a goal to provide meaningful employment opportunities to underemployed and unemployed individuals in Detroit through access to green jobs and formation of green businesses.

The program came about through a partnership with Dillard University's Deep South Center for Environmental Justice in New Orleans, Louisiana (www.dscej.org). Dillard's experience in training for environmental remediation dates back to 1992 and the organization develops most of the curriculum and materials that are used in the DWEJ Green Jobs Training Program⁴⁴. The program came about when Dillard approached DWEJ about expanding their training into an environmental technician jobs training program. Dillard offered DWEJ a turn-key service to help DWEJ successfully launch a green jobs training program.

The program developers at Dillard University observed that many environmental remediation jobs are seasonal in nature. As a result, the curriculum was developed to give workers a background in a variety of related environmental fields so that workers possessed the skills to find work at all periods throughout the year. The training focus of the program is to develop environmental technicians who are trained in several disciplines that are required for environmental work. The program provides a

⁴⁴ For the weatherization training modules, training is based on the Weatherization Technical Assistance Program for the US Department of Energy (www.waptac.org).

variety of key certifications that are required to work in the remediation, weatherization, and related fields, as well as specialized skills training. Students complete certification in:

- HAZWOPER certification
- Lead Worker certification
- Asbestos Worker certification
- OSHA 10 workplace card
- Confined Space entry
- Mold Remediation, and
- Phase I/Phase II environmental site assessments

The training course also includes the following Green Tracks:

- Energy Audits & Retrofitting
- Computer Aided Design(CAD)
- Deconstruction of building components, specifically for reuse, recycling and reducing waste
- Geothermal systems (ground source heat pumps)
- Green Landscaping
- Phase I/Phase II Environmental Site Assessments (intro and sampling methods)
- Phytoremediation (use of natural properties of plants in engineered systems to remove pollutants from soil, water and air).

The cross-training in several disciplines allows workers a great deal of career flexibility according to their interests. It also affords them the ability to move between similar fields and the meet the needs of employers.

The program has completed three training classes and is currently launching its fourth class. Classes are capped at twenty-five (25) students and twenty-two (22) students completed the first class in 2008. Since completion of the first class, each training class has experienced full enrollment. A job placement specialist working at WDJE works closely with twelve key Detroit employers to place workers in jobs in weatherization, remediation, and related environmental work. At graduation, students are placed in a variety of positions within industry. Past graduates have been placed in energy auditing, weatherization occupations, abatement occupations, energy-efficient construction, and other related fields. Program graduates have had little difficulty finding and maintaining employment in the relevant fields of practice and most of the past graduates are still employed in the field. DWJE plans to continue offering the course and placement service in the future, in step with demand from employers and ongoing interest in the program.

Challenges of the Program

Finding qualified work-ready participants for the program is a key challenge. Workers in this field perform manual labor, heavy lifting, etc. Some students entering the first course did not realize the level of strenuous work involved as an environmental technician and subsequently left the program.

Since the initial course, WDEJ has required interested students to attend an orientation to ensure that they are aware of the work conditions and are interested in working within these conditions.

In the planning phases, it was observed that DWEJ did not possess adequate training space required for the program. The organization moved its offices to a new warehouse site where they could construct mock walls and perform the hands-on training work.

The program offers training sessions at overlapping times to allow more flexibility for students to complete the course. DWEJ also offers child care and related services to address out-of-the classroom issues that can be a barrier for people interested in a career as an environmental technician. Other services include providing bus fare and meals for breakfast and lunch.

Keys to Success

The program's success is largely dependent on DWEJ's relationships with environmental employers. The DWEJ job placement specialist plays a critical role in forming relationships with employers who pay a living wage and ensures that the training and certification required by employers is included in the 12 week course.

Success is also attributed to the successful pre-screening of students who are interested in the program. Orientation for interested students helps them to become fully aware of the work requirements of these jobs and helps to lower course attrition rates.

The partnership with Dillard University is also a key to success of the program. Over the past two decades, Dillard has developed an effective program to form relationships with employers needing environmental technicians and has developed a system to effectively launch a Green Jobs Training Program to meet that need.

Warm Up Winnipeg

Program Overview

Warm-Up Winnipeg is perhaps Canada's best-known and most advanced green jobs training program. The program retrofits homes for low-income residents, helping them save on their heating and water bills while helping entry-level workers learn work and life skills. Warm Up Winnipeg is a non-profit venture of Building Urban Industries for Local Development (BUILD). The program provides energy efficiency upgrades for public-owned housing and for low-income individuals.

Background

The vast majority of low income families live in substandard housing, much of which was built with limited insulation in attics, walls, and basements. While these houses may offer cheaper than average rent or require lower down payments than newer more energy efficient homes - they cost more to operate. Recognizing the need for improved operating efficiency, the Government of Manitoba, Manitoba Hydro, the Winnipeg Foundation, and Winnipeg's United Way came together in 2006 to launch the Greening of Centennial Project, a program that provided water and energy retrofits to 120 low income families in the Centennial neighbourhood, one of Canada's poorest communities. Families participating in the program saved an average of \$500 per year through lower utility bills. This successful pilot program was the genesis of Warm Up Winnipeg which has a presence in 16 of Winnipeg's poorest neighbourhoods.

