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2013

Final Report

BC RESIDENTIAL CONSTRUCTION INDUSTRY PROFILE STUDY 2013

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BC Residential Construction Industry Profile Study 2013

Final Report

Prepared by:

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In partnership with:

Brantwood consulting
real estate • construction • infrastructure

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Canada

BRITISH COLUMBIA

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Preface

This report is a summary of the "British Columbia Residential Construction Industry Profile" study, commissioned by the Canadian Home Builders' Association of BC (CHBA BC) through the BC Government's Labour Market Development Agreement (LMDA) and supported by a number of industry stakeholders as part of a dedicated project Steering Committee. The research for this study was carried out by GLOBE Advisors, in partnership with Brantwood Consulting, during the first three months of 2013.

This study builds on earlier research, drawing upon insights and studies published by CHBA BC, the former Residential Construction Industry Training Organization (RCITO), the Professional Builders' Institute of BC (PBIBC), the Homeowner Protection Office (HPO), various industry organizations and associations, and a range of other secondary sources in order to provide an in-depth examination of the residential construction industry in BC and its related workforce.

The research methodology also included a comprehensive analysis of statistical and labour market information (LMI) from publicly available sources including Statistics Canada, BC Statistics, the Construction Sector Council, and others.

Secondary research and statistical analyses for this study were backed up by extensive quantitative and qualitative research activities that included:

- Developing a web-based industry survey with responses from more than 430 business owners, homebuilders, general contractors, sub-trades, and apprentices in the residential construction sector from across the province;
- Conducting more than two dozen one-on-one interviews with industry associations and organizations, training providers, the Industry Training Authority (ITA), and the owners of residential contracting and specialty trades companies; and
- Hosting a series of four regional focus groups that brought together homebuilders and developers, specialty trade contractors, deans and instructors from several post-secondary institutions, and representatives from various industry associations and organizations to discuss industry trends; challenges and opportunities with respect to training and continuous learning; and alternative delivery models relevant to residential construction training.

To access the supporting *Appendices Document* which includes more detailed information on apprenticeship and training for the residential construction sector in BC, the results from the industry survey, findings from the industry consultations and regional focus groups, and the project methodology, contact GLOBE Advisors at **info@globeadvisors.ca** or visit **www.globeadvisors.ca**.

Acknowledgments

As part of this project, GLOBE Advisors received input from a wide range of stakeholders involved in the residential construction industry in British Columbia. In particular, GLOBE would like to thank the project Steering Committee members and their organizations (listed below) for their support and input throughout the research phases of this study.

- BC Building Trades
- BC Government – Ministry of Energy, Mines & Natural Gas
- BC Government – Ministry of Jobs, Tourism & Skills Training
- BC Hydro
- BC Safety Authority
- Building Policy
- Canadian Home Builders' Association BC
- Canadian Institute of Plumbing & Heating (CIPH)
- Electrical Contractors Association of BC
- Fortis BC
- Homeowner Protection Office / BC Housing
- Independent Contractors Business Association
- Industry Training Authority (ITA)
- International Brotherhood of Electrical Workers (IBEW) Local 213
- Jomi Construction
- Mechanical Contractors Association of BC
- Professional Builders' Institute of BC (PBIBC)
- Roofing Contractors Association of BC
- Thermal Environmental Comfort Association (TECA)
- Thompson Rivers University
- WorkSafe BC

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Executive Summary

Background

The residential construction industry plays a significant role within British Columbia's economy. At present, there are over 130,000 jobs directly or indirectly associated with the sector province-wide. As an aging workforce looks to retire over the coming decade, new opportunities are opening up across the province and the face of the industry is changing. At the same time, evolving building codes, emerging technologies and best practices, and fierce competition for skilled workers in other construction and resource-based sectors, are putting new pressures on British Columbia's residential construction businesses, the vast majority of which are small with fewer than ten employees.

Training models need to respond to the realities of this rapidly evolving industry and provide flexible, dynamic, and accessible training throughout the province in order to ensure that the right skills are in the right place at the right time, as well as prove their worth to industry employers. The make-up of the province's trade training programs (how they are structured, what they include, how long they take, and so on) must meet the needs of residential construction businesses and trainees alike.

Between January and March 2013, GLOBE Advisors conducted extensive research on behalf of the Canadian Home Builders' Association of BC (CHBA BC) and a number of industry stakeholders. The purpose of the study was to develop a current snapshot or "profile" of the residential construction industry in British Columbia and to:

- Confirm support for apprenticeship and trades training within industry;
- Identify barriers to the delivery of residential construction training in British Columbia;
- Document challenges for employers and trainees in starting and completing training; and
- Document the ideal range, nature, and scope of residential construction training delivery.

"Residential" construction is generally understood as the construction and/or renovation of low-rise, predominately wood-framed single-family and multi-family residential buildings as defined under Part 9 of the BC Building Code. A list of key occupations and trades relevant to British Columbia's residential construction industry was used to frame the research and provide boundaries around scope. This list followed those trades and occupations identified as relevant to the residential construction sector by the national Construction Sector Council. In addition, a number of residential construction specific trades and occupations were included where apprenticeship and occupational training programs have been developed in BC (i.e., under the former Residential Construction Industry Training Organization).

This report is based on information gathered from extensive secondary and primary research activities which included an analysis of statistical data, industry forecasts, labour market information, and information on education and training programs in the province. Research activities for this project also included a province-wide industry survey that garnered 430 responses; 25 in-depth interviews with important industry leaders and stakeholders; and four regional focus groups comprising a total of 34 participants.

Key Findings

Profile of the Residential Construction Industry in British Columbia

British Columbia's residential construction market includes the new construction and renovation of single-family, semi-detached, row housing, and apartment buildings. The majority of construction activity occurs in the Mainland-Southwest and in the Vancouver Island-Coast Development Regions of the province. The industry is very sensitive to the economic health of the province and serves as a reliable "bellwether" of general economic prosperity.

Housing starts and building permits are good benchmarks for residential construction investment and they have followed similar expansion and retraction patterns between 1998 and 2012. Recovery from the 2008 economic downturn has been slowed by recent changes to BC's sales taxes (i.e., PST and GST to HST and back again) and the tightening of high ratio mortgages by Canada Mortgage and Housing Corporation (CMHC). However, the total number of single-family, semi-detached, and row house starts of approximately 14,000 in 2012 is now in-line with 5 years ago. By comparison, the number of multi-family unit starts has grown relatively quickly since 2008, driven in part by the rising cost of developable land and the "greying" of BC's population as a whole. These trends are likely to continue, signaling a fundamental change in the nature of homebuilding in British Columbia, and the breadth and depth of skills needed to support it.

Small Businesses Dominate with Low Industry Affiliations

At the start of 2013, there were 5,060 Licensed Registered Builders through BC's Homeowner Protection Office (HPO). Based on Statistics Canada's most current 2012 data, there were 13,900 residential construction establishments registered in BC and 27,800 specialty trade contracting establishments (firms which may serve both the residential construction and institutions / commercial / industrial sectors).[1] The residential construction industry is characterized by a large proportion of small businesses which primarily serve local markets. Approximately 13,330 (97 percent) of those establishments active in the residential building sector employ fewer than 10 workers. The vast majority of business owners surveyed (93 percent) work only in the province of British Columbia.

The residential construction sector is very competitive and its position within BC's larger construction industry as a whole is constantly shifting in response to economic drivers. In 2012, only about half (51 percent) of the 326 residential construction business owners and only 45 percent of the 89 employees surveyed worked exclusively on residential construction projects. Many residential construction workers appear to move seamlessly between residential and other types of construction projects (e.g., small commercial building projects and commercial tenant improvements) – particularly within the specialty trades that include electricians, plumbers, painters, refrigeration and air conditioning mechanics, sheet metal workers, and roofers. The slow recovery to the low-rise residential market may have contributed to a higher than usual level of involvement in other forms of construction by residential construction workers.

The shifting and transitory nature of the residential construction industry is further exemplified by the relatively low level of affiliation with industry associations, trade unions, and other trade organizations. The businesses and workers within the residential construction industry have historically been very hard to reach. Despite the fact that the survey was predominantly disseminated through project Steering Committee member organizations and related industry organizations, only about half (49 percent) of the 290 business owners and 44 percent of the 82 workers surveyed stated that they belonged to an industry association.

[1] An "establishment" is different from an "enterprise" or "company" by statistical measures. As defined by Statistics Canada, an establishment is a statistical unit that maintains accounting records for a business (principal inputs, revenues, salaries, and wages). An enterprise or company can be made up of a number of establishments that are active in multiple locations. As an example, a larger company might have multiple establishments (e.g., head office, sales offices, etc.) across the province. Statistics Canada reports on establishments and not enterprises and therefore, the data reflects a much larger establishment database than the total number of companies operating in this sector.

Of those surveyed who indicated that they were members of an industry association, approximately half were members of CHBA BC and/or one of its regional chapters. Very few of the business owners (only 3 percent) and a larger percentage of workers (21 percent) surveyed belonged to labour unions. There is a very large segment of the industry workforce that is not affiliated to any industry association, union, or other trade group.

Cyclical and Seasonal Nature of the Industry

The cyclical nature of the industry can make it difficult for companies in residential construction. British Columbia's residential market has become very competitive and, particularly in a slowing economy, small businesses can be challenged to retain workers and sponsor apprentices throughout the length of their programs.

In addition, seasonality has a large impact on the residential industry, particularly in colder regions of the province. While they make up a relatively small proportion of British Columbia's total residential construction industry workforce, employers in more northern communities are often reluctant to invest in apprentices for fear of having to pay them through the winter months, even if they are not working.

Building Code Changes and Emerging Technologies

Buildings in British Columbia account for about 30 percent of the province's greenhouse gas (GHG) emissions and over 50 percent of GHG emissions inventories for some urban municipalities. Since 2008, the BC Building Code has included energy efficiency standards, which have subsequently been raised. The residential construction industry can expect increasingly stringent requirements in energy efficiency and building envelope performance as the Government of British Columbia and local governments strives to meet their climate change mitigation goals. A total of 180 municipalities have signed the BC Climate Action Charter, in which they have committed to the goals of being carbon neutral and to create complete, compact, and energy-efficient communities.

In addition, all new buildings in the City of Vancouver are expected to be carbon neutral by 2020. Currently, new houses in several jurisdictions must achieve EnerGuide 80, which requires a high-performance, airtight building envelope and the installation of a heat recovery ventilator (HRV).

Nevertheless, the residential construction industry tends to be cautious in the adoption of new technologies and practices (such as HRVs, geo-exchange systems, insulated concrete forms, etc.), due in part to the lack of expertise held by some in the industry which, in turn, can result in added costs and liabilities for both businesses and homeowners when systems are incorrectly installed.

Despite the fact that "green building" practices (and the numerous rating systems that support them), have been in existence for more than ten years, only half (51 percent) of the survey respondents stated that they had worked with new or non-conventional technologies. Of those residential builders who believe they are keeping up with current trends so far, there may be a situation of "they don't know what they don't know" or that definitions such as "green building" and "new technology" may be interpreted widely.

A generally improved understanding of the principles of building science and building envelope will be expected of all members of the construction team in the future to ensure building performance commitments are achieved, reinforcing the need for integration across trades and a greater degree of technical expertise.

The most affected trades are:

- *Carpenters and framers*: activities related to window and door installation, air sealing (internal / external, suite demising), and building envelope (identifying and eliminating thermal breaks, blower door tests, weatherization, and general building science).
- *Plumbers and HVAC*: mechanical (ventilation and MAU systems, hydronic heating / cooling systems, HVAC system integration, balancing and commissioning, etc.).

However, research suggests that many residential construction industry employers have yet to fully appreciate the value of education and training for their businesses, their trainees, and for themselves. Numerous programs, resources, and services have been developed in an attempt to broaden and deepen educational offerings for apprentices as well as for skills upgrading but uptake has been lackluster for the most part.

Feedback from continuing education providers further suggests that many builders are unaware of the implications of new code requirements on skills, techniques, and the systems and technologies necessary to achieve the new standards. Builders therefore not only need access to practical training on a "just-in-time" or on an as-needed basis as they face unfamiliar systems or strategies for the first time, but they also understand that they need to be trained on these new systems and it is not possible to learn by trial and error.

Education on new technologies (e.g., HRVs, mechanical insulation, etc.) also needs to explain the value proposition, provide a means for comparison of various solutions, and clearly articulate the factors affecting the return on investment. While many courses currently offered in the market place by industry professionals and organizations such as CHBA BC do just this, it can be a challenge getting the average builder to stay up-to-date with changes as there is no requirement for ongoing learning or continuing professional development at the present time.

Profile of the Residential Construction Workforce in British Columbia

In 2011, BC's residential construction sector directly employed an estimated 87,530 workers. Forty percent of this direct employment was in new dwellings, 37 percent in housing renovations, 12 percent in acquisition costs, and 10 percent in housing repair. Carpenters are the largest employment group in BC's residential construction industry, with an estimated 14,530 carpenters working in the sector in 2010. Other dominant occupations / trades include trade helpers and labourers (11,785), painters and decorators (5,610), and electricians (5,450).

Workers in BC's residential construction industry earn an average full-time income of approximately $47,000 and a median income of $36,000. Specialty trades contractors in BC's construction industry earn an average full-time income of $53,000 and a median income of $43,000. Total compensation per hour worked has been increasing ahead of inflation in BC's residential construction sector over the last decade. The remuneration average in 2011 was $30.10 an hour, which represents a 17 percent increase over five years.

Four out of five workers surveyed (80 percent) indicated that they were employed full-time (35+ hours per week), either on salary or on an hourly basis. However, the residential construction sector, which largely comprises small businesses, generally struggles to compete on compensation rates and/or job security benefits with large, unionized organizations in non-residential construction and the natural resources sectors. As a result, it can be difficult for residential companies to attract and retain new workers.

Growing Skilled Labour Shortages and Competition with Other Sectors

BC's construction industry workforce as a whole is aging. At the time of the last Statistics Canada Census publication (in 2006), 41 percent of BC's residential construction workforce was over the age of 45. These workers are now entering pre-retirement age and will need to be replaced by new workers over the coming decade. However, the labour shortage that has become so problematic for other industry sectors has yet to materialize within the residential construction industry, due in part to a slower economic recovery in BC's housing market slowed further by flip-flopping sales tax regimes in the province.

In terms of labour shortages, three out of four (75 percent) of the business owners surveyed stated that they did not face challenges in 2012. In addition, two out of three (66 percent) of the business owners surveyed stated that they were not experiencing any difficulty in finding appropriately skilled or qualified workers. This may be due in part to the slow recovery in the residential market.

Looking ahead, there is concern within the residential construction industry that availability of skilled workers will become increasingly limited in the future. Key drivers are the current labour force demographics and the growing competition for limited skilled workers from the institutional / commercial / industrial (ICI) sector and Canada's burgeoning natural resource industries.

A Need to Raise the Professional Bar within the Sector

There are societal challenges that act as barriers to young people entering the trades. There is a need to elevate the perception of trades, particularly among key influencers (parents of high school students, career counselors, etc.) in order to demonstrate that a vocational career is an acceptable employment path and to showcase the potential opportunities for students who start their careers with an apprenticeship. There may also be a lack of appreciation of the benefits of working in residential construction among job seekers (e.g., it is a relatively "clean" construction sector, predominantly located in urban or suburban areas, the work is varied, projects finish faster, and good workers can move up quickly or start their own businesses with few restrictions).

Industry leaders recognize that to attract competent workers, the residential construction sector needs to establish a credentialing program to not only provide new recruits with confidence that they are entering a serious and long-term profession, but also to define career pathways within the industry. Contractor qualifications will also be important as building performance regulations are rolled out.

Increasing Specialization versus the Value of Skills Integration and Transferability

With the push toward performance-based codes, residential construction requires an increasingly integrated approach between trades and yet paradoxically, in the quest for improved productivity in an increasingly competitive market, there is pressure to specialize with growing numbers of trade workers focusing on sector-specific skills such as roofing, building envelope, finishing and framing, and certain types of mechanical systems. Despite this trend, the few workers who have multiple qualifications (e.g., double journeymen tickets) are in extremely high demand. Evidently, there is need for workers who can see the bigger picture, manage the increasing number of "specialist" trades, and proactively problem-solve – particularly as the "house as a system" approach becomes more widely entrenched within BC's residential construction sector.

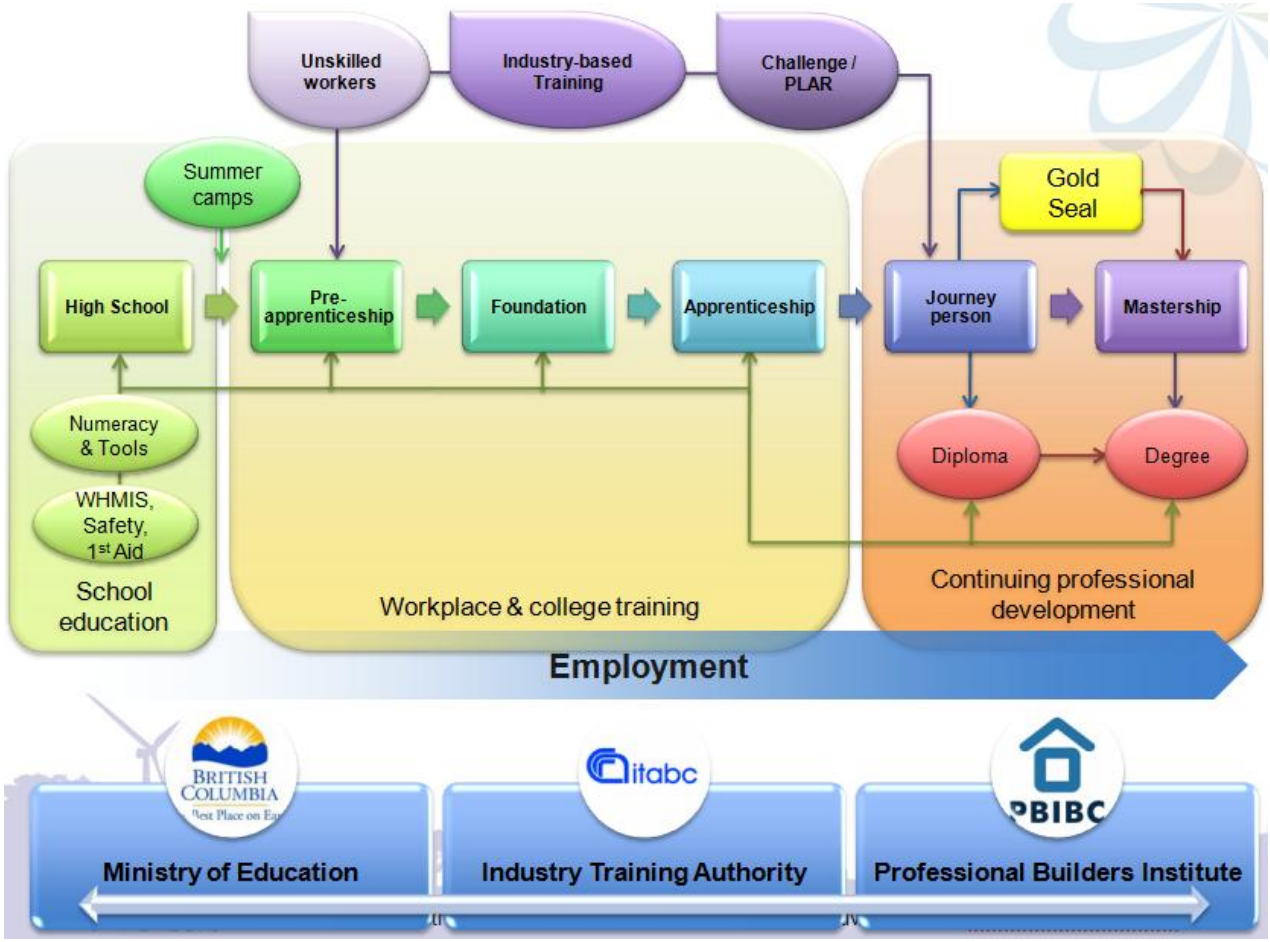
The study uncovered a range of views (including strong opinions for and against) on whether residential-specific training programs were needed, would be valued by the industry, and would be taken up by apprentices. Many see the residential construction sector as a "breeding ground" of a certain set of skills that can be applied later in other construction sectors as the apprentice moves on – emphasizing the need for transferable skills.

It was generally agreed that compensation was better for young workers in non-residential construction where there was a greater level of union involvement and in the natural resource-based sectors. There was more consensus in favour of a platform that allowed trainees to “pick and mix” the skills they acquire in a structured and organized fashion and to train in shorter, “modularized” blocks and thereby gain some specialized residential construction skills.