Today, 50 workers are employed by Warm Up Winnipeg, of which 40 are installing insulation or performing water retrofits on a daily basis. In 2010, the organization anticipates retrofitting 350 low income dwellings with improved insulation and performing over 1,500 water retrofits. Before beginning work, prospective employees complete a pre-employment program. There are currently 20 trainees in the program, all with multiple barriers to employment. Most trainees and program participants are male and aboriginal. The program depends upon a large amount of peer-to-peer mentoring for pre-employment trainees. Those completing the pre-employment training enter the program and are employed as an apprentice. A journeyman plumber or electrician oversees all work and guides on-the-job training.

Business Model

The business model focuses solely on lowering government expenditures. The program lowers energy and water costs for public-owned housing, achieving a rapid return on investment. It also creates jobs for marginalized workers that few employers will hire because they lack life skills or face other barriers to employment. Intervention offered by the program reduces government correctional costs. The workers pay income taxes and also pay off any fines for offences. In addition, the program brings about environmental benefits by lowering overall consumption of water and energy resources.

The program has focused on retrofits that offer the greatest return on investment. According to executive director Shaun Loney, it is not surprising for a housing unit to achieve savings of \$200 per year from a water retrofit that costs \$400 to perform. With a short two-year payback horizon for water retrofits, Manitoba Housing immediately recognized the savings that could be achieved through retrofits performed in public housing, reducing operational costs.

The program initially began as a government-funded program to provide water retrofit services to Manitoba Housing. As the program has matured, the focus has shifted from a government-funded program to an organization that performs work for government—a key shift that allows Warm Up Winnipeg greater autonomy and flexibility to reach its goals. BUILD is now a preferred contractor for the Government of Manitoba. The organization has maintained a specialization in water retrofits because of the short pay-back period, while also expanding into insulation. Manitoba Hydro offers a program to offset the cost of materials for water retrofits for low-income housing. Training funding is provided in part by federal and in part by provincial government. The organization operated on a budget of \$3.5 million in 2009.

As awareness of the program has grown, Warm Up Winnipeg has launched a for-profit sister organization to perform weatherization and water retrofits for the private sector. The new venture, Manitoba Green Retrofit Inc., was formed in late 2009 and hopes to earn revenues of \$500,000 in its first year of operation.

Warm Up Winnipeg Training Program

The organization offers three workforce training programs:

- (1) **Life Skills** – The life skills program covers topics such as money management, cooking classes, literacy and numeracy tutoring, parenting training, and a very successful driver’s license program. The driver’s license program helps participants to pay off penalties for past offences through payroll deductions. After the restrictions are lifted, participants study to attain a beginner’s license, with the help of a tutor. The program provides driving practice to prepare participants to take the drivers exam and obtain their license. The program is particularly beneficial for the communities served, where it is not uncommon for no one in the family to possess a driver’s license.
- (2) **Job training** – Manitoba Hydro trains participants on leading techniques for water retrofits. Beyond this, a standard trades training program is used to prepare future graduates for careers in trades.
- (3) **Cultural Training** – Cultural training occurs every Friday and encourages young workers to turn to an elder to work through some of the painful experiences that have deeply affected these men. The cultural training seeks to address some of the root causes of poverty and hopelessness, giving participants the tools and community of support to heal from past experiences and live more fruitful lives.

Challenges

The program focuses heavily on multi-family public-owned housing. Public-owned multi-family housing authorities have a unique interest in lowering water costs because the entity often also pays the water bill for residents. The same is not true in the private rental market where the property owner has little incentive to invest in retrofits because savings primarily benefit renters. The focus on a single customer (public-owned housing authorities) is a key to the success of Warm Up Winnipeg, but also poses an obvious risk to the business model (a single customer). The success is also dependent on contributions provided by Manitoba Hydro to offset the costs of materials for retrofits for low-income individuals. While the business model for the program is sound, an organization wishing to copy the Warm Up Winnipeg model must form similar partnerships with local housing authorities and other key partners.

Growth in the private sector market for residential retrofits can be hampered by lack of access to credit to perform residential retrofits. The future demand for private retrofitting services may also be affected by the recent budget cut of the federal ECOenergy program, which was closed without explanation on April 9th, 2010. The ECOenergy program provided an attractive tax credit to offset the costs of residential retrofits. Without this program, growth of the residential market for retrofits may slow.

Coordination between government entities can be a problem for any business plan that relies on partnerships with multiple public entities. Shaun Loney noted that it is much easier for the Government of Manitoba to directly coordinate payments among government entities than it is for BUILD to try to encourage cooperation. Existing rules on “who pays for what” often must be altered in order for governments to effectively cooperate, requiring strong political leadership.

Keys to Success

The most important key to success is demonstrating, measuring, and reporting the savings that the program achieves for governments. These savings are critical to the viability of the business plan. Warm Up Winnipeg does not focus on all retrofitting activities, but rather only those that have a near-term significant return on investment. Measurement of cost savings for government is also critical in maintaining top-level political support, which is essential to long-term success of the program. The environmental benefits of the program, while significant, are not the measurement of success—cost savings alone are the focus of the business model and the primary measure of the model’s success.

In reality, the success of the program is also dependent on each of the training programs offered. Job training and life-skills training are keys to graduating workers into successful careers in construction trades. Cultural training is also critical for addressing some of the root causes of barriers to employment. The relational peer-to-peer mentoring inherent in the program fosters a long-term support network that increases the chances of long-term success for program participants.

Springfield Green Worker Coop

This case study presents several negative characteristics of a green collar workforce development program and some key lessons on potential pitfalls to avoid. The name of the organization and the name of the location have been changed in the case study to protect the privacy of the organization.

Background on the Green Workers Coop

Springfield is one of the poorest communities in the United States and has historically been home to refineries that cause water pollution, garbage incinerators that pollute the air, and landfills where a larger nearby city dumps much of its trash. In the last decade, grass-roots activists in Springfield have been instrumental in effecting policy changes that have reduced pollution in Springfield. The Springfield Green Worker Coop grew out of this activism, with a vision to empower residents to form successful entrepreneurial businesses that improve the quality of life and quality of the environment in Springfield.

In the past decade, tremendous investment in construction in a nearby city has generated massive amounts of building materials waste, much of which ends up in Springfield landfills. Much of the construction waste is actually usable materials. Renovators and builders must pay a fee to dispose of construction waste, creating demand for recycling services to lower waste disposal costs. Observing an opportunity to benefit from recycling of usable construction waste, the Green Worker Cooperative formed its first worker cooperative business in 2008, BuilderSupply. BuilderSupply is a discount retailer cooperative of surplus and used building materials which are donated by construction and renovation firms, primarily as a means of lowering costs to dispose of excess materials and waste. The business collects not only construction materials but also used appliances and other high-dollar discarded goods. The business is a worker-owned cooperative that seeks to benefit the community both socially (by creating jobs) and environmentally (by reducing waste through recycling). According to the organization's website, the workers are individuals living in Springfield who advocate for social improvement and justice through hard work.

BuilderSupply was the first venture formed by the Green Worker Cooperative's CoopTrainingCorps. CoopTrainingCorps is an entrepreneurship training program that teaches people to start and operate their own businesses. CoopTrainingCorps specializes in training for cooperatives in which the employees of the firm are able to purchase shares of ownership and benefit from the firm's profits. The initial class of CoopTrainingCorps began with eight students, of which four became business owners, together in BuilderSupply. Subsequent classes have assisted participants to develop green business plans including an organic green restaurant that offers quality foods at reasonable costs.

Design of the Organization

The Springfield Green Workers Cooperative is comprised of three distinct legal entities:

- (1) A non-profit organization that raises funds to invest in new business ventures and operate the CoopTrainingCorps. Fund raising includes a mix of grant-writing and solicitation of private

donations. The non-profit organization has risen over \$900,000 in funding for new green business ventures such as BuilderSupply.

- (2) A holding company to hold the assets of the donated items for the BuilderSupply
- (3) A for-profit limited liability company (LLC) that is the workers cooperative for BuilderSupply. The BuilderSupply Cooperative was originally majority-owned by the non-profit organization with the intention that worker-owners would purchase ownership in the business over time.

The holding company and non-profit organization combination follows a model similar to that of Goodwill Industries that operates thrift stores throughout the USA that accept donations from the public and sell collected goods at low prices.

Challenges for the Organization

The organization has struggled on several levels to make the cooperative and CoopTrainingCorps successful. The only business to come out of the CoopTrainingCorps has yet to turn a profit. The initial business plan for BuilderSupply called for the organization to begin earning a profit within five years. Recent performance of the business suggests that the break-even point may be further in the future.

Although the organization was formed to start new business ventures, much of the staff on the non-profit side lacked significant business experience or experience in new business formations. Most of the employees of BuilderSupply work in sales of recycled materials, making sales online, through relationships with builders, and through the retail storefront. However, sales quotas set for employees are unrealistically low, in some cases as low as \$500 per month in sales. In addition, workers did not maintain regular business work hours for the store, with the store often open four days a week and closed at irregular times. The lack of business experience led to very low revenues for the coop. The coop employees began to routinely turn to the non-profit parent organization to request cash infusions to keep the venture going.

The relationship between the non-profit organization and BuilderSupply created conflicting interests. The non-profit organization's ability to raise funds was largely dependent on the success of the green business ventures launched by the organization. This created an incentive for the non-profit parent to continue to pour funding into a business model that showed little promise of future success. Worker-owners in the coop also recognized the importance that the coop played in helping the non-profit raise funding. This created a disincentive for workers to strive for higher sales because it was unlikely that they would be fired for missing sales targets, even targets as low as \$500. This created an unsustainable relationship that is now pushing the non-profit parent to reevaluate its business model and relationship with BuilderSupply.

The ownership structure within the cooperative was also a problem. At the outset, workers were offered an opportunity to buy the business in the future, via profits earned through hard work. The sweat equity model did not clearly define the method for valuing the business in the future at the time when workers could purchase shares. Although workers were not owners in the business initially, they

were expected to make management decisions, set reasonable sales goals, establish and manage margins, and other tasks that require difficult and sometimes painful decisions to preserve the cash flow of the business. Many of the tough decisions that needed to be made for the viability of the company were never made. An emphasis was placed on the social benefits being created by the company with little regard for the company's profitability.