Education and Training for Residential Construction in BC

One in three (33 percent) residential building and specialty trades workers in BC have obtained a high school certificate or equivalent and one in five (21 percent) have an apprenticeship or trades certificate / diploma. It is not possible to statistically report on how many workers have undertaken continuing professional development or skills upgrading courses.

Vocational training programs (including for some construction trades) are offered in some BC high schools – although shop space in many BC high schools has declined over the last decade. For many trades including carpentry, there is also a range of foundation and/or pre-apprenticeship programs, many of which can “ladder” into Levels 1 and 2 of formal apprenticeship training programs.



Pathways for residential construction education, apprenticeship, training, and continuous learning in BC

To enter an apprenticeship program, a worker must be employed / supervised by a certified skilled professional. Once indentured, apprentices can move through their training and log hours on the job site in order to gain their Certificate of Qualification to become a journeyperson and/or Red Seal if relevant. Traditional Red Seal apprenticeship programs typically take four years to complete.

The formal apprenticeship pathway is supported financially by the provincial government and overseen by the Industry Training Authority (ITA), a provincial government agency mandated to facilitate training in the trades and industry occupations in the province.

In 2011/12, there were 19,297 registered residential construction related apprentices in British Columbia, down from a high of 24,487 in 2009 – a reflection of the slowed growth of the provincial economy. The three most popular apprenticeships were Electrician (5,783), Carpenter (5,053) and Plumber (2,648), accounting for approximately 70 percent of the total. Currently, more than two-thirds of registered apprentices in British Columbia are under 30 years of age.

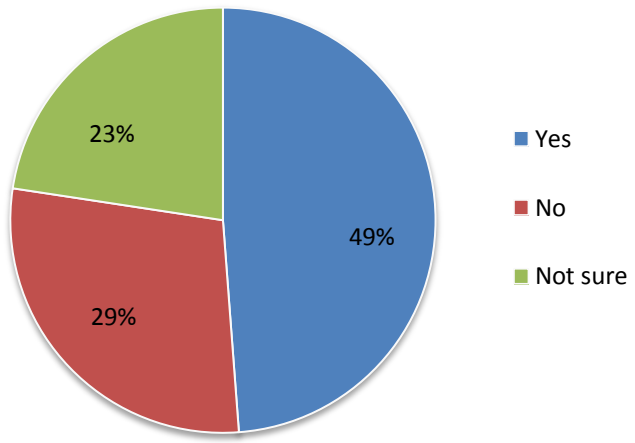
In British Columbia, apprenticeship programs are delivered through public (government-funded universities, colleges, and technical institutes) and private training providers which include industry associations and training institutes, private colleges, labour unions, and a number of private community-based and First Nations training providers. Accessibility and scheduling varies for the different programs across the province with some programs experiencing long waitlists.

Some apprenticeship programs for occupations such as carpenters and electricians are common and offered throughout the province while others, such as the heating technician, tilesetter, masonry, and glazier programs are offered at only a few locations province-wide. Most residential construction apprentices spend about 85 percent of their time learning in the workplace. The role of industry associations, organizations, and labour unions in terms of providing training programs and courses, educational seminars, and continuing professional development is critical.

There is a diversity of opinion among employers as to whether apprenticeship programs, as currently structured, are more aligned to ICI construction projects than to the residential sector. As noted, those that participated in the consultation process may have been more predisposed to industry involvement (members of associations, etc.) than the sector as a whole and, arguably, more likely to engage with formal training programs.

Despite this bias, only 17 percent of those surveyed felt that the current apprenticeship model in BC was excellent and that no changes were required. When the data is considered as a whole, the results suggest that there is a lack of an industry-wide "culture" of apprenticeship.

Employee Survey…



Is the current apprenticeship training model in BC effective in terms of its ability to train skilled workers for your occupation / trade? (n=84)

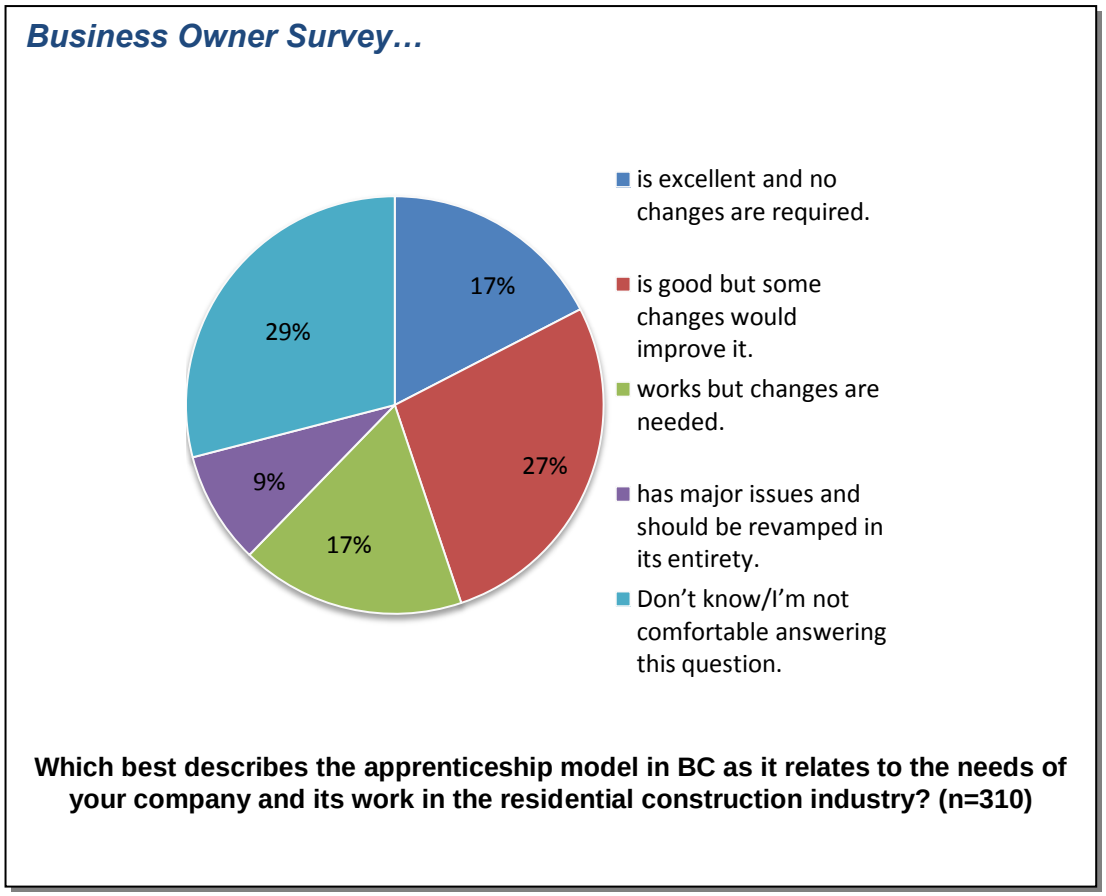
The top issues identified through the industry survey with respect to apprenticeship training in BC as it relates to the needs of business owners in residential construction (based on 252 survey responses) included that:

- Apprentices are not skilled enough for the needs of the industry (34 percent of respondents);
- It is difficult to dedicate time to training apprentices (25 percent of respondents);
- Apprenticeship programs are not updated enough in terms of adding new skills and new technologies (25 percent of respondents); and
- It is difficult to retain apprentices due to the cyclical nature of the industry (22 percent of respondents).

Comments from the focus groups concurred with survey findings, with a particular emphasis on the need for all apprentices (irrespective of their specific trade) to:

- Understand basic building science ("house as a system");
- Acquire a wide range of skills and experience; and
- Receive up-to-date training (modern equipment, relevant techniques, resolution of current code requirements, etc.).

Workers in the industry have mixed feelings on the relevance of apprenticeship training in-line with their occupations / trades, with only half (49 percent) of the employees surveyed stating that the current apprenticeship training model in BC was effective in terms of its ability to train people for their occupation / trade.



When compared to other Canadian jurisdictions, apprenticeship training in British Columbia is relatively well-structured and well-managed in BC. However, post-apprenticeship education, skills upgrading, and CPD is more “ad hoc”.

Professional development training courses are mostly designed to deal with upgrades to building codes, emerging technologies, evolving construction practices, and as “stop-gaps” to address particular problems that arise in the industry (such as the Homeowner Protection Office’s builder licensing program and associated prescribed qualifications that were established to address the leaky condo issue).

Industry associations and regulatory bodies such as WorkSafe BC and the BC Safety Authority, as well as energy utilities such as BC Hydro and Fortis BC, also offer courses, workshops, and professional development programs relevant to residential construction.

Residential construction companies generally value continuing education so long as it does not adversely impact productivity. Three out of four (73 percent) of the business owners and 71 percent of employees surveyed had attended a knowledge-based industry training or CPD course. Four out of five employees surveyed (81 percent) felt that their companies recognized professional development courses as important.

In 2012, 264 students attended Canadian Home Builders’ Institute (CHBI) courses (Built Green® Builder Training and the Certified Energy Advisor Training Course were the most popular). It is important to bear in mind that there may be a bias among survey respondents towards those most engaged in the industry and the likelihood that they may have a positive disposition towards training.

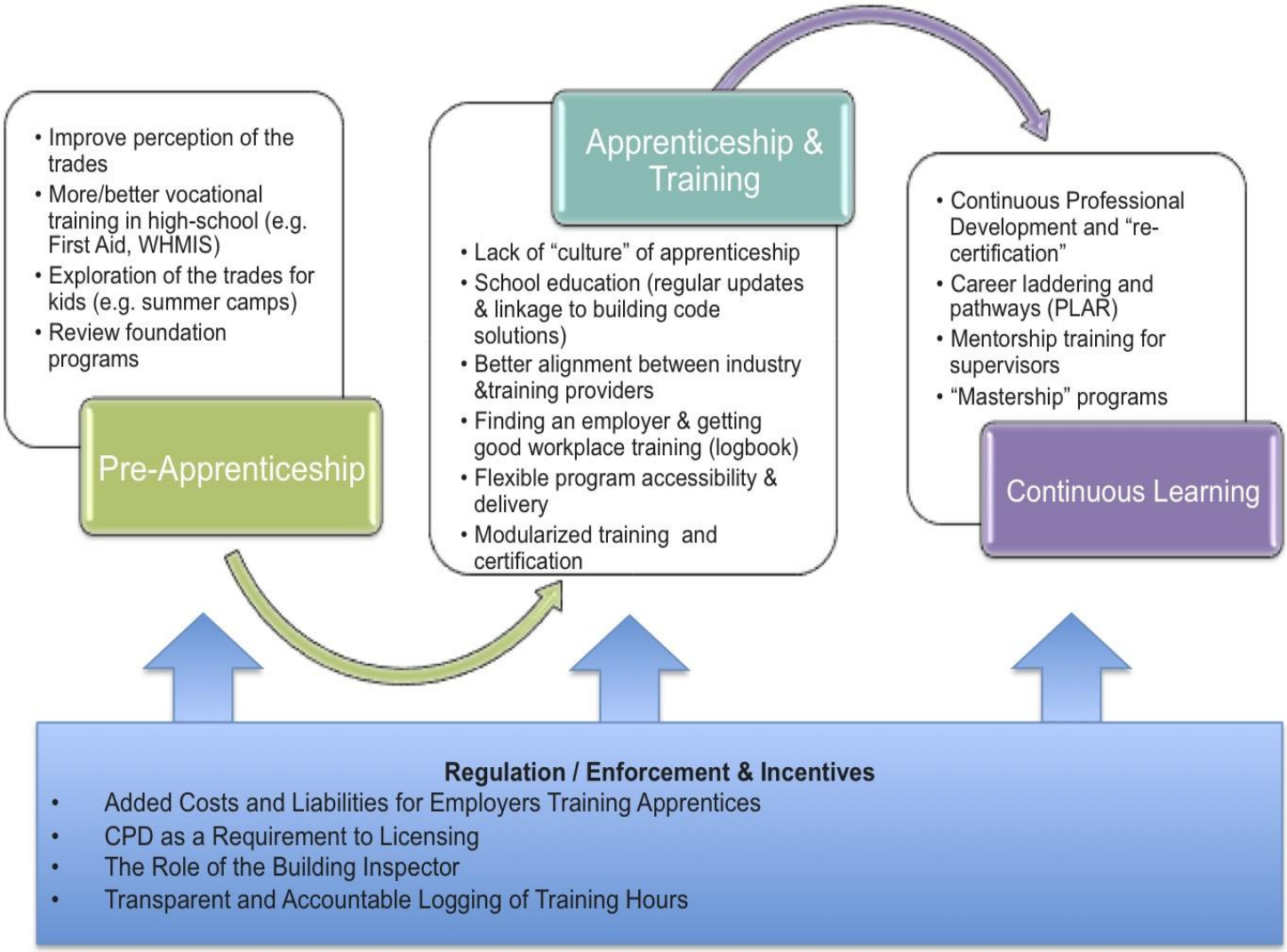
The majority of those surveyed believed that CPD is essential in order to stay current with changing building codes and emerging technologies. They expressed willingness to attend seminars and additional courses that could help them become more competitive, so long as the courses / training was relevant and accessible.

At the same time, since there currently is no requirement for CPD, it was suggested that there is a large percentage of the industry that will only take courses to “get a job, keep a job, or make more money”. Further, anecdotal information from building officials suggests that there is still a significant number of residential contractors and trades who are “learning by deficiency list” (i.e., by trial and error), particularly in areas outside of urban centres.

Suggestions on how to improve the continuous learning process include:

- Re-training for skilled journey people (particularly for those that mentor apprentices); and
- Developing a certification model for continuing professional development with enforcement of best practices.

The opportunities and challenges for education and training as it relates to BC's residential construction sector can be categorized into four broad areas that include: pre-apprenticeship; apprenticeship and occupational training; continuous learning; and regulation, enforcement, and incentives.



Summary of the opportunities and challenges with respect to education and training in BC's residential construction sector

In summary, the need to enhance the "professionalism" of the residential construction industry and need to improve the level of understanding of the training process required for improving overall quality within the sector resonated throughout the industry consultations for this study.

Summary of Alternative Training Models

The research for this project identified some potential solutions to the current challenges to residential construction apprenticeship and occupational training. A number of alternative training delivery examples were short-listed for potential deeper investigation in future phases for this project. A selection of these opportunity areas are described briefly in the table below.

Pre-apprentice	Apprenticeship	Post-apprenticeship
Integration of trade skills into high-school curriculum **Example:** Prince George and Burns Lake Grade 11 and 12 students can take two semesters in the Career Technical Centre (CTC) at the College of New Caledonia (CNC).	**Entry requirements** **Example:** College of the Rockies in Alberta establishes a range of requirements for their 13-week timber-framing program. Applicants must complete a questionnaire to assess their experience, aptitude and motivation prior to starting the course.	**Licensing and continuous professional development** **Example:** BC's Homeowner Protection Office (HPO) is developing a proposed new system of qualifications for builder licensing. The Oregon Construction Contractors Board licensing and mandates CPD for all builders.
Construction summer camps for youth **Example:** North West College of Construction in Portland, Oregon, offers 3 week exploration of 9 trades and field trips to construction sites for 16 – 21 year olds.	**Front-loading and seasonally-oriented training** **Example:** Thompson River University carpentry program allows 1st and 2nd level of the apprenticeship training to be done in 30 weeks.	**"Master-level" programs** **Example:** UK Chartered Institute of Plumbing and Heating Engineering (CIPHE) administers multi-tiered qualification system comprising Master, Journeyman and Apprentice Certificates for plumbers.
Pre-apprenticeship training for those on income assistance **Example:** HardHats BC 12-week program held at Camosun College in Victoria and Discovery Community College in Campbell River and Duncan.	**Course-based training** **Example:** Nova Scotia Community College (NSCC) has made the shift to course-based learning. Available options include a blend of full or part-time classroom delivery, day release, evenings and internet delivery	**Trade Training Centres** **Example:** the Chicago Regional Council of Carpenters (CRCC) offers a range of training and support in several languages for its labour force out of five purpose-built training centres across Illinois.
	Continuous intake **Example:** Pacific Vocational College (PVC) in BC provides a continuous enrolment for Level 1 technical training for its sprinkler fitting, pipe fitting, gas fitting courses allowing for flexible start and completion dates.	**Laddering into degree and diploma programs** **Example:** Algonquin College's two-year "Advanced Housing" diploma program teaches students carpentry skills, energy-efficient design and assemblies, advanced framing, etc.
	Blended learning **Example:** Numerous online course offerings plus "game-based" systems such as "virtual welding"	
	Mobile training units **Example:** The Thompson Interior Mobile Training Trailer operated by Thompson Rivers University and BC School District #73 in Kamloops provides access to skills training in the trades for rural communities	
	Dual vocational training **Example:** Germany's Technical and Vocational Training System (TVET) is an integrated multi-laddered credentialed system which starts to prepare students for the world of work in primary school. Ontario's Co-Op Diploma Apprenticeship Program enables individuals to train as apprentices in a specific trade while obtaining an associated college diploma.	
	Journeyperson mentoring **Example:** Nova Scotia Community College (NSCC) has a mentoring program for apprentices and employers to support journey people in their role in mentoring apprentices.	
	Apprentice share programs **Example:** Various programs set up by industry associations, unions, and private training providers in BC (mostly serving the ICI sector) that sponsor and manage apprentices.	

Solid, stable, and sustainable funding is necessary to continue to develop, implement, and test programs that will advance training opportunities and raise the bar in residential construction. Where funding models have been successful, there has generally been strong, long-term commitment from government, which is invariably responsible for other duties such as dispute resolution and licensing.

The current funding model for apprenticeship training and program development in BC also presents challenges for industry and training providers. While some training providers may consider it is easier to deliver traditional four-level apprenticeship programs as curriculum, many are over-burdened and face challenges with compressed delivery schedules and are under pressure from certain elements within the wider construction industry to push through new apprentices into the workforce as quickly as possible.

Despite the fact that the residential construction industry has yet to feel the full impacts of the looming labour shortage, the lack of skilled workers is already causing concern within other sectors of the non-residential construction and natural resources industries. Forward-looking residential construction companies are aware that they will soon be finding themselves competing with the large ICI companies for workers.

With a limited number of teaching hours per week, opportunities for instructors to add or amend curriculum are limited and adding new classes and instructors is not possible without firm commitment from apprentices to not only register for courses but to also show up in class. Apprentices are able to apply for Employment Insurance (EI) to cover their earning shortfalls while they are at school. The EI application process can be complicated and so slow to issue money that some apprentices do not receive cheques until after the course is finished. Training providers attest to "financing is the number one reason for students to pull out of a program"[2]. In some cases, so many students fail to show up to class despite having registered that courses have to be cancelled despite demand for the training being clearly articulated by employers.

Improved industry-wide communication and outreach will be critical to success. A key challenge for the residential construction industry with respect to apprenticeship and occupation training is the number of "non-participating" businesses. While HPO may be able to reach out to its database of more than 5,000 Licensed Registered Builders (LRBs) in the province, many of the sole operators are largely unreachable through existing channels due to their typically low affiliation with industry organizations. The HPO list also does not include renovators and sub-contractors.

As an example, there are only 885 builders, renovators, and trade contractors who are members of CHBA BC, the predominant industry association representing BC's residential construction sector. It is therefore important to explore ways to reach out to non-participating employers to persuade them to participate in programs in order to improve their technical knowledge which, in turn, could lead to improved uptake of apprentices into the system.

Pilot projects are also necessary to understand the costs and benefits of training and apprenticeship in-line with the needs of BC's residential construction industry. The costs to employers associated with the apprenticeship system are currently not known and need to be evaluated. To help support ongoing research and testing of models, funding needs to be in place and must provide timely, ongoing, stable support. Such a funding system needs to be governed by clear rules of accountability and reporting.

For small businesses, the impact of losing apprentices during the training process is a major concern. They also have limited ability to financially support the apprentice while he/she is away at school which is a relatively common practice within the ICI and natural resources sectors given the shortcomings of the EI process. It is not surprising that residential construction companies fear that when their apprentices go back to school, they will learn about and be attracted into other potentially better-paying industry sectors despite the fact that this work may be more routine, less varied, and be located in remote locations. In Alberta, the provincial government runs the Alberta Works Apprentice Income Support program, which helps to alleviate some of the financial barriers by providing assistance to apprentices while they are attending full-time technical training.

[2] Training provider in-depth interview

Summary of Industry and Training Challenges and Opportunities

The most commonly identified barriers / challenges for the residential construction industry and related training are listed in the tables below, along with a list of potential solutions.