The management of the non-profit emphasized that proper business planning was not seriously discussed at the start of the relationship. This was caused in part by ambiguity on the intended role of the non-profit. The non-profit provided business training through the CoopTrainingCorps, however employees, who were told to make owner-level decisions, resented the oversight of the parent non-profit. At the same time, the recession necessitated that the business be agile in a changing market, which pressured employee-owners to quickly find new ways to sell and make necessary cuts to staff.

The hybrid relationship between the non-profit parent and the for-profit cooperative was not working. The expectations placed on workers were high, but their lack of experience placed them at a disadvantage for success. A mix of inexperience, a safety net provided by the non-profit organization, and contentious relationships has seriously handicapped the organization and jeopardized its future.

Lessons Learned and Keys to Success

BuilderSupply is not profitable and continuously needs assistance and infusions of cash to keep the venture afloat, which jeopardizes the credibility and viability of the parent non-profit. While the parent non-profit clearly understood the social benefits that an entrepreneurship training program could bring to the community and the environmental benefits that may follow, the organization lacked leadership from highly experienced entrepreneurs who have successfully navigated difficult business conditions. The organization's goals, while noble, lacked clarity and a solid and sustainable business plan. The goals also lacked an exit strategy for business failures, and other best practices used by leading business incubators.

In response to the negative experience of BuilderSupply, the non-profit entity decided to hire a new training coordinator to run the CoopTrainingCorps and provide more effective oversight and management of new cooperatives. The new manager had experience in operating worker-owned cooperatives, a strong business management and marketing background, and most importantly, new business formation experience. The training manager made several key changes to the CoopTrainingCorps. The Academy became more professional and began charging participants tuition. This changed the type of participants interested in the program. The offices were moved from a warehouse to a more professional business setting, and the guest speakers and teachers in the program were selected based on their experience in the field and track record for success. The role of the CoopTrainingCorps with graduates became one of a business consultant, rather than direct oversight and indirect management. In addition, rather than directly funding business ventures, the CoopTrainingCorps has helped entrepreneurs to network with outside funders to raise the capital needed to start and operate their businesses.

The changes brought about by the new training manager have helped to clarify the future vision of the organization; however the group continues to struggle with its relationship with BuilderSupply. Future success will be dependent on both the business experience of leadership in the non-profit organization, and the level of experience of entrepreneurs entering the program. Starting a business venture may not be the best-suited job for someone with limited management experience. The success of any business is strongly influenced by the decisions of managers. New business owners focusing on a triple bottom line (planet, people and profits) must have the skills to manage all three interests, without compromising any one. This is a difficult task for entry-level workers. Other worker cooperatives focus on a distinction between those who manage the business and employees that have ownership in the business but not a management role. An example of this is found in the Evergreen Laundry Cooperative Case Study, in which workers have an opportunity for ownership in the firm and higher overall emerging potential, without requirements for management experience.

Making changes will be critical to the future success of Springfield Green Worker Cooperative. Unfortunately, at this point, misguided planning has placed the organization in a difficult position that may result in closure of operations.

Evergreen Cooperative Laundry

Website: www.evergreencoop.com

About the Cooperative

The Evergreen Cooperative Laundry operates a LEED-certified commercial laundry business that helps customers reduce operating costs, lighten their carbon footprint, and invest in local community development. The company was launched by Jim Anderson with the support of the Ohio Employee Ownership Center (OEOC). The OEOC was founded in the early 1980s at Kent University in Cleveland, Ohio. The center supports the development of businesses across Ohio and provides technical assistance, training, & outreach to the business community. Specifically, the OEOC provides services to business owners interested in selling their business to their employees and consulting with employee-owned enterprises. OEOC staff has over 20 years of experience in employee ownership training and organizational development (OD) to individual employee-owned companies on a fee for service basis. The organization hosts the nation's largest annual conference on employee-owned business and is a leading national authority on what it takes for an employee-owned cooperative to be successful.

The Evergreen Cooperative Laundry was formed by Jim Anderson, who works as both the CEO of the Evergreen Cooperative Laundry and is also employed as a project manager at the OEOC. Anderson personally has twenty-four (24) years of experience in employee ownership through the OEOC. His experience as a consultant to cooperatives has given him tremendous exposure to the pitfalls and keys to success for employee-owned businesses. After completing a rigorous two-year long business planning process, and extensive business model testing and preparation, Jim launched operations in October, 2009.

In addition to Evergreen, the OEOC has launched several other green cooperative employee-owned businesses including a solar power business and a weatherization business, and is in the process of launching a locally-grown organic food market.

Company Operations

Evergreen Cooperative Laundry (ECL) operates two LEED-certified laundry facilities that service commercial laundry needs for hospitals and other healthcare organizations. ECL has 23 people employed currently in the two facilities and expects to employ 50 workers at the facilities by the end of 2010. After six months of work experience, each employee is given the chance to buy ownership shares in the company for \$3,000 dollars, which is collected at a rate of 50 cents per hour over three years. After three years, the employee begins to earn a share of the cooperative's profits.

The cooperative seeks to empower workers to make better personal decisions by teaching soft-skills, financial management skills, and other forms of training. Financial training provided to workers includes an explanation of the company ownership structure as well as personal financial management. The training is made as simple as possible so as to be more successful. Accountability and other soft skills training help workers to live more productive personal lives but also plays a vital role in the success of

these organization. All participants in the worker coop have attended workforce training programs prior to becoming employees at the cooperative and the cooperative is highly selective in their hiring decisions, as to attract entry-level workers with the highest potential for retention.

Keys to Success

This program has only been in operations since October 2009 and is effectively a pilot, which makes it difficult to make many assessments on the success of the green business model. According to Anderson, the long term sustainability looks good for the program, but it is not easy to achieve. He adds, “It takes monumental personal effort, and is as yet unproven. As far as I can tell this is the only program of this type in the United States.”

According to Anderson, the key to success is developing a rigorous business plan that can hold up to the internal pressures brought by employee ownership. Worker-owned businesses pose additional challenges to those faced by any new start-up. In a cooperative, it is difficult for management to fire employees because they are also owners. Management often must make decisions that balance the benefits the company brings to workers with the viability and profitability of the firm.

Financing is also a challenge for cooperatives and Anderson found that local Cleveland banks were reluctant to invest in cooperative start-ups. To secure start-up financing, the Cleveland Foundation, provided a loan guarantee, which allowed Evergreen to borrow at a very low interest rate—much lower than would be available to a comparable start-up business, and at lower rates than competitors. This offered a financial advantage to the green business by lowering financing costs. (The Cleveland Foundation is the second-largest community foundation in the United States with assets of \$1.62 billion. The organization provides annual philanthropic grants of around \$80 million per year. The organization’s role was critical in securing low-cost financing for ECL.) In addition to debt financing guaranteed by the Cleveland Foundation, ECL received a large donation from the City of Cleveland to help offset part of the start-up costs.

All facilities built for use in Evergreen coops are LEED silver certified (or higher) allowing ECL to cut costs on utilities, a key operational cost for a commercial laundry facility. The worker ownership also drives much higher employee retention rates than standard employment models. This saves the company money that might be otherwise spent on recruitment of workers, giving ECL another advantage over the competition.

The combination of low-cost financing, lowered start-up costs, lower utility costs, and low employee recruitment costs enables ECL to pay their employees 25% more than they would make at similar facilities. The organization manages to pay higher wages and can, at the same time, offer a lower rate to ECL customers.

To insure success of the cooperative model, Anderson cautions that cooperative start-ups should be transitioned as quickly as possible toward worker-owned and worker-operated businesses or they will ultimately be less sustainable. Great care must also be paid to business plan development (in this case 2 years were spent developing the program before anyone was hired into it). Anderson emphasizes that

the business plan must be a sustainable autonomous system that can survive without the need for additional outside funding.

Key Findings

While it is too early to assess the success of the program, it is evident from the experiences so far that this green business put forth tremendous effort to properly plan for the launch of the business. The business start was organized and managed by a seasoned and savvy business person with over 23 years of experience. In addition, the relationship with the Cleveland Foundation and government-supplied start-up funds increased the potential for the business to be successful and enabled Evergreen to offer competitive living wages to workers. While the social and environmental benefits of the business are evident, the focus of the start-up phase has been on executing a business plan that can be profitable.

Michigan Green Jobs Initiative

Website:

www.michigan.gov/greenjobs

The Michigan Green Jobs Initiative is a \$5.1 million state-level program to form green sector skill alliances in Michigan. The Michigan skill alliances focus on specific green industries present in Michigan and bring together employers, workforce developers, faith-based organizations, community colleges and academics to identify and solve workforce skill gaps in green industries. One such skill alliance, the Michigan Academy for Green Mobility focuses on green development in Michigan's automotive and transportation sector. The sector has identified key gaps in training for hybrid automobile engineers, has facilitated development of curriculum to meet employer needs and has worked with educational institutions to offer training courses. A similar program was developed for battery technicians and other emerging new occupations.

The alliances begin with identifying what the employers see as the skill gaps that are missing within their workforce or in the pool of outside job candidates. Gaps are also assessed by academics, who try to anticipate additional future skill gaps that may not yet be felt by employers, but are likely to be felt in the future. The partnerships that are forged between workforce stakeholders are the primary focus of the alliance. Through these partnerships, Michigan hopes to help workers displaced through layoffs to move into retraining programs in related green industries.

The training provided by educational partners in the alliance is funded through the state's No Worker Left Behind program that provides \$1.5 million to community colleges to develop training materials and \$3 million in tuition support to workers. The program offers \$5,000 per year to eligible participants for a period of up to 2 years during which time students receive training in a growth industry or growth occupation. The grant aims to expand worker's skills and capacity while offsetting some of the costs of retraining.

In addition to the \$5.1 million initial state funding, Michigan Green Jobs Initiative has been awarded a \$5.8 million federal grant to expand the state energy partnership training program. The organization has also been able to secure several other multi-million dollar federal grants that have been made possible through the American Recovery and Reinvestment Act (ARRA) and similar programs. Michigan's ability to win federal funding has been helped by the state's focus on employer partnerships.

Green Jobs Creation and Workforce Development through Michigan Green Jobs Initiative

It is difficult to measure the number of green collar jobs created or retained through the Michigan Green Jobs Initiative. The program also has difficulty measuring the number of workers impacted by sector alliance relationships. At a basic level, the program aims to establish *relationships* and it is difficult to directly measure the benefits occurring as a result of these relationships. Beth Sommers, Green Jobs coordinator for Michigan Department of Energy, Labor & Economics, noted that the organization does not directly track statistics on the number of green jobs created or green collar workers trained through

the program. However, the initiative is helping to prepare workers green industries that have shown strong growth.