INDUSTRY RELATED Political / Regulatory	
Barriers	**Potential Solutions**
• Additional complexities and risks/liabilities in the building industry tied to evolving building codes and new technologies • No licensing for renovators and no requirements for pulling municipal renovation permits • Low barriers to entry and low value assigned to residential specific trades such as carpentry	• Require licensing for home builders and renovators linked to CPD • Consider developing sub-ticketed trades through a moduralized system • Have industry push for PLAR recognition for those working in the industry who may be experienced but not already recognized through qualifications • Tying building permit applications to trade qualifications and required training
Economic	
Barriers	**Potential Solutions**
• Downward cost pressures on the industry resulting in a trend toward a more fragmented industry • Competition for skilled labour with higher-paying sectors (i.e. ICI construction, natural resource, etc.) • Smaller communities require workers with more diversified skill sets	• Provide opportunities for more diversified work experience throughout an individual's apprenticeship program through tracking and logging hours in different categories and exploring apprentice share options. • Develop retention strategies that go beyond salary to counter competitive wages in other sectors
Social	
Barriers	**Potential Solutions**
• Cultural perceptions with respect to working in the trades • Impending labour shortage due to attrition (retirement) • Shortage of experienced residential construction project managers	• Develop strategies to raise the profile for the benefits of working in the residential construction industry • Develop tools for employers and workers/ apprentices to better connect with one another (e.g. online portals, industry liaisons, etc.) • Make it easier for employers to hire and retain apprentices (training credits, tax incentives, etc.) • Focus on attracting new demographics into the industry and recognize foreign worker credentials through PLAR processes, etc. • Develop pathways for continuous learning in the industry to attract new demographics and shift public perceptions
Technological	
Barriers	**Potential Solutions**
• Lack of home energy performance related skill sets in the trades, from design through to installation and maintenance (building envelope, building science, HVAC, controls)	• More collaboration with equipment manufacturers/ suppliers and more education on the "home as a system" as a CPD requirement for all builders and trades • Encouraging an integrated project delivery process on the construction site involving engineers, architects, builders, etc.

EDUCATION & TRAINING SPECIFIC Pre-Apprenticeship	
Barriers	**Potential Solutions**
• Shortage of youth with well-developed "life skills" • Lack of understanding and experience with basic tools, numeracy, etc.	• Develop additional pre-requisites and front-end load more skills into high-school and pre-apprenticeship programs (WHMIS, first aid, safety, basic tools, numeracy, etc.) • Develop construction-related summer camps to engage youth (K-12 levels) in trades
Apprenticeship & Training	
Barriers	**Potential Solutions**
• Lack of a "culture of apprenticeship" in residential construction • Affordability issues for both apprentices and employers • Block release issues – the cyclical and seasonal nature of the industry makes it difficult for employers to indenture apprentices when it's slow and hard for apprentices to leave the job site when it's busy • Challenge for employers to spend time training apprentices – considered as an added cost and liability • Colleges and instructors have limited budgets and time for expanding / updating program curriculums • Structural issues around ITA funding e.g. minimum enrolment • Lack of regulatory enforcement with respect to tracking and reporting of apprenticeship hours by employers • Limited access to training providers and educators in rural areas	• Incentivize employers to invest in training their apprentices through training credits, tax breaks, etc. • Provide student loans to apprentices going through their trade programs • Provide more flexibility with respect to training in terms of scheduling in-school training / learning (evening / weekends; front-loading with one year in school, then 2 years on the job site, etc.; bulk of school training in the winter months) • Develop "apprentice/employer support hubs" with an industry liaison to connect businesses with apprentices, provide better alignment between training providers and industry, and provide input on current practices, technologies, and building code developments • Enforce the reporting of apprentice training hours and journeyperson requirements • Structure apprentice log books to allow training to be recorded in different areas and consider developing "sub-tickets" or "endorsements" based on this modularized approach • Address waitlist issue with max. registrations per apprentice • Provide more accessible education / training options through mobile trainers/ building inspectors, online programs, etc.
Continuous Learning	
Barriers	**Potential Solutions**
• Limited access to training in rural areas • No well-recognized pathway for ongoing / advanced-level education and training • No requirements for CPD resulting in low participation rates by industry and added risks, liabilities and costs	• Provide more accessible education / training options through mobile trainers/ building inspectors, online programs, etc. • Develop more recognized pathways to learning that go beyond the CofQ / Red Seal to include construction management, business ownership, and laddering into mastership trades, diploma, and degree programs • Link CPD / training requirements to annual licensing of builders and developers and extend to renovators in the province.

Conclusions

The findings for this study confirm that the residential construction sector plays a large and very important role in British Columbia's economy and that apprenticeship and trades training are critical to ensuring the quality and professionalism of the industry as a whole. The fact that half of the business owners surveyed for this study had apprentices employed on a full-time basis within their companies attests to the importance of the relationship between the employer and trainee in the career development pathway for construction. However, more critically, three out of four business owners active in the residential construction sector felt that at least some changes would help to improve the overall system. Importantly, there is a "silent majority" of companies which are active within the residential construction industry but which are not affiliated with any association, have no formal training, and are extremely hard to reach.

While there is general appreciation within the industry of how the apprenticeship system can serve to grow British Columbia's skilled workforce and at the same time, provide durable, healthy, and energy efficient homes, there is not the same "culture" of apprenticeship training in residential construction compared to the ICI sector. Compared to other industry sectors, businesses that are active in residential construction tend to be small with the majority retaining less than 10 employees and a large proportion operating as sole proprietors with no employees at all. Recruiting and indenturing apprentices is a very significant business decision.

As a result of the factors described above, there is arguably less willingness among residential construction employers to invest in worker training for the long-term given that the industry is so exposed to economic fluctuations. Combined with the short project timelines, the seasonal nature of the industry, and fluctuations in the economy, the traditional 4-year "block-release" apprenticeship training model can be a real challenge for some.

While there are indications that apprenticeship training does not go far enough, at the other end of the spectrum, it does not address the skills gap of under-trained and non-certified workers currently involved in the residential construction sector in British Columbia. It also does not address the prevalence of "fly-by-nighters" which has done much to tarnish the industry's reputation as a whole. This may ultimately be a regulatory issue.

In the interim, training providers have the ability to create and deliver stand-alone programs as "stop-gaps" and they have expressed willingness to do so conditional on industry demand. This may be a good first step to gauging industry support with the potential to adjust curriculum "on-the-fly" if necessary. The success of any continuing education courses is predicated on industry stakeholders commitment to market the courses as well as the strategic value of education to their networks.

It is also important to focus not only on training flexibility but also promote continuity. This is especially important to ensure training investment dollars are retained in the industry during economic cycles. Historically, British Columbia's construction industry has suffered from the loss of skilled workers to other provinces during economic lulls and has found that it is very difficult to get them back. By providing a range of training opportunities in terms of depth and breadth, as well as targeting different career stages, it is possible to improve retention, foster greater commitment to program completion, and improve resiliency.

The home building industry in British Columbia attracts a diverse workforce for whom flexibility and accessibility in the learning process is becoming increasingly important. It is the "new face" of this industry which will benefit from the experience and knowledge of qualified professionals working in the sector. The opportunity and timing for raising the bar for the residential construction industry in British Columbia in terms of quality and professionalism has never been better.

Introduction

Background and Context

The residential construction industry plays a significant role within British Columbia's economy. At present, there are over 130,000 jobs directly or indirectly associated with the industry in the province.

It is an excellent time for young workers looking to enter the residential construction sector in BC. The sector is facing an aging workforce with many looking to retire over the coming decade, increasing the demand for young workers and opening up new opportunities across the province. As such, the face of the industry is changing.

At the same time, the introduction of new technologies and practices combined with fierce competition for skilled workers in other construction and resource-based sectors are putting pressures on BC's residential construction businesses, the majority of which are small in size with fewer than ten employees.

Overarching these business challenges is the wide range of engagement levels in BC's traditional apprenticeship programs by residential builders. While the industry can help to grow BC's skilled workforce through apprenticeship and trades training and at the same time, provide durable, healthy, and energy efficient homes, research suggests that there is not the same "culture" of apprenticeship training in residential construction when compared to the institutional, commercial, and industrial (ICI) sector.

The lack of "culture" for apprenticeship training in the residential sector stems in part from the financial and structural challenges that exist in terms of the ability of small businesses to indenture apprentices. Combined with short project timelines, the seasonal nature of the industry, and fluctuations in the economy, the traditional four-year, "block-release" apprenticeship training model can be a real challenge for BC's residential construction sector.

The current funding model for apprenticeship training and program development in BC also presents challenges for industry and training providers. While some training providers may consider it is easier to deliver traditional four-level apprenticeship programs as curriculum, many are over-burdened and face challenges with compressed delivery schedules and are under pressure from industry to push through new apprentices into the workforce as quickly as possible. With a limited number of teaching hours per week, opportunities for instructors to add or amend curriculum are limited.

It should be noted that the vast majority of practical training and experience is gathered on the job throughout a workers lifetime. As such, there needs to be ways to better encourage and integrate on-site education and training for apprentices and workers alike, at all stages in their careers.

Employers and other industry stakeholders in the residential construction sector are interested in a training model that reflects the realities of this rapidly evolving industry and provides flexible, dynamic, and accessible training throughout the province in order to ensure that the right skills are in the right place at the right time. The make-up of the province's trade training programs (how they are structured, what they include, how long they take, and so on) must meet the needs of employers and trainees alike.

About the Project

GLOBE Advisors conducted extensive research on behalf of the Canadian Home Builders' Association of BC (CHBA BC) and a number of industry stakeholders in order to develop a detailed industry profile of the residential construction industry in British Columbia. This study also looked at current apprenticeship and trades training as it relates to the needs of residential construction employers, workers, and trainees.

Objectives and Intended Outcomes

The **objectives** of this project were to conduct research and consultation with industry stakeholders in order to:

- Confirm support for apprenticeship and trades training within industry;
- Identify any barriers to the delivery of residential construction training in BC;
- Document challenges for employers and trainees in starting and completing training; and
- Document the ideal range, nature, and scope of residential construction training delivery model(s).

The **intended outcomes** of this project were to identify opportunities to:

- Initiate the process to develop viable training pathways for residential construction skills development;
- Promote the residential construction apprenticeship model and its designated trades;
- Build employer and employee participation in residential construction apprenticeships;
- Enhance regional access to technical training opportunities;
- Develop a process for industry evaluation of training approaches; and
- Determine a process for ongoing residential industry influence on BC's apprenticeship and training system.

Definition and Scope

For the purposes of this study, a working definition of "residential" construction was adopted in order to provide scope and guide the research activities. "Residential" construction in BC is generally understood as the building and/or renovation of single-family and multi-family residential buildings, as well as light commercial mixed-use structures as **defined under Part 9 of the BC Building Code**. These structures are typically low-rise, predominately wood-framed buildings.

Projects are generally "builder-led" rather than "architect/engineer-led", with code requirements differing from Part 3 buildings and using a set of trades people often defined as "residential construction trades".

Although many residential trades and builders may be involved in larger projects (admissible under Part 3 of the BC Building Code), it is assumed for the purpose of this project that the primary focus is in the trades and occupations associated with low-rise residential and light commercial buildings.

In addition, a list of key occupations and trades relevant to the residential construction industry in British Columbia was used to frame the research and provide boundaries around scope. This list followed mostly those trades and occupations identified as relevant to the residential construction sector by the Construction Sector Council. In addition, a number of residential specific trades and occupations where apprenticeship and occupational training programs have been developed in the BC were included. The full list of these trades and occupations can be found in Appendix B.

About this Report

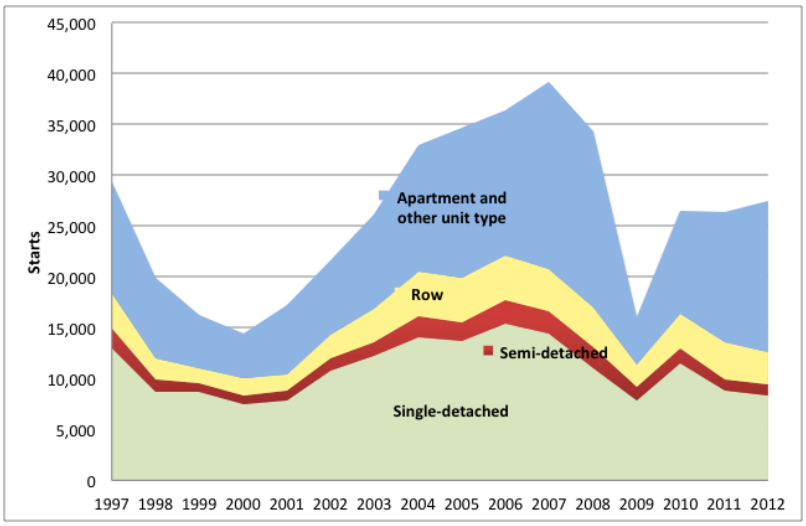
This report provides a current snapshot or "profile" of the residential construction industry in British Columbia, based on extensive secondary and primary research activities which include an analysis of statistical data, industry forecasts, labour market information, and information on education and training in the province (as outlined in the Methodology in Appendix A of the related Appendices Document).

In addition, the findings from an extensive online industry survey, more than two dozen in-depth interviews with key stakeholders, and a series of regional focus groups are presented as part of each chapter. The full results of each of these activities are included in the accompanying Appendices Document.

Statistical Analysis

Residential Construction Activity

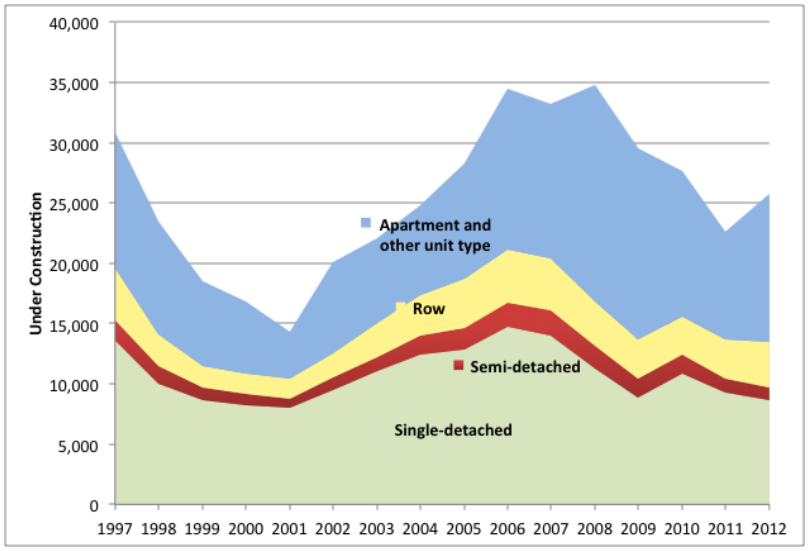
This section examines construction activity in British Columbia. The data has been largely gathered from Statistics Canada, which in addition to publishing its own surveys for the residential housing sector, also publish Canada Mortgage and Housing Corporation (CMHC) data on housing starts, completions, and units under construction. As illustrated in Figure 1, housing starts dipped from 1997 to 2000 and then rose dramatically to 2007 after which they declined due to the 2008 recession in 2008 and 2009.



Source: Statistics Canada, CANSIM Table 027-0008

Figure 1: Housing starts in British Columbia, 1997-2012.

In 2010 housing starts climbed up, but fell off slightly in 2011 and grew moderately in 2012 (Figure 2). The 2012 growth was largely attributable to apartment starts.

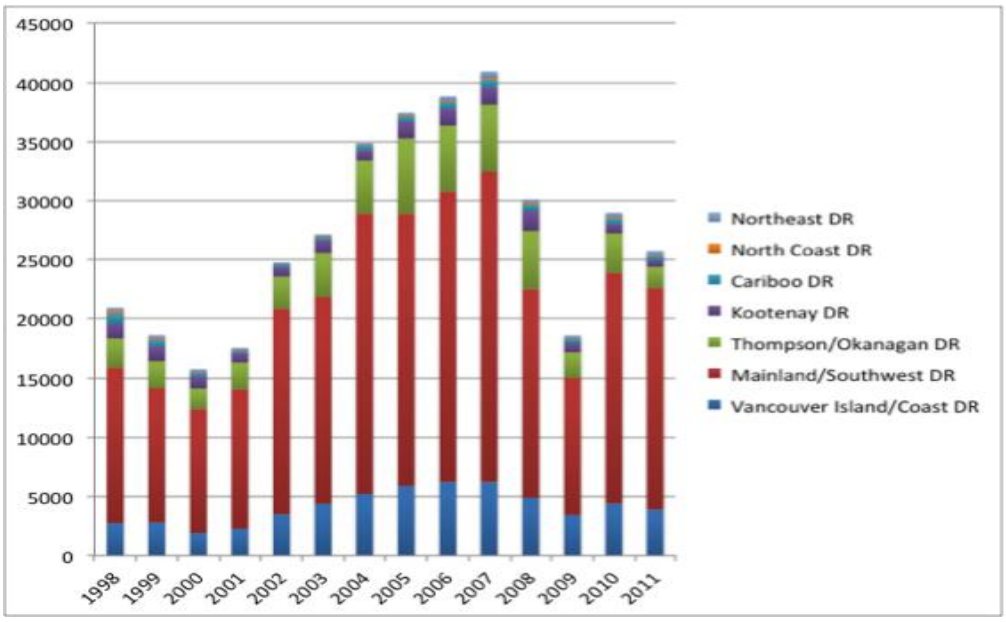


Source: Statistics Canada, CANSIM Table 027-0008

Figure 2: Residential units in British Columbia under construction, 1997-2012.

The number of units under construction declined substantially from 1997 to 2001 then grew at a steep slope to 2009 and then fell off to 2011. 2012 showed a small uptick in housing construction activity particularly for apartment and multi-unit residential building construction.

The majority of this residential construction activity is occurring in the Mainland-Southwest and in the Vancouver Island-Coast Development Regions of the province, as illustrated in Figure 3 below.

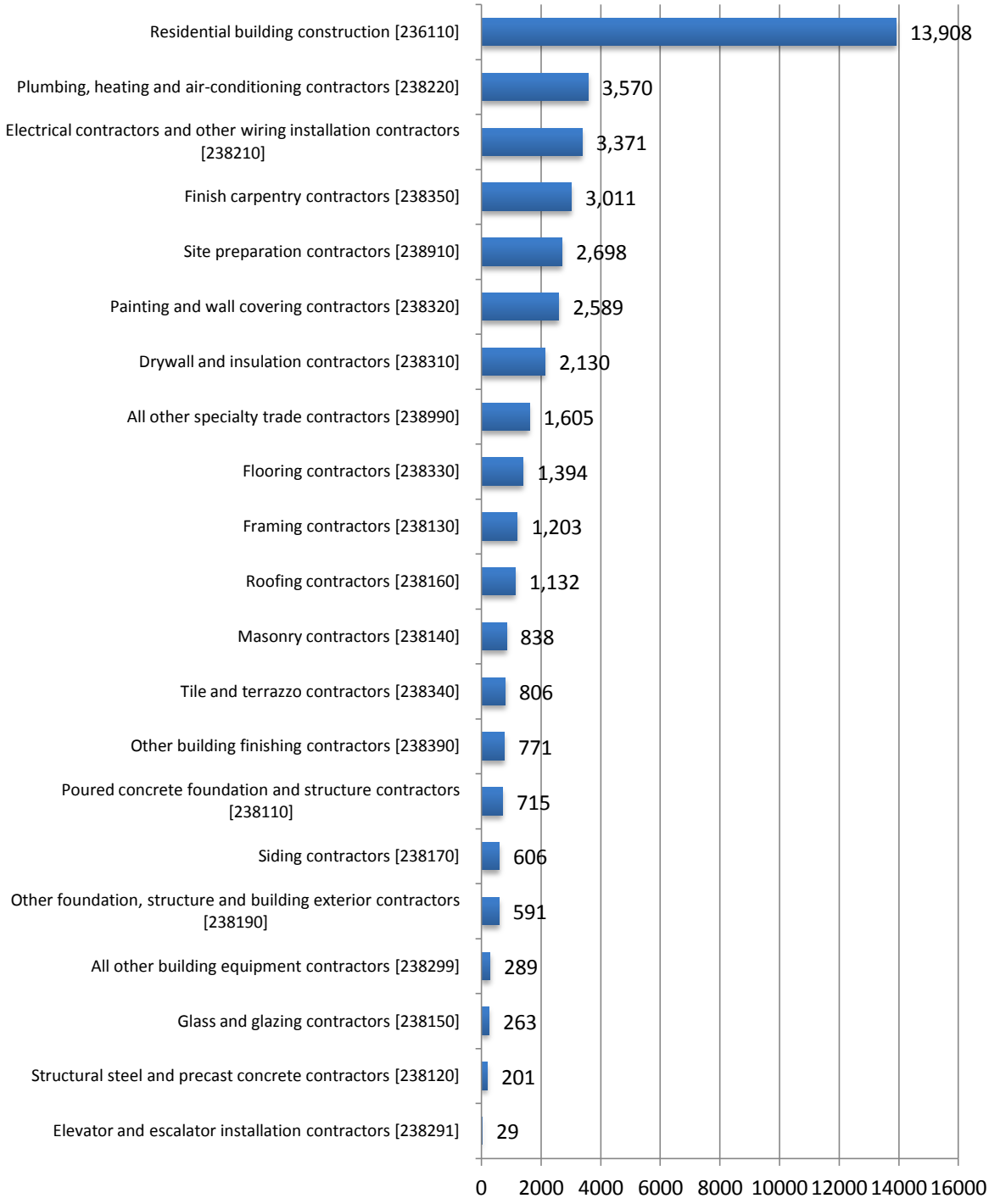


Source: BC Stats

Figure 3: Residential building permits in British Columbia by Development Region, 1998-2011 (Total Number of Units).

Profile of Residential Construction Businesses in BC

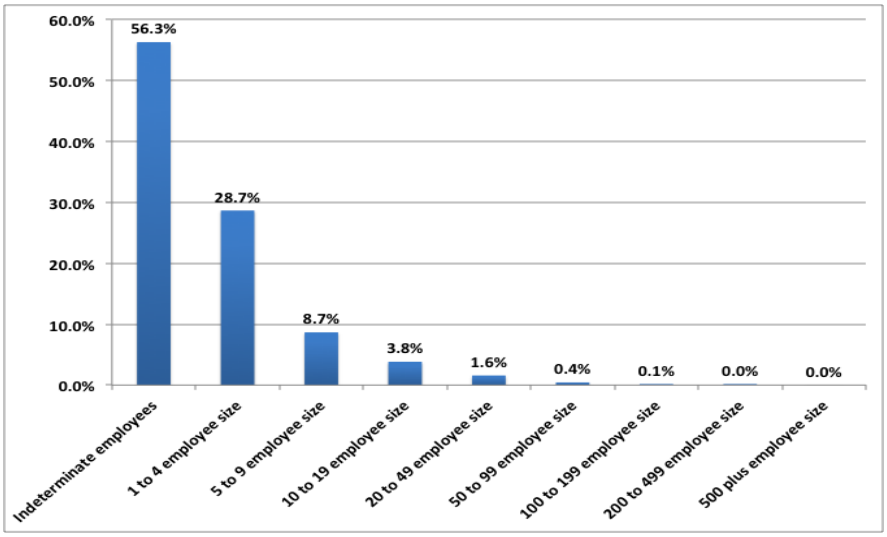
Figure 4 below provides the estimated number of residential construction and specialty trade establishments in British Columbia as of June 2012. Residential building construction (homebuilders, etc.); plumbing, heating, and air-conditioning contractors; and electrical contractors are the dominant business establishments in the province.



Source: Statistics Canada CANSIM Table 551-0002

Figure 4: Distribution of residential construction and specialty trades establishments in British Columbia by NAICS code, June 2012.

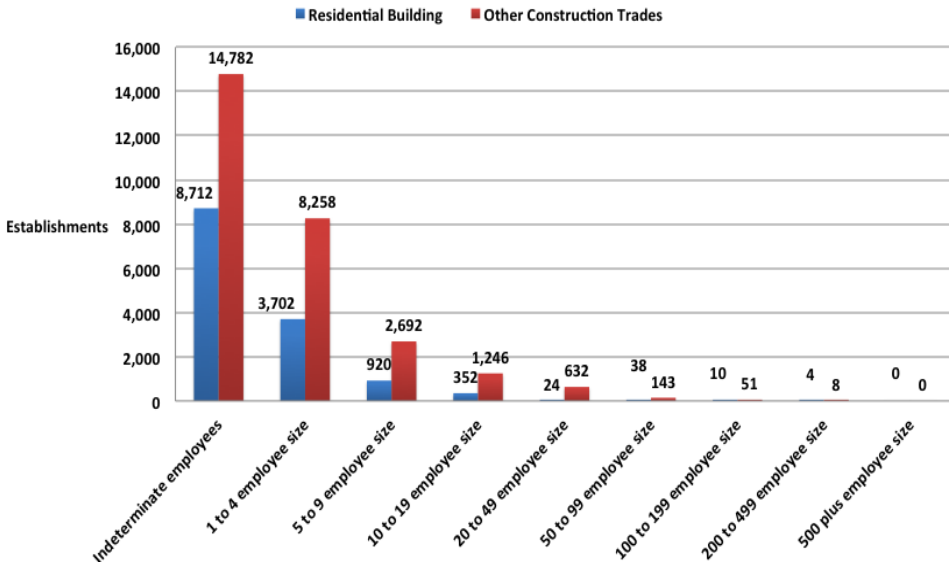
Figure 5 illustrates the percentage distribution for establishments in the residential building construction industry and the various construction specialty trades. Note, this chart represents the number of establishments, which are mostly all very small with very little to no revenue and very few employees.[3]



Source: Statistics Canada CANSIM Table 551-0002

Figure 5: Percentage of business establishments by size group in both residential building and specialty trades in British Columbia, June 2012.

Figure 6 breaks these establishments out in terms of residential building construction and specialty trades. Approximately one-third of these establishments represent companies classified under residential building and the remaining two-thirds represent companies in the more general specialty trades – who operate in both residential and other construction sectors.



Source: Statistics Canada CANSIM Table 551-0002

Figure 6: Number of business establishments by size group in both residential building and specialty trades in British Columbia, June 2012.

[3] In statistical terms, "indeterminate employees" is an employment size category defined as establishments with no or an indeterminate quantity of employees – those that do not maintain an employee payroll but may have a workforce which consists of contracted workers, family members, or business owners.

As illustrated above, the residential construction industry is characterized by a large proportion of small businesses. Approximately 13,330 (97 percent) of those in the residential building sector have fewer than 10 employees. This brings with it particular challenges for the industry when it comes to retaining workers and providing on-the-job training, as described later in this section.

Insights from the Industry Survey

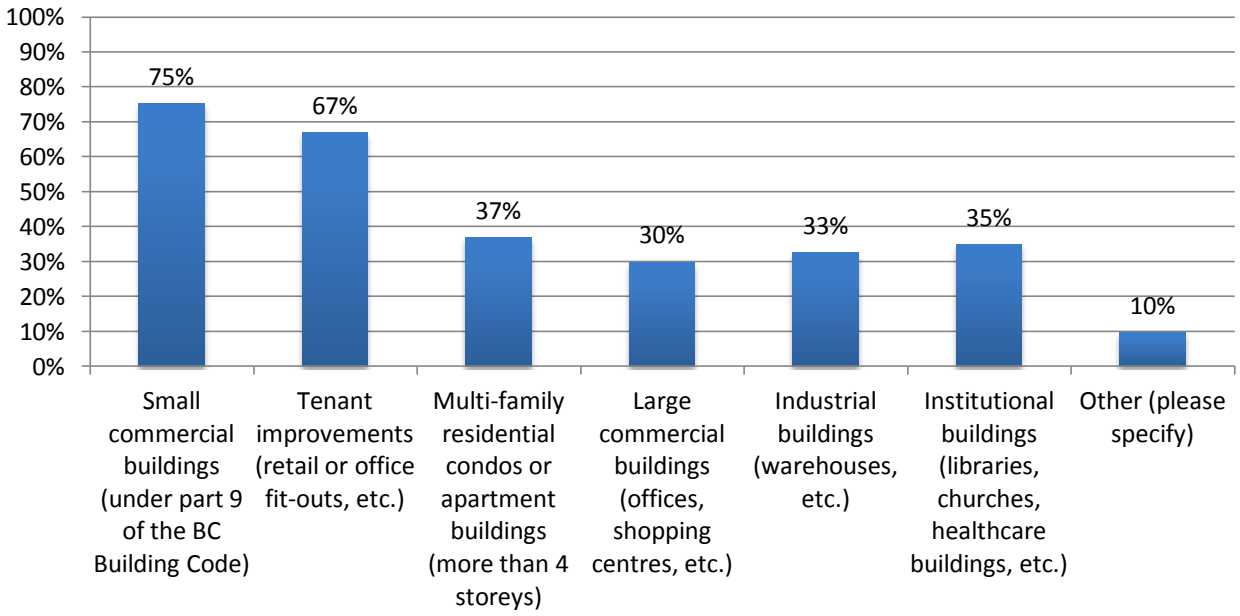
Findings collected from the on-line survey as part of this study provide additional insights into the profile of businesses active in the residential construction sector. The following results and figures provide an overview of the responses collected to questions from the industry survey.

Approximately half (51 percent) of the 326 "business owners" and 45 percent of the 89 "employees" who responded to the survey worked exclusively on projects in the residential construction sector in 2012. For those involved in projects outside of the residential construction industry (Figure 7), three out of four (75 percent) were involved in small commercial building projects (under Part 9 of the BC building code).

Tenant improvements were another major category for those also involved in non-residential construction at 67 percent. Institutional, commercial, and industrial (ICI) construction sector projects included agricultural, mining, and correctional facilities among others.

These findings would suggest that residential construction workers need to acquire a broad range of skills as they seek to be flexible in an increasingly competitive market that is highly impacted by economic fluctuations and seasonality. Indeed, research has suggested that an employee who can work on multiple project types is more valuable to an employer as it can open up new business opportunities.

Figure 7: Other than residential construction, what types of projects did your company work on in the last 3 years (new buildings and retrofits / renovations)? (n=157)



The vast majority of business owners surveyed (93 percent) work only in the province of British Columbia. For the small percentage who did work outside of the province, approximately 70 percent had projects in Alberta while the balance were projects in other parts of Western Canada and Ontario (22 percent combined) and 4 percent internationally (Figure 8). Research for this study suggests that the mobility of workers is not overly important or considered valuable to employers, although this may be valuable to the workers themselves.

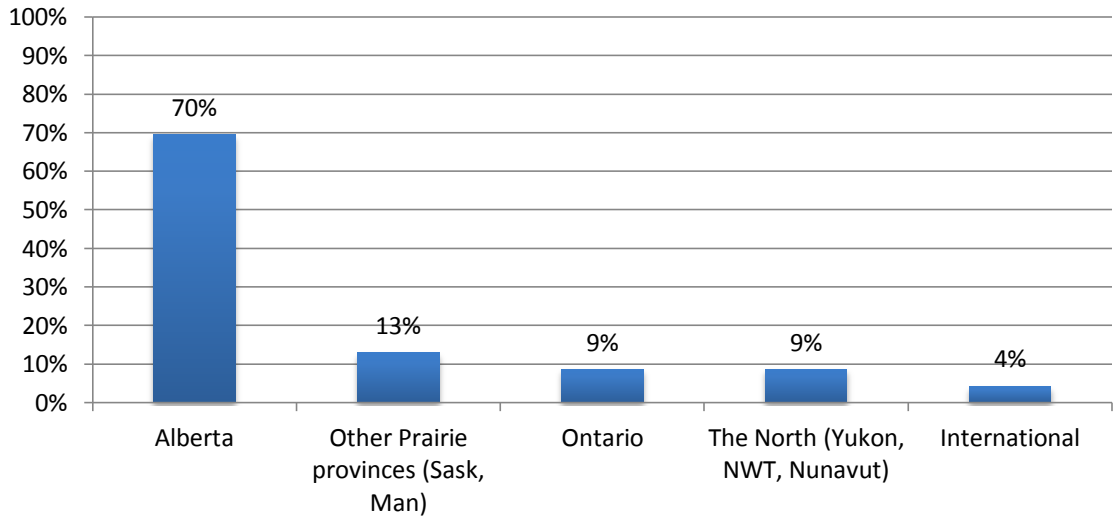


Figure 8: Where else has your company worked on residential construction projects? (n=18)

The vast majority (87 percent) of the businesses surveyed were very small in size, employing 10 or fewer workers (Figure 9). Exactly half (50 percent) of business owners surveyed had apprentices working as full-time employees pursuing a trade.

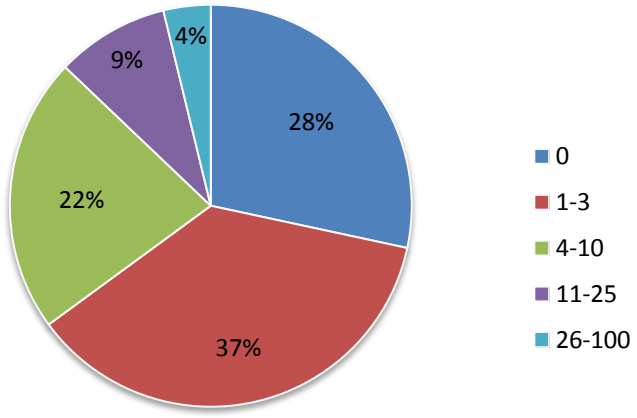


Figure 9: How many "full-time" workers (35+ hours / week), not including you, are currently employed in your company in BC? (n=320)

Industry Affiliations

Approximately half (49 percent) of the business owners and 44 percent of workers surveyed belonged to an industry association / organization. Of those surveyed who indicated that they were members of an industry association, approximately half were members of CHBA BC and/or one of its regional chapters and a quarter were members of the Thermal Environmental Comfort Association (TECA).

On the other hand, very few of the business owners (only 3 percent) and a larger percentage of workers (21 percent) surveyed belong to a labour union.

Emerging Technologies & Practices

When asked about the application of new and emerging technologies and practices, business owners were roughly evenly split between those who have worked on projects that have included new or non-conventional technologies requiring specialized skills. Approximately half (48 percent) of the respondents did not identify themselves as having worked with new or non-conventional technologies while 44 percent of them had. On the other hand, approximately half (51 percent) of the workers / employees had.

Figure 10 illustrates the relative use of new or non-conventional technologies by the business owners surveyed in residential construction projects. The dominant technology identified was heat recovery ventilators (HRVs) with approximately 66 percent of business owners having worked with them in the past. Forty-four percent had worked with heat pumps of some variety and 36 percent had worked with insulated concrete forms (ICFs). These results were very similar to the "employee" survey.

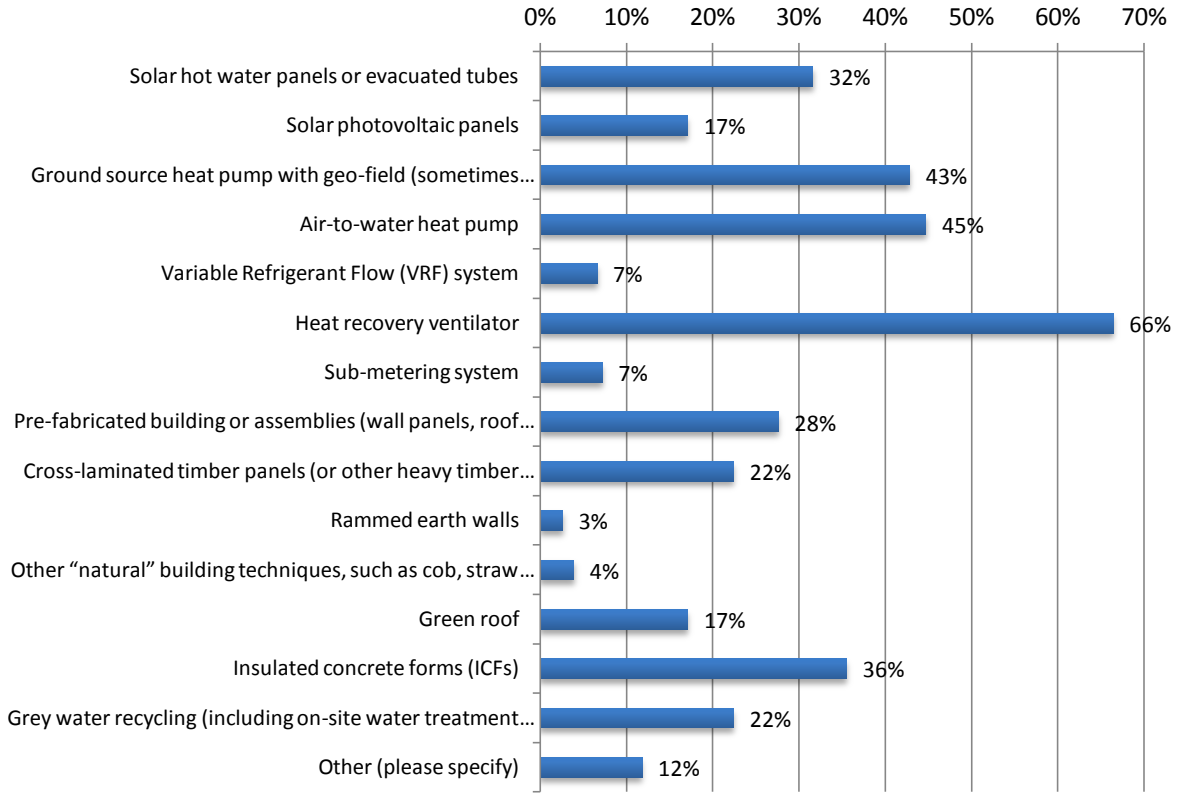


Figure 10: Please check all of the following technologies that you have used on your projects which have required specialized skills. (n=152)

In general, the business owners and workers surveyed were satisfied with respect to the skills training they had received in the past for applying, installing, and/or commissioning new or non-conventional technologies in their projects. Approximately three in four (74 percent) of the 151 business owners and three out of five (61 percent) of workers surveyed were satisfied with the skill level and approximately one in five (18 percent) indicated dissatisfaction.

Of those who indicated dissatisfaction, top reasons provided included the challenge of working with new technologies that are not "user-friendly", the limited access to trained workers in more remote locations, the poor training resulting in extra money having to be spent by companies to train internally, and a lack of regulation with some trades working on new technologies. Several business owners reported particular frustration with the lack of skilled and qualified HVAC technicians and geothermal heating companies.

"I have had to spend thousands of dollars training journeyman refrigeration mechanics, sheet metal workers, gas fitters, and plumbers in geothermal, hydronics, and solar hot water service and installations."

Response from business owner survey

"Many HVAC contractors do not know how to determine Energy Star qualified heat pump and ventilation systems. Many forced air and ventilation systems installed are not balanced. The result is many heating and ventilations systems do not perform as they should."

Response from business owner survey

"There are no laws in BC governing heating contractors with respect to the design of the system...Heating contractors should be licensed like plumbers, electricians, well installers, and septic field installers."

Response from business owner survey

"Installers were not cross-trained so they were competent at one aspect of installation but not others. An example was the solar DHW installers who were adequate at the collectors, control panels, and tubing installation but struggled with the plumbing and piping at the tanks. Perhaps better suited to a plumber with additional training."

Response from business owner survey

"The company my clients wanted to use were new to the business and couldn't afford qualified crews to assemble the pre-made panels or floor system."

Response from business owner survey

Insights from Industry Consultation

Several themes with respect to BC's residential construction industry in general were raised during interviews and focus group discussions as part of this study. The key points are summarized below.

Cyclical and Seasonal Nature of the Industry

The residential construction sector in British Columbia is highly exposed to fluctuations in the economy. The acutely cyclical nature of the industry makes it difficult for companies to retain their workers and indenture apprentices. In a slowing economy, the residential market has become very competitive. Downward cost pressures on contractors often results in a trend toward fragmentation of responsibilities which can present challenges for ensuring quality in construction and can result in increased risk.

In addition, seasonality has an impact on the residential industry, particularly in colder regions of the province where work tends to slow down considerably in the winter months and ramp up throughout the spring and summer months. Employers in more northern communities are often reluctant to invest in apprentices for fear of having to pay them through the winter months, even if they are not working. Those employers that do have apprentices have a variety of apprentice-retention strategies. For example, they may manage project scheduling so employees can continue working inside in the winter, may top up contributions to an employee's Employment Insurance, or allow their apprentices to do piece work elsewhere.

Building Code Changes and Related Challenges

Starting in 2008, the BC Building Code has included energy efficiency measures and the provincial government states that "greening the BC Building Code is an ongoing initiative"[4], suggesting that the industry can expect regular ongoing improvements in energy efficiency and building envelope as BC moves to fulfill its commitments under the BC Clean Energy Act of 30 percent reduction in GHG emissions by 2020. Additional seismic upgrade / lateral bracing requirements were also enacted during the latest building code updates in December 2012.[5]

The provincial government has deferred some of the building code changes with respect to the new window and door requirements[6] in order to allow some manufacturers to get up to speed with changes – which has frustrated some leaders in the industry.

Another major trend in building is toward high performance construction. The City of Vancouver for example is updating its building by-law this year so that all new homes must consume 50 percent less energy (achieve at least EnerGuide 80). By 2020, all new buildings are expected to be carbon neutral within the City of Vancouver's jurisdiction.