In May 2009, the organization released the Michigan Green Jobs Report. The report found that the state has over 110,000 green jobs, which represents about 3% of all jobs in the state. The report also found that between 2005 and 2008—green jobs in the state expanded by 8% per year, while overall employment in the state declined. Most of the green jobs growth occurred in clean transportation manufacturing, including transportation engineers and technicians for biodiesel and hybrid vehicles.

In addition to current industry growth, green jobs demand is being spurred by the Michigan Economic Development Corporation (MEDC) that has aggressively recruited job-creating investments in Michigan. MEDC has attracted business that have created over 50,000 jobs related to automotive battery manufacturing (mainly for hybrid electric vehicles), 21,000 jobs in solar power manufacturing and 5,000 jobs in wind power manufacturing. The sector alliances are responsible for ensuring that Michigan has a skilled and available workforce to fill new jobs created in these fields.

Workforce Development Challenges

According to Sommers, the main challenge for the green sector alliances is helping academics, funders, and employers agree on the content and objectives of new skill training. It is felt that employers typically focus on the skills that are needed at the present moment with perhaps less concern for skills that will be needed in the future. For instance, municipal utility providers are seeking utility service operators to replace the workforce of utility operators who are moving into retirement. The skill requirements for these workers have not changed – there is just significant worker attrition through retirements. Academics interested in municipal utilities would like to see more training emphasis placed on gaining knowledge of smart grid operations, a need that is likely to occur for utility employers in the future, but is not needed immediately. In addition, in April, 2010, Michigan Green Jobs Initiative was awarded \$5 million federal grant to train workers on smart grid technologies. With significant funding available and educational partners interested in the new technology, it was felt that employers in the field lacked foresight to include smart grid training for future workers. Given the lead time required for workers to complete training and reenter the workforce, there is a concern that educational partners may provide training that is adequate today but is obsolete in a few years, when students are graduating and seeking new jobs.

Keys to Success

Sommers observed that the alliances have made a huge difference in Michigan's ability to support growing green industries. Partnerships formed between employers and educational partners are difficult to manage. The sector alliances formed through the Green Jobs Initiative play a critical role in securing federal funding resources to develop new training that directly benefits employers. The alliances are typically staffed by knowledgeable industry veterans who have extensive relationships within the industry and are able to foster partnerships across all stakeholders.

Key Observations on the Program

The Michigan Green Jobs Initiative has undoubtedly benefited workers and employers by ensuring the availability of a skilled workforce. Unlike smaller grass-roots programs where success or failure is relatively easy to measure, benefits of this state-level program are more difficult to measure. The large number of partners involved makes it difficult to identify specific outcomes of the program and opens the program to criticism by fiscal conservatives. These shortcomings, however, could be addressed through incorporation of a system for measuring success.

A key strength of the program is the focus on existing large industries and high-growth industries. State and federal investment in employer-driven workforce development gives the state an advantage in retaining large employers by lowering overall training costs. Coordination with Michigan Economic Development Corporation's job creation investments has helped to ensure that Michigan residents have the required skills to benefit from new green jobs created through green business relocations.

Appendix A: Methodology

In Phase I of the Green Jobs Feasibility Study, the research team has evaluated the growth opportunities for entry-level green collar jobs in Calgary and throughout Alberta. The initial analysis has been informed primarily by a set of interviews with employers and industry experts in a select set of industries. The growth potential of green collar jobs has also been assessed through the collection of secondary data to illustrate long-term and recent patterns in green collar jobs demand.

Definition of Green Collar Jobs

The definition for green collar jobs is modeled after that used by the Apollo Alliance, which defines these jobs in terms of skill level (blue collar) and type of work performed (improving environmental quality). At the outset of the project, the research team identified five criteria that a job must meet to be considered a green collar job:

- (6) The work tasks performed in the job must be comparable to that of blue collar jobs. (This excludes green jobs like environmental engineers or environmental scientists that require extensive post-secondary education).
- (7) The work activities of the employee must improve the quality of the environment
- (8) The job must be an entry-level position
- (9) The job must pay a living wage (over \$12.25 per hour for 35 hours per week, 52 weeks per year)⁴⁵
- (10) The job must offer opportunity for career advancement.

In interviews with employers and experts, it became apparent that the second criterion (a requirement that the job improves the quality of the environment) is somewhat difficult to assess. For instance, workers in an industry like landscaping may improve the appearance of the built environment while at the same time using pesticides or other chemicals that have been shown to have adverse environmental effects. Likewise in the remediation industry, there are multiple processes that may be used to meet regulatory requirements for remediation of contaminated sites. Some processes effectively reduce the concentrations of soil contaminants while other processes simply move the contaminated soil to a less sensitive location. A worker may be employed at a firm that offers both remediation processes, the second of which does not likely improve the quality of the environment. In this report, we have sought to assess job growth opportunities that have a high likelihood that workers are improving the quality of the environment in their work. However, we cannot be certain that this is always the case. Exceptions and caveats to this rule are noted in the relevant occupations as we discuss them throughout the report.