To achieve the energy consumption and GHG emission reductions described by the province, there is a shift from prescriptive to performance-based codes in progress. Performance-based codes will require a significant change in roles and responsibilities. The first performance-based code will likely come from the City of Vancouver within the next five years as it transitions toward its "low-carbon building" policy. Not surprisingly, the drive for efficiency in residential construction is causing a number of organizations to become concerned about the disparity between current training program curricula, the needs of industry, and the expectations of policy makers.

[4] http://www.housing.gov.bc.ca/building/green/index.htm
[5] http://www.housing.gov.bc.ca/building/green/energy/9.36_DRAFT.pdf
[6] http://www.empr.gov.bc.ca/EEC/Strategy/EEA/Documents/Windows5Dec2011.pdf

Residential construction industry employers are concerned that the pace of change exposes them to increased cost and risk. A high performance home is more complex, requires more specialist consulting expertise, more costly components, and pass-fail testing procedures (e.g., blower door, indoor air quality, etc.) at the end of the project. A generally improved understanding of the principles of building science and building envelope will be expected of all members of the construction team in the future to ensure building performance commitments are achieved, reinforcing the need for integration across trades and a greater degree of technical expertise.

While the research for this project found that residential builders, for the most part, believe they are keeping up with current trends so far, there may be a situation of "they don't know what they don't know". Feedback from continuing education providers suggests that builders are largely unaware of the implications of new code requirements and, in some cases, building officials are too. For example, new lateral bracing requirements are likely to affect most new home designs but there has been little education on this topic to date.[7]

Emerging Technologies and Skill Sets

The business case for new technologies is often not clear. Despite the fact that energy-consuming products are required to be clearly labeled in BC,[8] the actual performance is conditional on how, where, and within what assembly they are installed – often leaving the homebuilder and homeowner confused as to the best available options.

The design, installation, and operation of high performance buildings and the systems within them dictate the return on investment anticipated by the owner. Builders who are uncomfortable with unfamiliar technologies and assemblies need access to practical training on a "just-in-time" or on an as-needed basis. Education on new technologies also needs to explain the value proposition, provide a means for comparison of various solutions, and clearly articulate the factors affecting the return on investment (e.g., mechanical insulation, etc.).

To meet current and proposed building codes, energy efficient technologies such as heat pumps (air-to-air, air-to-water, ground-source, etc.) and renewable energy systems such as solar hot water panels are becoming increasingly common. Heat recovery ventilation (HRV) systems are mandatory for houses aiming for EnerGuide 80 or higher. At the same time, quality skill sets related to home energy performance have been identified as being in short supply and that workers are plentiful but inadequately trained. The most affected trades are:

- Carpenters and framers: activities related to window and door installation, air sealing (internal/external, suite demising), and building envelope (identifying and eliminating thermal breaks, blower door tests, weatherization, and general building science).
- Plumbers and HVAC: mechanical (ventilation and MAU systems, hydronic heating/cooling systems, HVAC system integration, balancing and commissioning, etc.)

[7] Lateral Bracing Guide is available from the BC Codes website: http://www.bccodes.ca/Illustrated-Guide-For-Seismic-Design-of-Houses.pdf
[8] http://www.empr.gov.bc.ca/EEC/Strategy/EEA/Pages/default.aspx

Statistical Analysis

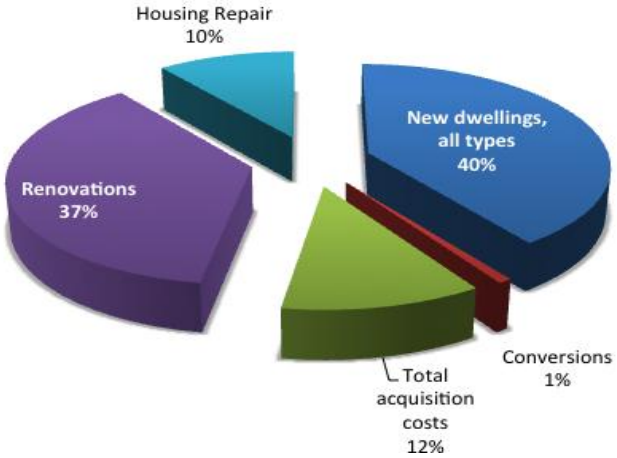
This sub-section describes the overall residential construction employment in British Columbia and its salient characteristics based on statistical sources. The analysis presents information from all the currently available national statistical data sets, which involved having to examine the trades and the residential building construction industries separately in some instances, as well as working with the more comprehensive National Accounts figures where residential building construction and residential-specific trades employment figures are rolled-up together.

In addition to working with the Statistics Canada National Accounts, the Input-Output employment multipliers for British Columbia were used in order to estimate the direct and the indirect employment impact of the residential construction sector in British Columbia.

It should be noted that Statistics Canada does not cover residential employment in a consistent manner. The monthly Employment and Earnings Survey and the Census taken every five years (the labour force component was last published in 2006) count both the specialty trade contractors for construction and the residential building construction industry separately, as does the North American Industry Classification System (NAICS). Therefore, both these publications do not include construction trades in their employment statistics for the "residential building construction" category (i.e., as part of NAICS code 2361) but instead break them out as specialty trade contractors as part of NAICS code 238 (which lumps residential building construction with non-residential construction activities including industrial, commercial, and institutional projects).

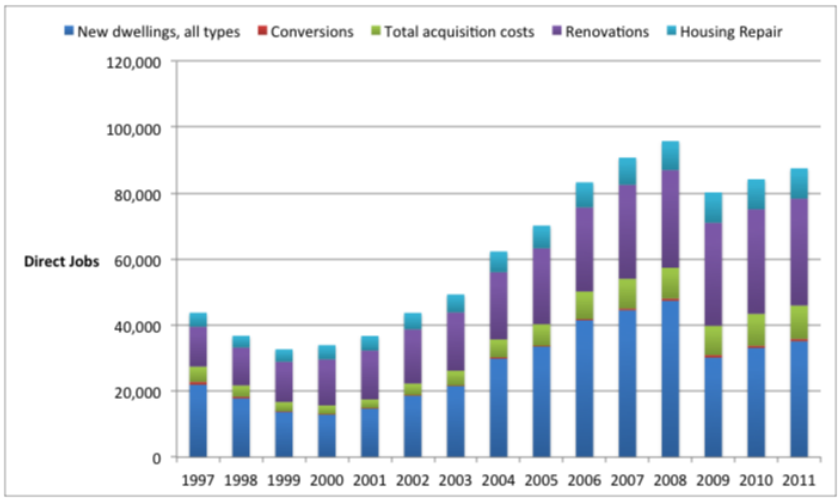
On the other hand, the Statistics Canada National Accounts do include both the embedded construction trades and the non-trades employment in their labour accounts as they relate specifically to the residential building construction sector in BC. This is due in part to the fact that the National Accounts need to be able to rigorously tabulate the total labour and capital activity that goes into each industry, including the residential construction sector, for its Input-Output Tables.

As shown in Figures 11 and 12 below, the residential construction sector in British Columbia directly employed an estimated 87,530 workers in 2011. Forty percent of this direct employment was in new dwellings, 37 percent in housing renovations, 12 percent in acquisition costs, and 10 percent in housing repair.



Source: Statistics Canada Table 026-0013 Residential values, by type of investment and Statistics Canada direct employment input output multiplier.

Figure 11: Residential housing construction employment in British Columbia by type, 2011.

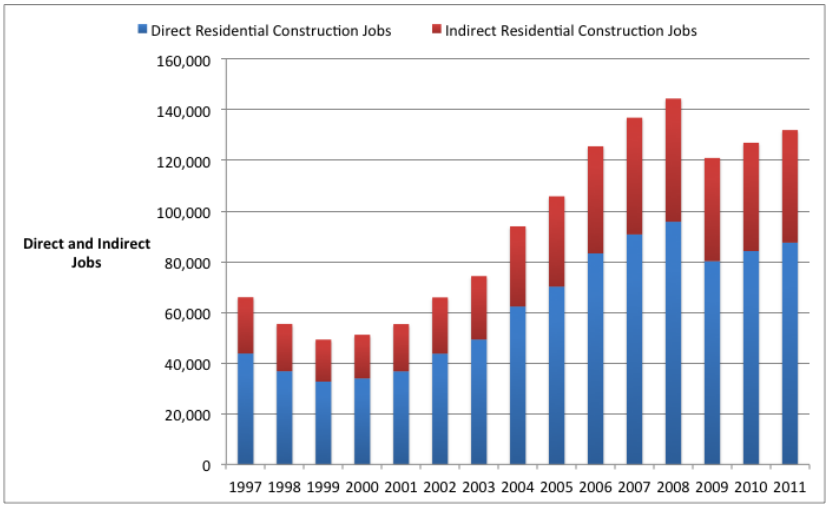


Source: Statistics Canada Table 026-0013 Residential values, by type of investment and Statistics Canada direct employment input output multiplier.

Figure 12: Direct employment in British Columbia's residential construction industry, 1997-2011.

Based on the Statistics Canada employment multipliers for the residential construction sector in British Columbia, for every direct job in BC's residential construction sector, there is an additional 0.51 indirect jobs created within the province. The overall provincial multiplier is 1.51.

Figure 13 shows both the direct and indirect jobs for the residential construction industry in British Columbia. In 2011, it was estimated that the industry employed approximately 132,000 direct and indirect people in the province, including the housing repair sector, which is included in these statistics in order to be consistent with the published reports by the Construction Sector Council and the Residential Construction Industry Training Organization (RCITO).[9] At its peak in 2008, this sector employed nearly 144,000 people directly and indirectly, after which the number dropped to 121,000 in 2009 during the economic downturn.



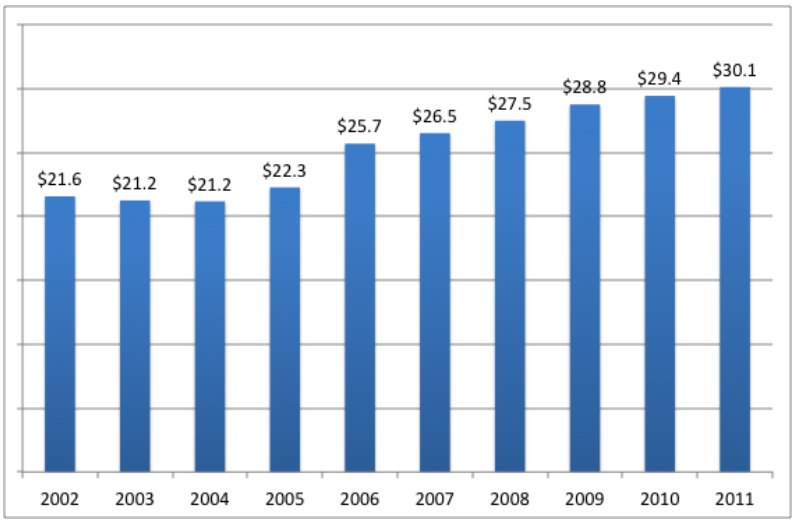
Source: Statistics Canada Table 026-0013 Residential values, by type of investment and Statistics Canada direct employment input output multiplier.

Figure 13: Direct and indirect employment in the residential construction industry in British Columbia, 1997-2011.

[9] For the Construction Sector Council forecasts refer to http://www.constructionforecasts.ca/

Compensation

Total compensation per hour worked has been increasing slowly in BC's residential construction sector over the last decade, as illustrated in Figure 14. The current remuneration average is $30.10 an hour.

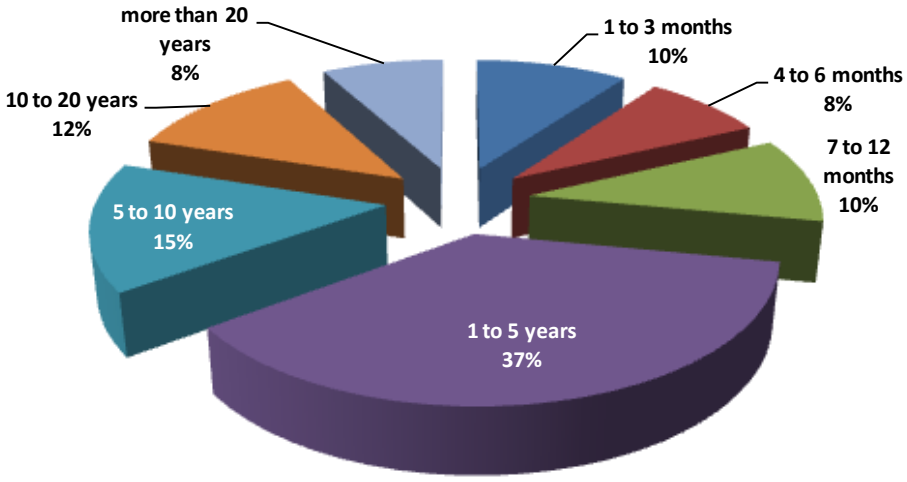


Source: Statistics Canada, CANSIM Table 383-0010

Figure 14: Total average compensation per hour worked in the residential construction industry in British Columbia, 2002-2011.

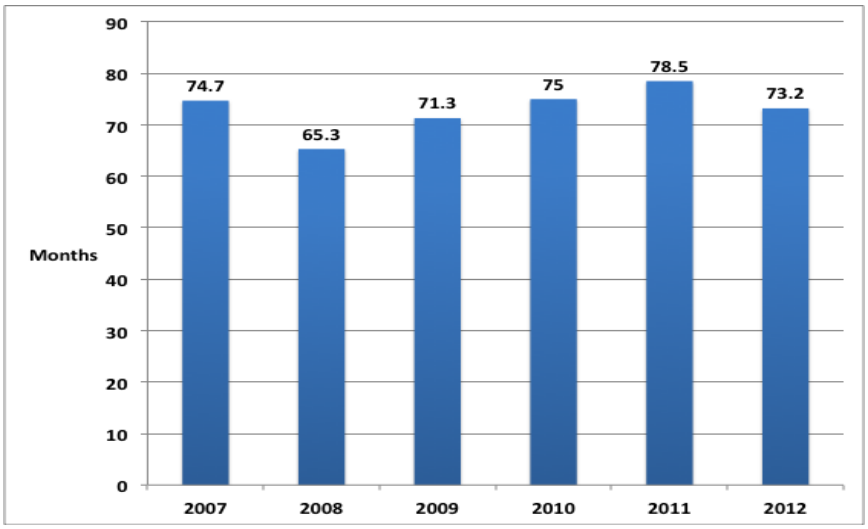
Job Tenure

As illustrated in Figures 15 and 16 below, approximately one in three (37 percent) of overall construction trades people in 2012 had worked on a job for between 1 and 5 years, 15 percent worked between 5 to10 years, and 12 percent from 10 to 20 years. The average job tenure was 73 months (approximately 6 years). While these job tenure figures represent the entire construction trades group that includes commercial and industrial construction as well as the residential sector, this information may be indicative of reasonably long job tenures.



Source: Statistics Canada Labour Force Survey CANSIM Table 282-0040

Figure 15: Job tenure by months employed for construction trades in British Columbia, 2012.



Source: Statistics Canada Labour Force Survey

Figure 16: Average job tenures in months for construction trades in British Columbia, 2007-2012.

Census-based Labour Force Characteristics

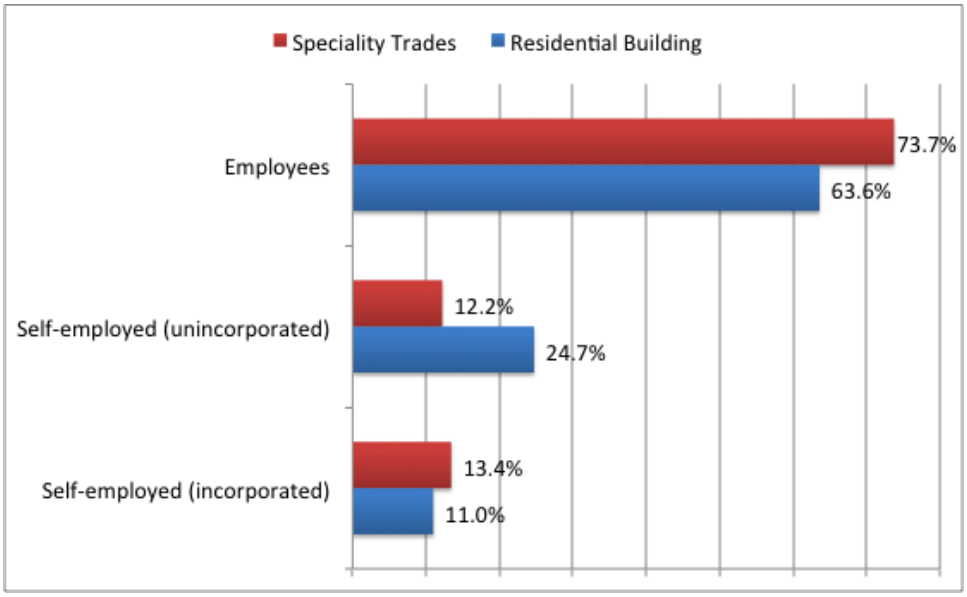
In addition to the Statistics Canada National Accounts and Input-Output Division, several labour force characteristics from the 2006 Census on Labour Force Activity were used to paint a more detailed picture of residential construction employment in British Columbia.

While the 2011 Census results are released in the summer of 2013, the 2006 labour force characteristics are still useful as they provide an historical baseline by which to monitor changes based on the 2011 Census.

Employees versus Self-Employed

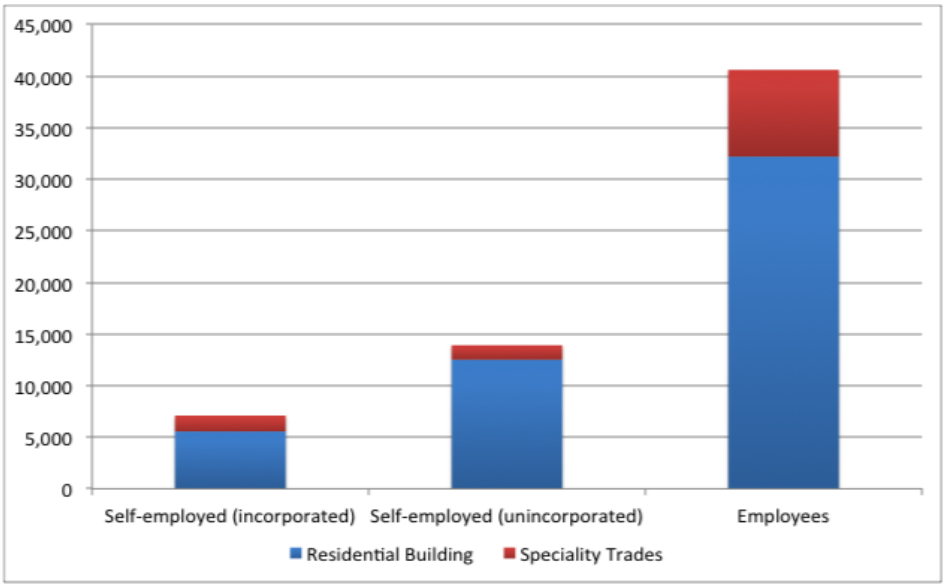
Another interesting statistic published in the Census involves the employment structure of both the residential building and the construction trades sectors. Figures 17 and 18 show the percentages and actual amounts of people working in these industries as employees, incorporated businesses, and unincorporated businesses. A very small amount of unpaid family members are included in the Census figures but are not included in these charts, as this amount would be indistinguishable.

Seventy-four percent of the specialty trades industry workers and 64 percent of residential building construction workers are employees working for businesses. Twelve percent of specialty trades and 25 percent of residential building construction workers are self-employed unincorporated contractors and 13 percent and 11 percent respectively are self-employed and incorporated.



Source: Statistics Canada, 2006 Census

Figure 17: Percentage of specialty trades and residential building workers as employees, self-employed unincorporated, and self-employed incorporated businesses.

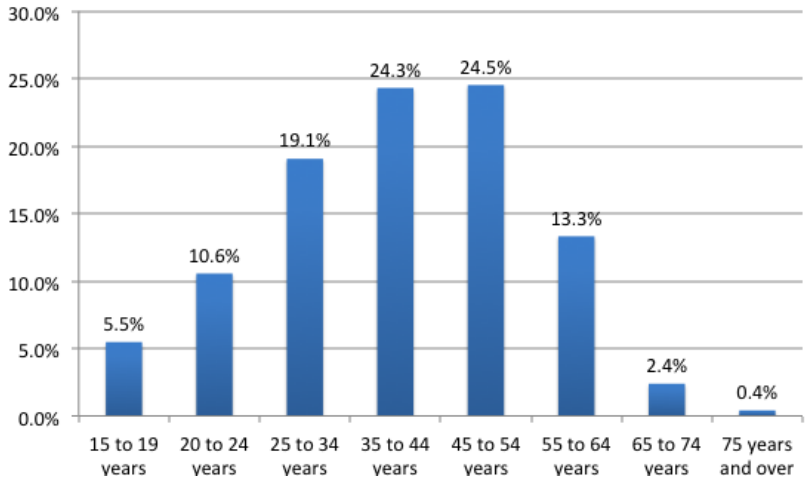


Source: 2006 Census

Figure 18: Specialty-trades and residential building workers as employees, self-employed unincorporated, and self-employed incorporated businesses.

Average Age

The percentage age groups for the residential building construction and specialty trades industries are shown in Figure 19. In 2006, approximately half (49 percent) of these workers were in the 35 to 55 year age cohorts. Many of these workers are now at a pre-retirement age and will need to be replaced by new workers over the next few years as they enter retirement.

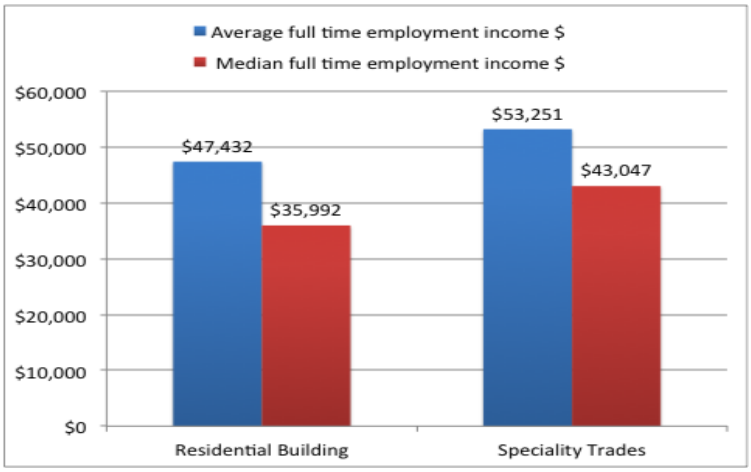


Source: Statistics Canada 2006 Census

Figure 19: Residential building and specialty trades workers by age group in British Columbia.

Average Income

In 2006, workers in the residential building construction industry earned an average full-time income of $47,000 and a median income of $36,000 (see Figure 20). Specialty trades contractors in BC's construction industry in general earned an average full-time income of $43,000.



Source: Statistics Canada, 2006 Census

Figure 20: Average and median full-time employment income for the residential construction industry in BC.

Key Occupations & Trades

Figure 21 below shows the total estimated number employed in residential building construction and specialty trade related occupations and Figure 22 on the following page shows the percentage distribution for these occupations. The occupation data is derived from BC Stats and the median full-time earnings from the Canada Census.

Trade / Occupation	NOC Code (2011)	Total # Employed in Residential Construction (2010)	Median Full Time Earnings	Red Seal Program?	Apprenticeship Program Duration
Bricklayer (Mason)	7281	940	$34,911	Yes	4 years
Building envelope technician	2231*	20**	$56,163	No	N/A
Carpenter	7271	14,534	$35,371	Yes	4 years
Concrete finisher	7282	941	$40,120	Yes	3 years
Construction estimator	2234	703	$58,694	No	N/A
Construction manager	0711	5,096	$60,100	No	N/A
Contractor and supervisor	7204	4,613	$60,523	No	N/A
Crane operator	7371	350	$57,903	No	2 years
Driller and blaster	7372	125	$49,605	No	N/A
Electrician	7241	5,447	$56,934	Yes	4 years
Floor covering installer	7295	1,770	$29,440	Yes	3 years
Gasfitter	7253	424	$52,611	No	2 years
Geothermal technician	2232*	45**	$57,456	No	2 years
Glazier	7292	703	$39,430	Yes	4 years
Heating technician	2233*	60**	$46,566	No	2 years
Heavy equipment operator (except crane)	7521	2,326	$52,938	No	1 year
Heavy-duty equipment mechanic	7312	146	$63,369	Yes	4 years
Insulator	7293	554	$38,983	Yes	4 years
Ironworker and structural metal fabricator and fitter	7236	474	$48,062	Yes	3 years
Painter and decorator	7294	5,610	$29,539	Yes	3 years
Plasterer, drywall installer and finisher, and lather	7284	3,303	$32,120	No	2 years
Plumber	7251	3,930	$41,241	Yes	4 years
Refrigeration and air conditioning mechanic	7313	828	$53,624	Yes	5 years
Residential and commercial installer and servicer	7441	1,827	$30,840	No	N/A
Roofer and shingler	7291	2,427	$33,842	Yes	3 years
Sheet metal worker	7233	783	$46,908	No	3 years
Tilesetter	7283	1,069	$31,478	Yes	3 years
Trade helper and labourer	7611	11,785	$30,095	No	N/A

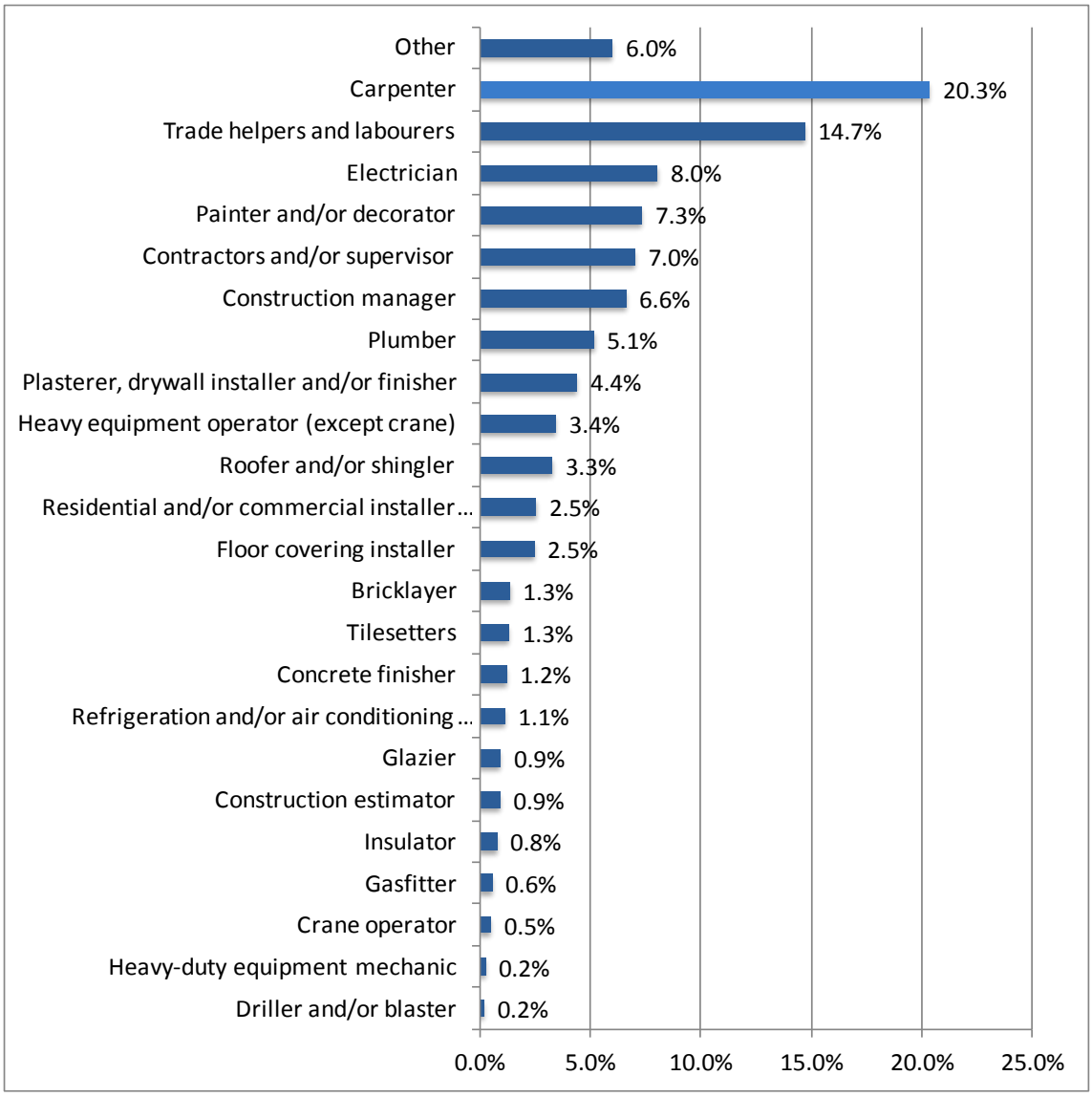
Source: BC Stats, Statistics Canada (2006 Census), and BC Industry Training Authority (ITA)

* The 4-digit NOC presented is not specific to this trade/occupation but the larger occupational category.
**Estimated number based on the Certificate of Qualifications awarded by the ITA in British Columbia.

Figure 21: Occupations and trades relevant to the residential construction industry, including estimated numbers of employed, medial full-time earnings, Red Seal designations, and apprenticeship program duration.

Carpenters, Trade Helpers and Labourers, Electricians, and Painters and Decorators are the leading residential construction related occupations and trades in British Columbia.

In addition, a smaller number of specialty trades and occupations that have particular relevance to the residential construction industry in BC are shown in Figure 21. The estimated total number of employed for these occupations is based on ITA data and the median full-time earnings comes from the 2006 Census based on their more aggregated 4-digit NOC occupational categories. These occupations include Heating Technicians, Geothermal Technicians, and Building Envelope Technicians.



Source: BC Stats and Statistics Canada

Figure 22: Percentage distribution of residential building construction and associated specialty trade related occupations in British Columbia, 2010.

Based on the percentage distribution illustrated in Figure 22, GLOBE has profiled the top 10 residential construction related occupations and trades below. Profiles of the additional relevant occupations and trades can be found in Appendix J of the Appendices Document.

Carpenters: Carpenters build and repair a vast array of structures made of wood, wood-substitutes, and other materials. Employment is divided between residential and non-residential construction. Many work for construction companies, contractors, and maintenance departments while others are self-employed.

Carpenters assemble and erect forms for concrete, wood, and metal frame construction and use plans and instruments to prepare for excavating and shoring. On smaller projects, they direct concrete placement, and install exterior and interior finish materials such as siding, doors, windows, and cabinets.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 14,534 carpenters employed in BC's residential construction sector in 2010 with a median full-time earning of $35,371 (from the 2006 Census). While not well represented by a specific industry association, organizations such as CHBA BC and the Carpenters Union of BC act as a voice for some who work as carpenters in the residential construction sector.

The carpenter is a nationally designated trade under the Inter-provincial Red Seal program (4 year program).

Trade Helpers and Labourers: Construction trades helpers and labourers assist skilled tradespersons and perform labouring activities at construction sites, in quarries, and in surface mines. Employment, however, is concentrated in residential construction.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 11,785 trade helpers and labourers employed in BC's residential construction sector in 2010 with a median full-time earning of $30,095 (from the 2006 Census). While not well represented by a specific industry association, organizations such as the Construction and Specialized Workers' Union (part of the larger Labourers' International Union of North America) and the Christian Labour Association of Canada do act as a voice for some who work as labourers in the residential construction sector.

There is no recognized or formal industry training or apprenticeship program for labourers.

Electricians: Construction electricians lay out, assemble, install, test, troubleshoot, and repair electrical wiring, fixtures, control devices and related equipment in buildings and other structures. Electrical contractors and maintenance departments of buildings and other establishments employ them, or they may be self-employed. Employment is divided between residential and non-residential construction.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 5,447 electricians employed in BC's residential construction sector in 2010 with a median full-time earning of $56,934 (from the 2006 Census). Key industry organizations and labour unions include the International Brotherhood of Electrical Workers (IBEW), Local 213; the Electrical Contractors Association of BC; and the BC Electrical Association.

The electrician is a regulated trade in BC and is nationally designated trade under the Inter-provincial Red Seal (4 year) program.

Painters and Decorators: Painters and decorators are people who prepare and apply paint or any organic/inorganic coating when applied in the same manner as paints, sand/hydro blasts for cleaning decorative or preparatory purposes to steel, concrete or wood, installs rubber, fiberglass, acid resistant or metalized linings to tanks, pipes, or other vessels; installs all wall coverings on buildings or structure surfaces. Employment is divided between residential and non-residential construction.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 5,610 painters and decorators employed in BC's residential construction sector in 2010 with a median full-time earning of $29,539 (from the 2006 Census). A key industry organization is the Master Painters and Decorators Association.

The painter and decorator is a nationally designated trade under the Inter-provincial Red Seal (3 year) program.

Construction Managers: Construction managers plan, organize, direct, control and evaluate the activities of a construction company or a construction department within a company, under the direction of a general manager or other senior manager. They are employed by residential, commercial, and industrial construction companies and by construction departments of companies outside the construction industry. As such, employment is divided between residential and non-residential construction.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 5,096 construction managers employed in BC's residential construction sector in 2010 with a median full-time earning of $60,100 (from the 2006 Census). Key industry organizations include the BC Construction Association; the Construction Institute of Canada; and the Project Manager Association of Canada.

There is no recognized or formal apprenticeship program for construction managers. Many do have their journeyperson certificates of qualification and/or may have taken popular construction management courses such as CCA's Gold Seal program.

Contractors and Supervisors: Residential construction contractors and supervisors (home builders) own, operate, and manage companies engaged in the construction of new residential homes. Home renovation contractors and supervisors or renovators own, operate, and manage companies engaged in the renovation of existing residential homes. Employment is divided between residential and non-residential construction.

Based on GLOBE's estimates from BC Stats and Statistics Canada data, there were 4,613 home building and renovation contractors and supervisors employed in BC's residential construction sector in 2010 with a median full-time earning of $60,523 (from the 2006 Census). Key industry organizations include the Association of General Contractors; the BC Association of Restoration Contractors; the BC Construction Association; and the Canadian Home Builders' Association of BC.

There is no recognized or formal apprenticeship program for home builders and renovation contractors, although many enter the occupation as a carpenter.

Plumbers: Plumbers are people who install, alter, or repair plumbing systems, including all work usually done by a journeyperson plumber governed by the BC Plumbing Code. Employment is divided between residential and non-residential construction.

Based on the 2006 Census, there were 3,930 plumbers employed in BC's residential construction sector in 2010 with a median full-time earning of $41,241 (from the 2006 Census). Key industry organizations include the United Association of Journeymen and Apprenticeship of the Plumbing and Pipefitting Industry of Canada (UA Local 170); the Plumbers & Pipefitters Union; the Plumbing Official's Association of BC; and the Canadian Institute of Plumbing and Heating.

The plumber is a nationally designated trade under the Inter-provincial Red Seal (4 year) program. The trade is regulated under the BC Safety Authority.

Plasterers and Drywall Finishers: A "plasterer" is a person who applies coats of plaster and decorative coverings of other materials to inside and outside walls and ceilings of building to produce finished and/or fireproofed surfaces, and all other work usually performed by a journeyperson Plasterer. A “drywall finisher" is someone who prepares, tapes, fills, and sands all seams, corners and angles. Prepares for and applies all decorative features. Drywall installers and finishers install and finish drywall sheets and various types of ceiling systems. Employment is concentrated in residential construction.

Based on GLOBE’s estimates from BC Stats and Statistics Canada data, there were 3,303 plasterers, drywall installers, and finishers/lathers employed in BC’s residential construction sector in 2010 with a median full-time earning of $32,120 (from the 2006 Census). Key industry organizations include the Association of Wall and Ceiling Industry; the Northwest Wall and Ceiling Bureau; the BC Wall & Ceiling Association; and the Interior Systems Contractors Association.

The drywall finisher is an ITA-recognized, 2-year apprenticeship program. It is not a nationally designated trade under the Inter-provincial Red Seal program.

Roofers and Shinglers: A "roofer" is a person who builds or lays insulation, vapour retarders, built-up or flat-deck roofs, covering roof frames with unitized materials such as tile, slate, composite, wood, shakes, and shingles and metal shingles; application of roof deck waterproofing with modern plastic and rubberized coating materials; and, the damp and waterproofing of floors, foundations and below-grade pipes and tanks with such materials as pitch, tar asphalt, plastic, bitumen and rubberized materials, in any building other than residential premises. Employment is divided between residential and non-residential building construction.

Based on GLOBE’s estimates from BC Stats and Statistics Canada data, there were 2,472 roofers and shinglers employed in BC’s residential construction sector in 2010 with a median full-time earning of $33,842 (from the 2006 Census). Key industry organizations include the Roofing Contractors Association of BC.

The Roofer is a nationally designated trade under the Inter-provincial Red Seal (3 year) program. The trade is regulated under the BC Safety Authority.

Residential Installers and Servicers: Workers in this areainstall and service a wide variety of interior and exterior prefabricated products such as windows, doors, electrical appliances, water heaters, fences, play structures and septic systems, at residential or commercial properties. Companies specializing in specific product installation and service employ them. Employment is divided between residential and non-residential building construction.

Based on GLOBE’s estimates from BC Stats and Statistics Canada data, there were 1,827 residential and commercial installers and servicers employed in BC’s residential construction sector in 2010 with a median full-time earning of $30,840 (from the 2006 Census).

There is no recognized or formal apprenticeship program for residential and commercial installers and services in British Columbia.

Key Occupations

In terms of the business owners surveyed, carpenters were the highest employed group at 60 percent, followed by gasfitters and plumbers (at 59 percent and 57 percent respectively). Other top occupations / trades identified by the business owners who responded to the survey included concrete finishers, electricians, heating technicians, insulators, labourers, painters, plasters/drywallers, and roofers/shinglers. From a statistical perspective, gasfitters, heating technicians, and roofers appear to be over-represented in the survey.

The occupations and trades with the lowest representation identified by respondents include boilermakers, millwrights, elevator constructors / mechanics, heavy-duty equipment mechanics, lathers, log home builders, steamfitters / pipefitters, and welders. These occupations with lower representation do seem to align and support the Construction Sector Council's list of occupations and trades that are less relevant for the residential sector, with the exception of log home builders which have relatively low numbers in the trade.

Of the 110 employees surveyed, approximately one in four (24 percent) were construction managers. Other top occupations / trades for the employee survey included carpenters (13 percent), plumbers (8 percent), electricians (8 percent), and residential home builders / renovators (7 percent). Just over half (57 percent) had either a Certificate of Qualification or a Journeyman ticket. Approximately one out of four (27 percent) of the employees surveyed indicated that they had also received a Certificate of Qualification or Journeyman (Red Seal) ticket in an additional trade or occupation.

Full-time versus Part-time Employment

In terms of employment, four out of five workers surveyed (80 percent) indicated that they were employed full-time (35+ hours/week), either on salary or on an hourly basis. Only a small percentage (1 percent) of the respondents surveyed were employed on a part-time basis while 4 percent indicated they were self-employed (Figure 23).

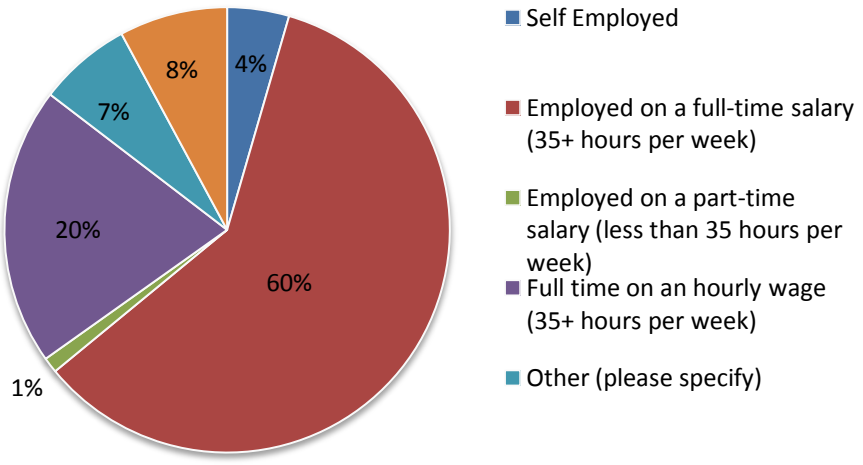


Figure 23: I am currently: (n=89)

Availability of Skilled Labour

In terms of labour shortages, three out of four (75 percent) of business owners surveyed did not face challenges in 2012. Of those business owners who were affected by labour shortages in 2012, more than half (57 percent) felt that the impact of the shortage was manageable. Approximately one out of three (32 percent) identified themselves as being severely impacted with financial losses.

"We are able to maintain what we have but can't grow to the size that we want to be."

Response from business owner survey

As far as finding the appropriately skilled or qualified workers for completing residential construction projects in BC, 66 percent of 311 business owners surveyed indicated that they were not experiencing any difficulty, while 27 percent were experiencing difficulties (Figure 24). For those who indicated that they were currently experiencing difficulties in finding skilled workers, approximately two out of three (68 percent) said that the impact was manageable and that they were working round it.