⁴⁵ Living wage of \$12.25 per hour is based on estimates by Vibrant Communities Calgary. Public Interest Alberta defines a living wage in Alberta at \$12.00 per hour or more. During the height of the economic boom in Alberta in 2007, 21.9% of Alberta residents earned less than \$12.00 per hour.

Secondary Data Availability

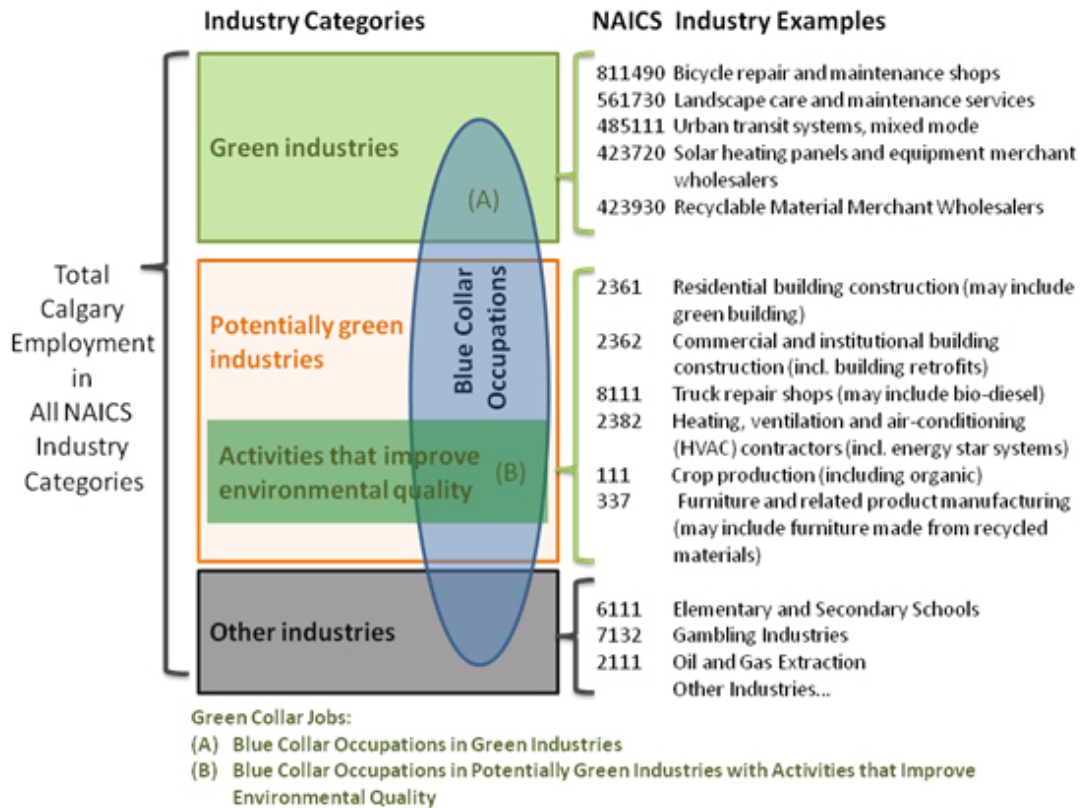
Labour force statistics such as the labour force survey, depend on industry and occupational classification systems that are not highly conducive to identifying green collar jobs. An example is workers employed in installation of solar panels. Firms and workers that install solar panels are likely classified in the construction industry (NAICS 236) or in maintenance and repair services (NAICS 811). However, from the industry statistics it is not possible to differentiate firms and workers that install solar panels from other firms and workers in the construction and repair industries who may for instance pour concrete or other tasks that may not improve environmental quality. The same sort of difficulty arises when attempting to use occupational statistics to directly measure green collar jobs (for instance, we cannot differentiate an automotive mechanic from a bio-diesel automotive mechanic).

Although occupational statistics do not differentiate *green* collar jobs per se, they are effective for characterizing size and growth trends on all traditional blue collar jobs in Calgary and Alberta. Trades occupations and low-skilled occupations can easily be identified within the National Occupational Classification (NOC) system and historical employment statistics on these occupations are available from Statistics Canada. Likewise, within the NAICS industry classification, there are a few industries that may be considered to be entirely green—such as bicycle repair or urban transit systems—and which are likely to mainly employ trades workers and low-skilled workers. Historical growth trends in these niche industries can give some insight into green collar jobs growth.

Figure 1.1 describes a model for segmentation of Calgary’s workforce into green collar jobs. From an industry perspective, the labour force may be divided into the following groups:

- (1) Green Industries: These are industries where 100% of employment may be considered “green”
- (2) Potentially Green Industries: These are industries that have a strong potential to be green—such as construction—but may not be green. These industries can be grouped into two categories:
 - a. Activities that improve environmental quality
 - b. Activities that do not intentionally improve environmental quality
- (3) Other Industries: these are industries that are primarily professional or do not have many activities that would be considered “green”

Figure 8.1 Industry and Occupation Categories for Green Collar Jobs



Blue collar jobs exist across all industry categories. The blue collar jobs that (A) intersect with green industries or (B) intersect with activities that improve environmental quality in potentially green industries are jobs that can be considered “green collar jobs”.