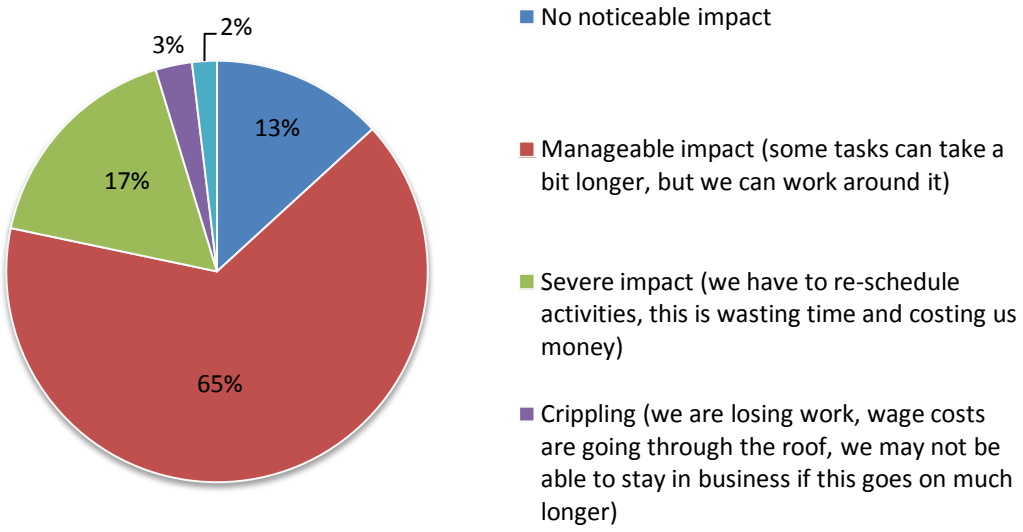


Figure 24: How severe is the impact on your business due to the lack of skilled or appropriately qualified workers? (n = 106)

Of the business owners surveyed who were experiencing problems with hiring workers for their companies, a majority (60 percent) complained of issues finding workers who are properly trained (see Figure 25). Approximately half (48 percent) were experiencing difficulties finding project leaders as well as workers with sufficient on-the-job experience.

"Good site foremen are very difficult to find."

Response from business owner survey

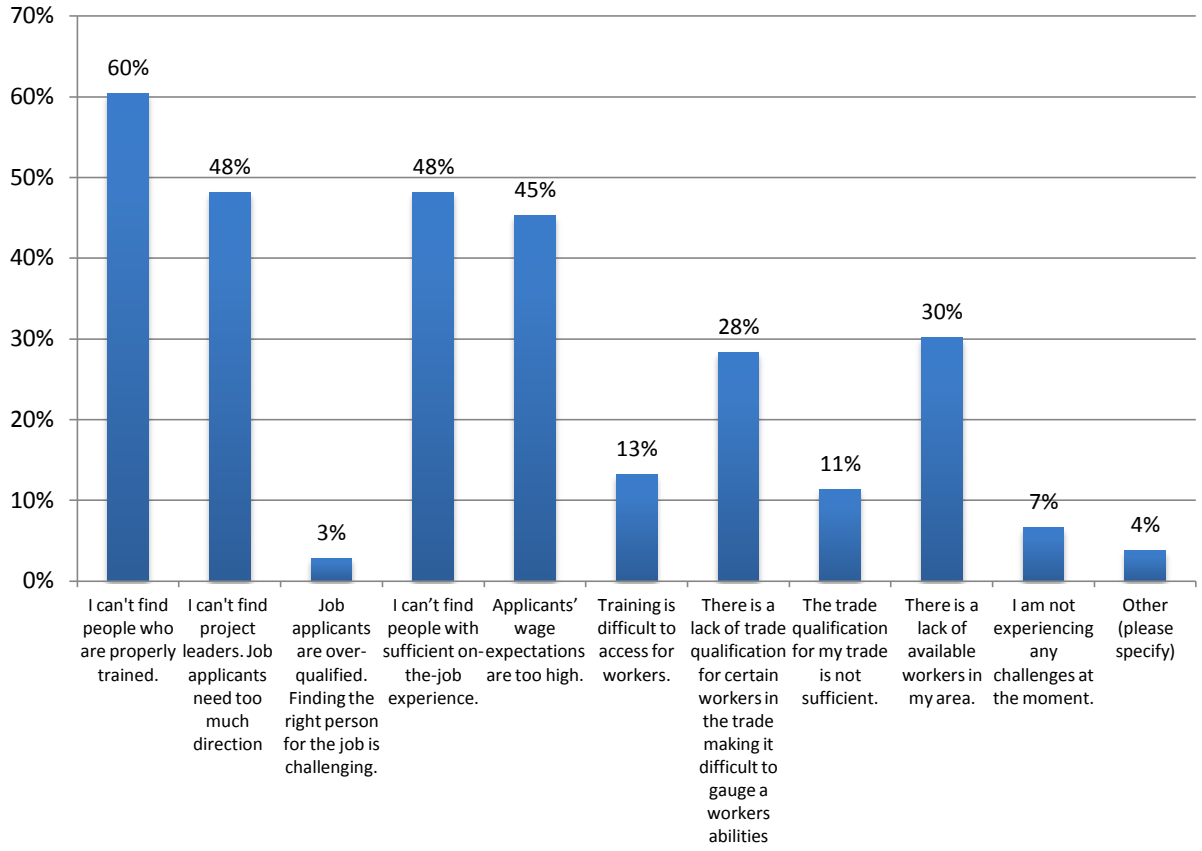


Figure 25: What other challenges are you experiencing in hiring workers for your company? (n=79)

"Sheet metal installation in residential projects requires no formal training or proper installation or design. This make finding properly trained employees hard."

Response from business owner survey

"Many of the gas fitters coming out of school have done little or no gas work – there qualification is simply attached to their plumbing ticket. The current gas ticket program for a B fitter is of no use."

Response from business owner survey

Insights from Industry Consultation

Several residential construction workforce related themes were raised during interviews and focus group discussions as part of this study. The key points are summarized below.

Shifting Society's Perceptions with Respect to Work in the Trades

There was an underlying conversation around the societal and perceptual challenges that act as barriers to entering the trades. Many felt that there is a need to elevate the perception of trades in general – that a shift in perception was needed, even before the high school level, to make the trades an acceptable career path.

Efforts need to be made to engage with key influencers (parents of high school students, career counselors, etc.) and to educate them about the potential opportunities for students who start their careers with an apprenticeship. There are programs in BC, which provide high school students with exposure to the trades (such as the College of New Caledonia's Career Technical Centre or CTC program[10]) and there are programs which offer "pathways" from apprenticeship to technology diplomas (such as WoodLINKS[11]). These programs need to be actively promoted and, where appropriate, replicated in other jurisdictions and for other trades.

Growing Skilled Labour Shortages and Competition with Other Sectors

Two major factors driving concern within the industry relate to: 1) the current labour force demographics and 2) the growing competition for limited skilled workers from the ICI sector and growing natural resource industries. There is fear that there will not be enough apprentices going through the various programs in order to meet the coming demand and that residential construction is a "poor cousin" to other potentially more lucrative (although possibly more routine, repetitive, and "messy") opportunities in other industries / sectors.

High rates of imminent retirement within the residential construction industry will start to impact the availability of seasoned, qualified, and experienced workers within the next 10 years. There will be fewer mentors to train the next generation and very few of the business owners in residential construction have made adequate succession plans.

The competition for labour with the oil and gas and other natural resource sectors in BC and Alberta is intensifying with demand expected to outstrip supply in the coming years. This is felt particularly acutely in northern parts of the province, although the effects are impacting all areas. As examples, direct flights to Fort McMurray are now available from Nanaimo and workers in Kamloops are being sought for the major camp-building companies such as "Northern Trailer" (Horizon North Logistics Inc.).

Once workers have been lost to other industries, it is often difficult to entice them back. Having invested in apprentices in the past and then lost them, some residential construction companies are now very cautious about investing in apprentices again. This problem is known to companies that have never hired apprentices, reinforcing their resistance to do so.

> **"The pickup of apprentices is really low for residential. The reason for that is when they are in training they're not very productive. As they get more experienced, poaching is common or they'll become their own self-employed contractors."**
>
> ***Interview with an Industry Association / Organization***

[10] http://www.cnc.bc.ca/CNC_Programs/ctc.htm
[11] http://www.woodlinks.com/home.html

Wage expectations are a major challenge. Companies in residential construction are small and predominately non-unionized. They are either unwilling or unable to offer compensation and/or job security benefits at levels found in other sectors. There may be a lack of appreciation of the benefits of working in residential construction among job seekers (e.g., it is a "clean" industry, the work is varied, projects finish faster, good workers can move up faster or start their own businesses, etc).

A strategy for retention with some of the larger residential construction companies is to try and pay more than the residential construction industry average and to offer financial incentives (including paid vacations, spiffs, commissions, and/or top up EI payments when apprentices are away training) in order to retain good employees.

Raising the Professional Bar within the Residential Construction Sector

Because employers are reluctant to invest in training, there is a lack of value ascribed to professional credentials. Hiring is currently based on the reputation of the previous employer and on-the-job performance during a probationary trial period.

Industry leaders recognize that to attract competent workers, the residential construction sector needs to establish a credentialing program to not only provide new recruits with confidence that they are entering a serious and long-term profession, but also to define career pathways within the industry. Contractor qualifications will also be important as building performance regulations are rolled out. In BC, there are no organizations representing buyers of new homes or consumers of building construction services. Furthermore, work is needed to determine whether the home-buying public would value and/or positively discriminate in favour of qualified builders. A lack of training in customer service may also be having an impact on the professionalism of the industry in general.

> **"At the moment, there are no barriers to entry to becoming a builder – there are some dreadful builders and the public can't tell the difference."**
>
> ***Interview with Training Provider***

The regulation of certain trades (e.g., plumbers, electricians, gas fitters, etc.) means that there are benefits to the apprentice completing the training program. However, there is less perceived value in the marketplace to completing a carpentry apprenticeship because it is believed that the qualification does not bestow any special benefits. For example, a Certificate of Qualification is not required to secure a building permit. Some felt strongly that there is a need to raise the value of the Carpentry Certificate of Qualification / Red Seal so that it is better recognized by employers.

However, the carpentry trade encompasses a wide range of skills and there was debate as to the value of a residential-specific designation. Some felt that it would help to establish specific skills in the face of limitations of current log-book tracking while others thought that there would be little uptake of residential-only apprenticeships given the lack of mobility and flexibility it would offer.

To attract workers from other jurisdictions, as well as to qualify older workers in the industry (to take on apprentices), there is a need for an aptitude or "challenge" test (based on PLARs) that will recognize the experience and skills sets of homebuilders working in the industry but who are not formally "certified". It was feared that simply "grand-fathering" in existing workers will perpetuate some of the current issues with lack of knowledge, quality in skills, and professionalism. Some also felt that homebuilders should become more involved in self-regulating and raising their requirements in order to stem the lack of professionalism. However, others cautioned against self-regulation given public reaction to attempts by other groups in BC to do some (e.g., BC Teachers' Federation and the RCMP).

Increasing Specialization versus the Value of Transferable Skills

With the push towards energy efficiency and high performance buildings, residential construction requires an increasingly integrated approach between trades and yet, in the quest for improved efficiency, paradoxically, there is a trend toward increasing specialization with growing numbers of trades' workers focusing on sector-specific skills such as roofing, building envelope, finishing and framing, and mechanical systems.

Unlike many developed countries (e.g., in Europe, Japan, etc.), Canada still operates under a predominately prescriptive building code which, while ensuring minimum fire and life safety standards, does not impose particular performance criteria onto builders and this has made it easy to disaggregate responsibilities and tasks. As codes change to be more performance-based, the disaggregation may create challenges, added risks, and liabilities.

There is a small but growing number of businesses which specialize in passive-house construction, pre-fabrication, and other high-performance systems are increasingly looking for skills such as computer-assisted drafting (CAD), detailing, and an understanding of building sciences when hiring carpenters. Until such workers become available locally, these employers often recruit their skilled workers from Europe.

While some in urban centres felt that it is important to know how to do a range of carpentry work, they felt that it can be difficult to make a living out of it due to more intense competition and that it was better to become specialized and market their businesses accordingly. On the other hand, in more rural communities in BC, it is necessary to be flexible and able to work on projects in a variety of different sectors (residential, commercial, industrial, etc.). Specializing or having specialized technicians is only beneficial for some of the larger operations that might be doing many houses per year.

While there are many aspects of home building that are unique to the construction industry as a whole, compatibility and transferability between sectors is important for ensuring market resiliency. Workers with transferrable skills are more valuable to business owners, allowing them to take on a range of projects and activities.

> **"The most valuable employee is one who is not one-dimensional – a 'jack-of-all-trades'."**
>
> ***Kamloops focus group***

It is considered by many that individuals with multiple qualifications (double journeymen tickets for example) get all the jobs, which reinforces the need for workers who can integrate and see the bigger picture. Many see the residential construction sector as a "breeding ground" of a certain set of skills that can be applied later in other construction sectors as the apprentice moves on – emphasizing the need for transferable skills. Some claimed that a specific residential program was not needed, but rather there was a need to develop a platform that allowed the ability to specialize in residential construction.

> **"The specialized skills that the current training system provides pigeonhole apprentices too much. The value in today's economic climate is in versatility – breadth-focused training rather than depth."**
>
> ***Interview with Contractor / Tradesperson***

It is true that in some aspects of carpentry and HVAC, residential construction does not share the same training and education needs of the institutional, commercial, and industrial (ICI) construction sector. However, opinions varied as to whether residential construction was more complex (demanding additional training over the standard apprenticeship) or less complex than other construction activities (meaning that apprentices could be qualified for residential work ahead of other types of construction).

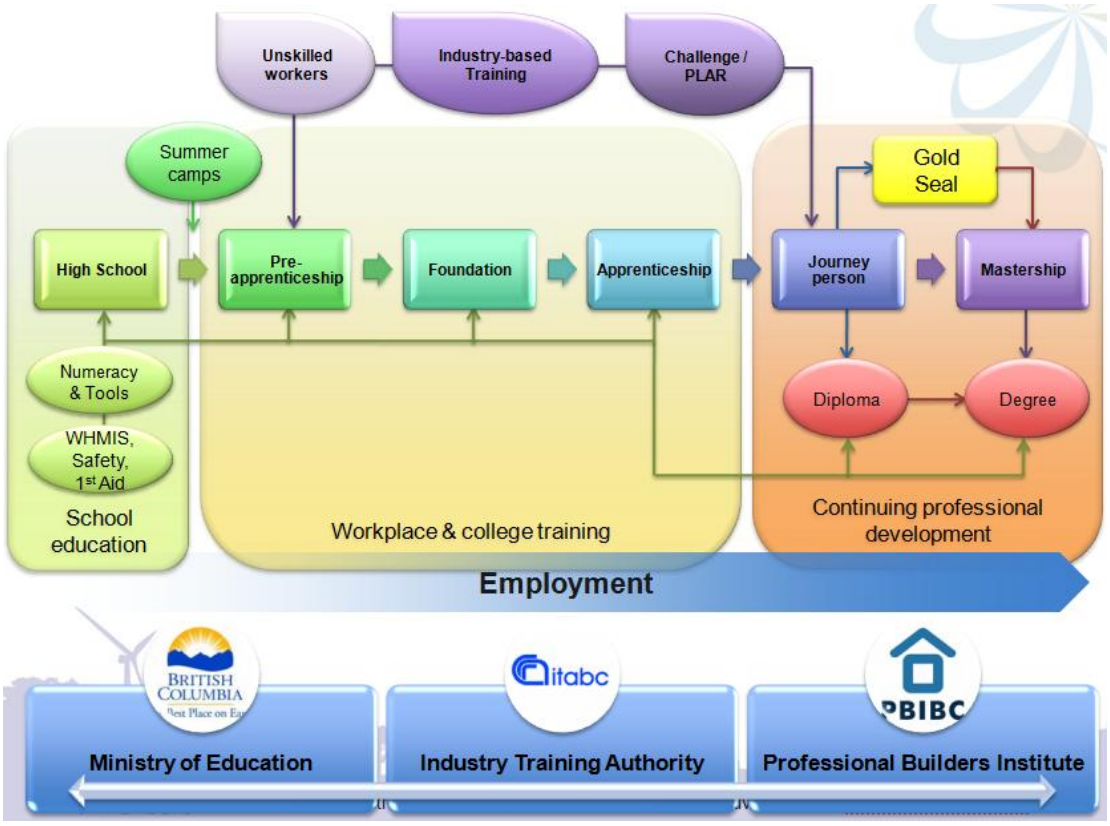
While some thought that there was not enough emphasis put on the needs of the residential construction industry by the ITA and that there should be separate ITA exams for residential construction, few felt that there was value in residential-only training in place of traditional apprenticeship training. No one suggested that apprentices were over-qualified upon completion of their training.

As illustrated if Figure 26 below, formal education and training for the residential construction industry in BC starts as early as the middle and high school years through programs such as ACE IT and Yes-2-It and initiatives such as the Career Technical Centre (CTC) at the College of New Caledonia. Foundation programs for pre-apprenticeship ladder into Levels 1 and 2 of apprenticeship training for the trades. Once indentured, apprentices can move through their training and log hours on the job site in order to gain their Certificate of Qualification to become a journeyperson and/or Red Seal if relevant.

The more formal apprenticeship pathway is supported financially by the Provincial Government in BC and overseen by the Industry Training Authority (ITA), a provincial government agency mandated to facilitate training in the trades and industry occupations in the province.

For many residential construction occupations, much of the learning happens on the job. The role of industry associations, organizations, and labour unions in terms of providing training programs and courses, educational seminars, and continuous professional development is critical. Ongoing learning opportunities also exist for journeypersons who seek out construction management through programs such as Gold Seal and/or technical diploma programs at post-secondary institutions such as BCIT and Thompson Rivers University (TRU). In addition, more advanced "master-level" training and degree programs in construction, which are more common in Europe for example, may have a place in BC's residential sector in the future as professionalism and public perceptions around the trades begin to shift.

This section looks at both apprenticeship and more general occupational training, providing a statistical overview and insights from the industry survey and consultation processes.

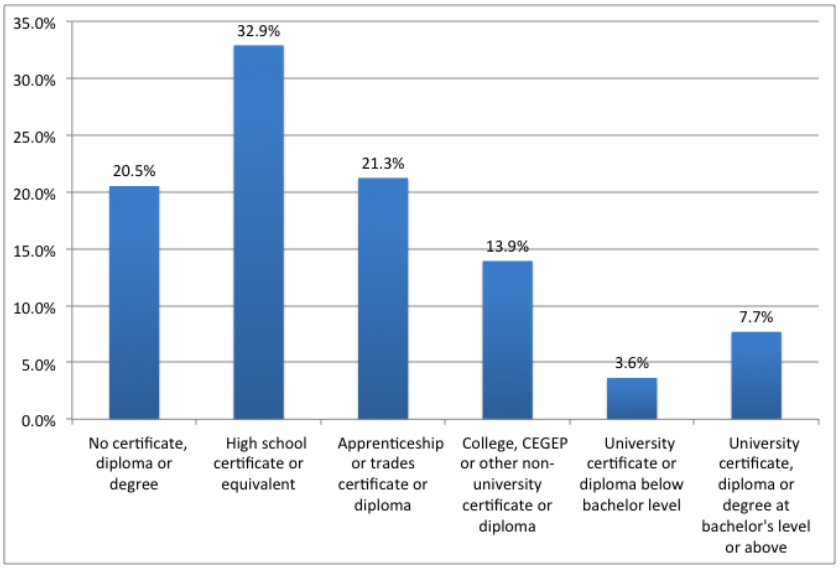


Source: GLOBE Advisors

Figure 26: Pathways for residential construction education, apprenticeship, training, and continuous learning in BC.

Statistical Analysis

One in three (33 percent) residential building and specialty trades workers in BC have obtained a high school certificate or equivalent and one in five (21 percent) have an apprenticeship or trades certificate / diploma (as illustrated in Figure 27 below).



Source: 2006 Census

Figure 27: Total labour force by highest certificate, diploma, or degree (residential building and specialty trades industries, British Columbia).

Apprenticeship Training in BC

Statistics Canada and the ITA both publish statistics on active apprenticeship registrations. While both these sources are highly useful, one must be cautious when examining both sources as Statistics Canada and the ITA work with different definitions.

Statistics Canada utilizes a highly aggregated set of occupations which do not specifically match any the specific trade groups used by the ITA. Nonetheless, the Statistics Canada database provides certain important details that the ITA does not report on including the age groups for active apprentices and the number of people obtaining their “ticket” through the challenger route versus the more traditional apprenticeship route.