Statistics Canada’s labour force survey statistics can be used to describe (1) green Industries and (2) statistics on all blue collar occupations. Using the 2006 census, we can estimate a baseline number of blue collar workers in green industries (intersection (A)). However, the statistics are not detailed enough to provide information on intersection (B), where many of the green collar jobs likely exist. Since statistical sources cannot provide us precise insight on green collar jobs in intersection (B), we relied heavily on key expert interviews in a set of target potentially green industries. In collaboration with the advisory committee, the following six industry sectors were selected and targeted for key expert interviews.

- (1) Renewable energy and energy efficiency management
- (2) Green construction
- (3) Recycling
- (4) Environmental remediation
- (5) Green manufacturing
- (6) Sustainable landscaping and gardening

The selection of key industry segments was based on the concentration of blue collar jobs in each industry and the potential for these industries to improve the quality of the environment. It is important to note that the six industry sectors studied in this feasibility study do not represent to total universe of green collar jobs in Alberta; they were selected as areas of focus for this feasibility study either because they are focus industries noted in the literature on green collar jobs or because the industry is particularly important in Alberta (i.e. environmental remediation in the energy sector).

In addition to the six target sectors, the feasibility study collected some information on other sectors such as health foods stores, green retail establishments, alternative fuels, and alternative fuels vehicles (e.g. for jobs such as biodiesel mechanics or electric vehicle mechanics), and jobs in carbon capture and storage. Preliminary discussions with stakeholders in these sectors suggested that jobs in these sectors would not meet our definition criteria for green collar jobs either because they often do not pay a living wage (i.e. retail clerks at health stores) or because they require extensive experience or specialized training and cannot be considered entry-level positions (i.e. electric vehicle battery maintenance).

In the interviews with key experts, the research team contacted and performed preliminary interviews with 81 informants. Of these 81 informants, 32 informants were selected for in-depth interviews with a research analyst. The 32 informants were considered to have extensive knowledge on green collar occupations in their sector and were able to critically assess the recent growth and future growth potential for green collar jobs in their sector. Table 1 contains a list of the key experts interviewed in each sector.

Participants in the interviews agreed to join in a 45-minute discussion of green collar jobs within their sector. The questionnaire guide for the surveys sought to identify a list of green collar job categories within the six key industry sectors, identify the growth drivers for those jobs, obtain estimates of the number of green collar workers currently employed in the sector, and identify regulatory or policy changes that may affect growth of the sector.

A copy of the discussion guide may be viewed online at:

<http://www.surveygizmo.com/s/242314/momentum-expert-survey>

Table 8 Interview Participants

Sector	Participant	Organization
Green Energy	Brent Harris	Sustainable Energy Technologies
	Coen Van Der Maaten	Thermal Creek (Thermal Energy)
	Sean Louthaed	Boyd Solar
	Jef Shen	Klead Electrical
	Colleen Simmons	Enersol
	Paul Horton	Genalta Power
	Andy Smith	Canadian Solar Energy Society (Alberta Chapter)
	Rick Dunsmoore	Goose Creek Renewable Energy (installation contractor)
	Stewart Duncan	Alberta Wind Energy Corp.
Green Construction	Donna Moore	Calgary Home Builders Association (CBHA)
	Kerry Ross	Alberta Eco Roof Initiative
	Clifford Maynes	Green Communities Canada
	Tanya Dorn	Canadian Green Building Council
	Melody Bundt	Concept Group
	Brett Abrams	Ecofinity (Home Energy Audit)
	Ryan Scott	Avalon Homes (energy efficient homes)
	Dave Smith	Calgary Contractors Association
Recycling	Betty Grey	Alberta Recycling
	Philippa Wagoner	City of Calgary Recycling
	Aaron Glover	Clean Earth Recycling
Environmental Remediation	Ty Watchell	Nelson Environmental Remediation
	Frank Magdich	Oak Environmental
Green Landscape	Laureen Rama	Eco Yards
	Tim Penstone	EnviroPerfect Solutions (Landscaping)
	Natalie Odd	Green Calgary
Green Manufacturing	Nattalia Lea	Sustainable Development for the 21st Century
	Julie Pithers	Dirtt Environmental Solutions
	Brent Harris	Sustainable Energy Technologies
Electric Vehicles & Biodiesel	Art Wildeman	Canadian Independent Automotive Association
Other Key Partners	Gwen Blue	University of Calgary
	Bill Luxton	SAIT Technical Training Programs
	Pat Letizia	Alberta EcoTrust

In Phase II of the Green Jobs Feasibility Study, the research team evaluated 23 green collar workforce development programs. Evaluations began with a review of the organization's website and related information available through the Internet (news stories, etc.) to identify if the organization met our criteria for evaluation. Twelve (12) organizations responded to a request we made for an interview with senior leadership. (Several of the programs were not selected as case studies because we could not get in touch with a senior level manager within the organization who was able to respond to our interview request within the timetable for the study). There were 8 interviews performed with organizations and 6 were selected for development of case studies.

Qualitative aspects of each workforce development program were identified before the interview and explored in more detail in a semi-structured interview format with participants. A brief summary of each case study was written by the analyst performing the interview, identifying strengths and weaknesses of the organization.

After all interviews were complete, each program was evaluated against criteria for success that are contained in the Sustainable Livelihoods Framework. The project steering committee provided input on the key recommendations, based on the research findings.