The Statistics Canada database on apprenticeship training for each province (including British Columbia) provides information on individuals who receive training and those who obtain certification within a trade where apprenticeship training is being offered. Specifically, the survey compiles data on the number of registered apprentices taking in-class and on-the-job training in trades that are either Red Seal or non-Red Seal and where apprenticeship training is either compulsory or voluntary. It also compiles data on the number of provincial and interprovincial certificates granted to apprentices or trade qualifiers (challengers).[12]

The next few charts and related discussion points summarize the key facts from this Statistics Canada apprenticeship database that are useful for the larger study on apprenticeship training models. It should be noted that the Statistics Canada apprenticeship groups are much more aggregated than the training groups used by the ITA.

[12] Registered Apprenticeship Information System (RAIS)

Figure 28 below illustrates the young age profile of these residential construction-related active apprentices. More than two-thirds of these registered apprentices are under 30 years of age.

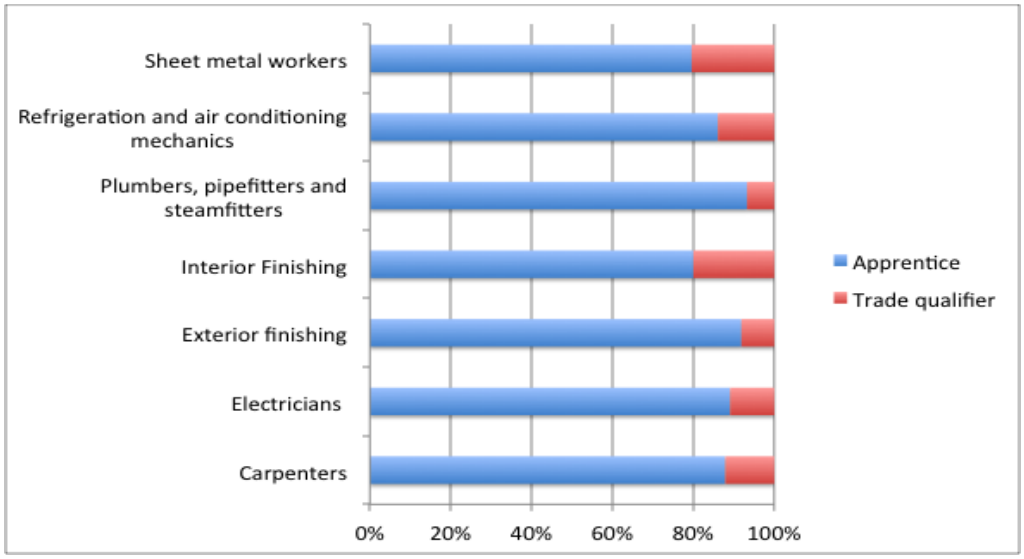
	Under 20	20-24	25-29	30-34	35-39	40-44	45-49	50 Plus
Carpenters	15.7%	33.0%	23.8%	13.0%	6.5%	3.9%	2.3%	1.8%
Electricians	8.8%	31.7%	26.1%	14.9%	9.0%	4.9%	2.7%	1.8%
Exterior finishing	8.2%	28.0%	26.7%	14.4%	9.3%	6.3%	4.3%	2.7%
Interior finishing	14.2%	27.3%	24.3%	13.6%	7.4%	5.0%	4.1%	4.1%
Plumbers, pipefitters and steamfitters	8.7%	30.2%	26.5%	14.9%	8.8%	5.1%	3.5%	2.2%
Refrigeration and air conditioning mechanics	2.9%	25.7%	27.0%	19.0%	9.8%	7.9%	5.1%	2.2%
Sheet metal workers	4.6%	35.0%	27.6%	15.3%	7.9%	4.9%	2.6%	2.1%
Total	10.9%	31.2%	25.5%	14.3%	8.1%	4.8%	3.0%	2.2%

Source: Statistics Canada, CANSIM Table 477-0053

Figure 28: Age profile of registered apprentices in specific residential construction related trades in British Columbia, 2010.

Another interesting set of facts published in this apprenticeship database is the number of people being registered through the apprenticeship delivery model versus the “trade qualifier” or TQ model. A trade qualifier (challenger) is an individual who received training within a trade where apprenticeship training is voluntary and did not register for the apprenticeship training but succeeded in obtaining their certification within that trade.[13]

Overall, 89 percent of registrations were obtained through the apprenticeship route and 11 percent by the TQ process (Figure 29).



Source: Statistics Canada CANSIM Table 477-0055

Figure 29: Apprenticeship versus trade qualifier by trade group.

[13] Registered Apprenticeship Information System (RAIS)

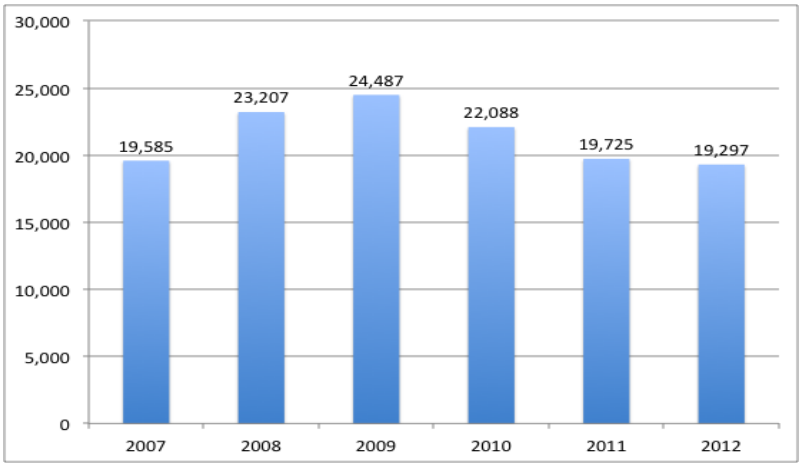
The Industry Training Authority (ITA) publishes data on an annual basis on active apprentice registrations. The following grid (Figure 30) shows active apprenticeships in British Colombia for each trade group relevant to the residential construction sector.

ITA Trade Group	FY 2006/07	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12
Electrician	5,543	6,404	6,791	6,099	5,742	5,783
Carpenter	5,749	6,891	7,401	6,278	5,454	5,053
Plumber	2,758	3,312	3,509	3,222	2,807	2,648
Heavy-duty equipment mechanic	1,074	1,153	1,130	1,031	894	1,022
Refrigeration and air conditioning mechanic	540	633	669	703	729	731
Ironworker and structural metal fabricator and fitter	84	121	570	689	558	638
Sheet metal worker	859	1,028	1,029	841	686	588
Roofer and shingler	462	393	598	639	562	564
Painter and decorator	256	356	377	354	304	355
Glazier	291	393	386	345	306	308
Gasfitter	206	342	364	303	268	298
Heavy equipment operator (except crane)	17	134	198	160	148	254
Residential framing technician	1,082	1,138	478	417	295	203
Bricklayer (Mason)	211	251	278	229	283	183
Architect sheet metal workers	49	69	71	149	169	182
Concrete finisher	143	202	232	186	171	147
Insulator	100	104	132	149	117	140
Plasterer, drywall installer and finisher, and lather	61	70	118	152	117	106
Tilesetter	53	51	6	65	51	60
Heating technician	0	58	79	40	30	28
Geothermal technician	0	0	1	10	10	3
Log home builder	8	80	55	23	22	2
Building Envelope Technician	13	9	3	3	2	1
Residential formwork technician	23	14	7	0	0	0
Total	**19,585**	**23,207**	**24,487**	**22,088**	**19,725**	**19,297**

Source: Industry Training Authority Annual Reports 2007 to 2012

Figure 30: Active residential construction related apprentices by ITA trade group, 2006-2012.

Figure 31 illustrates the change in the total number of active ITA residential construction related apprentices in BC from 2007 to 2012.



Source: Industry Training Authority Annual Reports

Figure 31: Summary of active ITA residential construction related apprentices in British Columbia, 2007-2012.

Training Providers

In British Columbia, apprenticeship programs are delivered through both public (government-funded) and private training providers. There are 13 public universities, colleges, and technical institutes in BC that offer some form of apprenticeship or trades training related to the residential construction sector, some with multiple locations or campuses across the province. These include:

- BC Institute of Technology;
- Camosun College;
- Kwantlen University;
- Okanagan College;
- Vancouver Island University;
- Thompson Rivers University;
- the College of New Caledonia;
- the University of the Fraser Valley;
- Selkirk College;
- North Island College;
- Northwest Community College;
- College of the Rockies; and
- Northern Lights College.

Private training providers include industry associations and training institutes such as the RCABC Roofing Institute, the Trowel Trades Training Association (TTTA), the Finishing Trades Institute of BC, and the BC Wall and Ceiling Association; private colleges such as Sprott-Shaw and the Pacific Vocational College; and labour unions such as the International Brotherhood of Electrical Workers (IBEW) Local 213 for electricians and UA Piping Industry College of BC for plumbers. In addition, a number of private community-based and First Nations training providers exist.

High schools also play a role in terms of offering Foundation and youth-focused programs such as “ACE IT” and “Yes-2-It” that act as feeders into apprenticeship programs throughout the province.

Accessibility and scheduling varies for the different programs across the province with some programs experiencing long waitlists. Some apprenticeship programs for occupations such as carpenters and electricians are common and offered throughout the province while others, such as the Heating Technician and Glaziers, are offered at only a few locations province-wide. The bricklayer (masonry) program is only offered at one location in BC at the moment (i.e., Surrey) through the TTTA.

Other Occupational Training in BC

While apprenticeship training is relatively well-structured and managed through the ITA, additional education, training, and continuous professional development is slightly more ad hoc in nature, often designed to deal with upgrades to building codes, emerging technologies, and evolving construction practices and sometimes as "stop gaps" to address issues that arise in the industry.

One case in point is BC's leaky condo problem. The Homeowner Protection Office (HPO), now part of BC Housing, was created in 1998 after the passing of the "Homeowner Protection Act", designed to protect buyers of new homes from such construction-related issues. HPO runs ongoing industry and building seminars to inform industry of the latest technologies, practices, and changes in the BC Building Code.

The HPO also established a collaborative process with the residential construction industry to develop a new system of prescribed qualifications for homebuilder and developer licensees which includes core competencies for different categories of licenses, educational benchmarks, training programs, and professional development requirements. As a result, the Professional Builders' Institute of BC (PBIBC) was created in 2010 as an independent body for the purpose of assisting government with the implementation and on-going review of prescribed qualifications required for licensed builders.[14] It should be noted that until updates to the Homeowner Protection Act with respect to prescribed qualifications for licensees are passed into law, the role of the PBIBC is yet to be determined.

Industry associations and regulatory bodies such as WorkSafe BC and the BC Safety Authority, as well as power and gas utilities such as BC Hydro and Fortis BC, also offer training and professional development workshops relevant to residential construction.

As one example, CHBA BC offers 12 online courses through the Canadian Home Builders' Institute (CHBI) that count toward their certification programs such as the Registered Housing Professional, Certified Residential Builder, Registered Renovation Professional, and Certified Renovator.[15] These include:

- Business Planning and Management
- BC Building Code for Single Family Dwellings
- Built Green® Builder Training
- Construction Law
- Financial Management
- Marketing and Project Sales
- Project Management and Site Supervision
- Certified Energy Advisor Training Course
- Communication & Negotiation
- Building Science for Renovations
- Service & Warranty
- House-as-a-System Seminar - FortisBC

In 2012 alone, some 264 students attended CHBI courses, with the Built Green® Builder Training and the Certified Energy Advisor Training courses as two of the most popular.

[14] See: http://pbibc.ca/
[15] See: www.learnyourliving.ca

Apprenticeship Training

The on-line survey sought to document industry support for or against the apprenticeship training in BC and identify issues, challenges, and opportunities to improve the training model.

Figure 32 illustrates the opinions of the business owners surveyed on whether or not apprenticeship training in BC is better suited to commercial / institutional / industrial construction projects versus the residential sector. In terms of those with an opinion, approximately six out of ten (59 percent) felt that the apprenticeship model is suitable for residential construction. Nearly one out of three respondents (31 percent) was not sure.

"The carpentry program is ideally suited to residential not commercial where they tend to do only one specific task all the time."

Response from Business Owner Survey

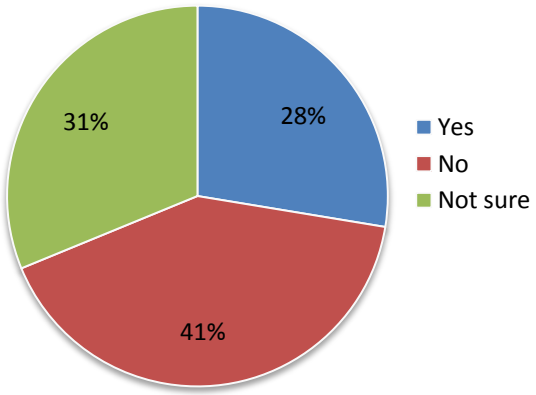


Figure 32: Do you think that apprenticeship training in BC is better suited to commercial / institutional / industrial construction projects than to residential construction? (n=301)

However, when business owners were asked to describe the apprenticeship training model in BC as it relates to the needs of their companies in-line with work in residential construction, a wide range of responses were received. Approximately one out of three (29 percent) indicated that either they did not know or were not comfortable answering the question (Figure 33). Of those who had an opinion, three out of four (75 percent) said that at least some changes would be good.

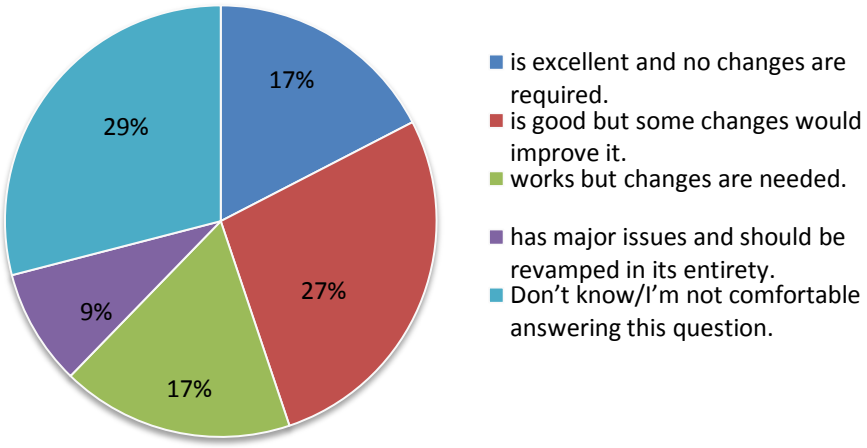


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Figure 33: Which best describes the apprenticeship model in BC as it relates to the needs of your company and its work in the residential construction industry? (n=310)

As illustrated in Figure 34, top issues identified with respect to apprenticeship training in BC as it relates to the needs of business owners in residential construction included that:

- Apprentices are not skilled enough for the needs of the industry (34 percent);
- It is difficult to dedicate time to training apprentices (25 percent);
- Apprenticeship programs are not updated enough in terms of adding new skills and new technologies (25 percent); and
- It is difficult to retain apprentices due to the cyclical nature of the industry (22 percent).

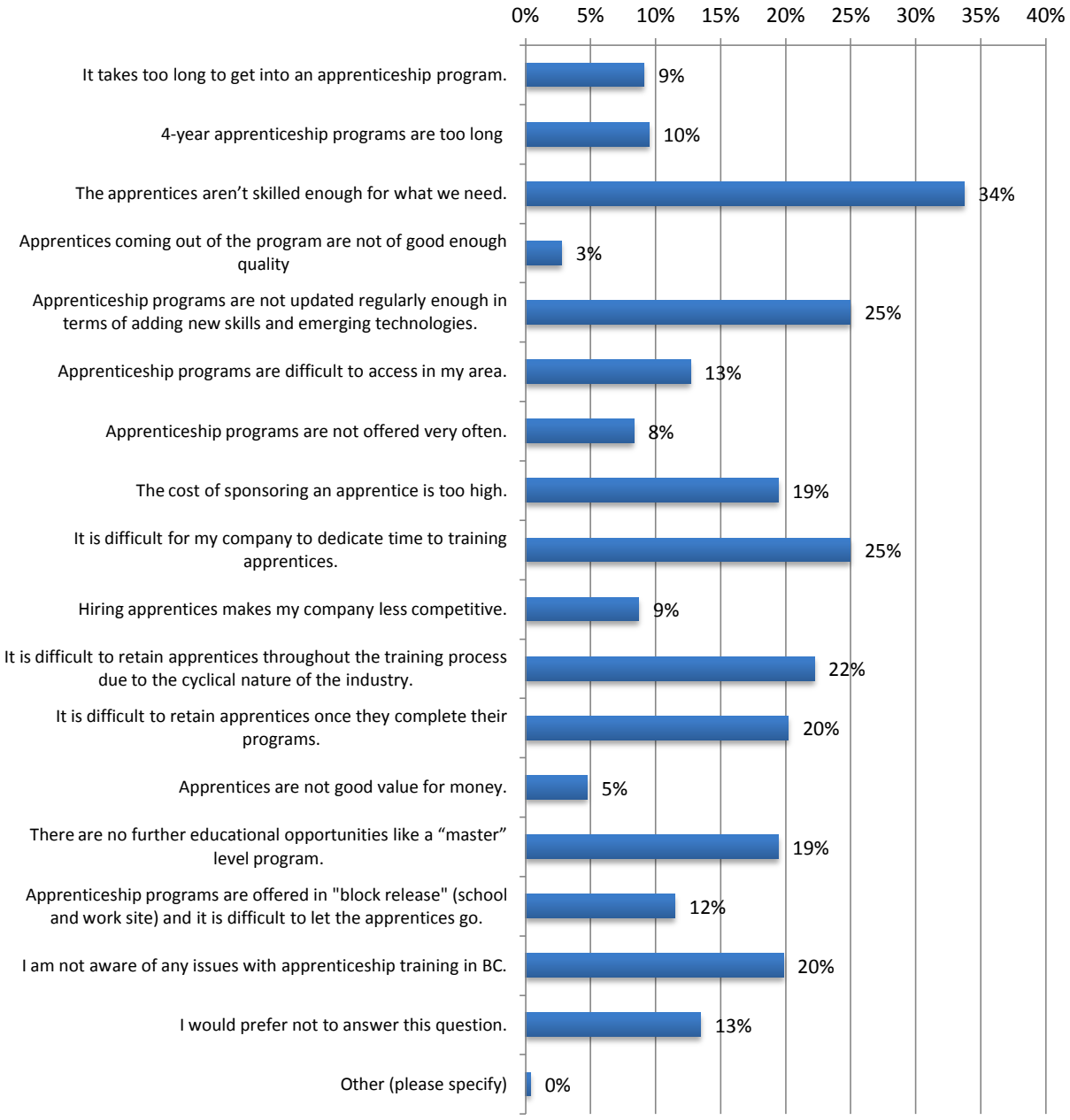


Figure 34: In your opinion, what are the issues with the current apprenticeship training model in BC as it relates to the residential construction industry? (n=252)

"A general carpenter's ticket is outdated by 30+ years. A carpenter's ticket has some good but very general training. Onsite, a carpenter needs to do some cribbing, framing, finishing, install windows and doors, install reinforcing steel in footing, slabs, and so on."

Response from Business Owner Survey

"It would be helpful if all trades where provided with a course on "House as a System" and training on how each trade impacts the other. An example of the challenge at the moment might be when an electrician doesn't understand the importance of air, weather, and vapour barriers and the problems that can occur if the barriers are damaged and not repaired. Another example is a heating technician that doesn't understand the structural consequences of drilling a hole through a parallam to run his lineset."

Response from Business Owner Survey

"Carpentry should have a minimum of 10,000 hours."

Response from Business Owner Survey

"There is a need for more on-the-job experience. A lot of guys with tickets aren't as qualified as those without".

Response from Business Owner Survey

"Programs should omit portions of training that don't apply to the carpentry trade any longer (e.g. window sash construction).

Response from Business Owner Survey

"We find it frustrating in the North when guys have to go to school during construction season."

Response from Business Owner Survey

"We have hired certified Red Seal carpenters and to be honest, it doesn't mean anything. It depends on where they apprenticed and the experience they gained. In general, we have found people who trained with an experienced carpenter for years have much more practical knowledge and creative skills than anyone coming out of the apprenticeship program through school."

Response from Business Owner Survey

Employees surveyed also had mixed feelings on the relevance of apprenticeship training in-line with their occupations / trades. Approximately half (49 percent) of the employees surveyed felt that the current apprenticeship training model in BC was effective in terms of its ability to train people for their occupation / trade while nearly one in three (29 percent) felt that it was not (Figure 35).

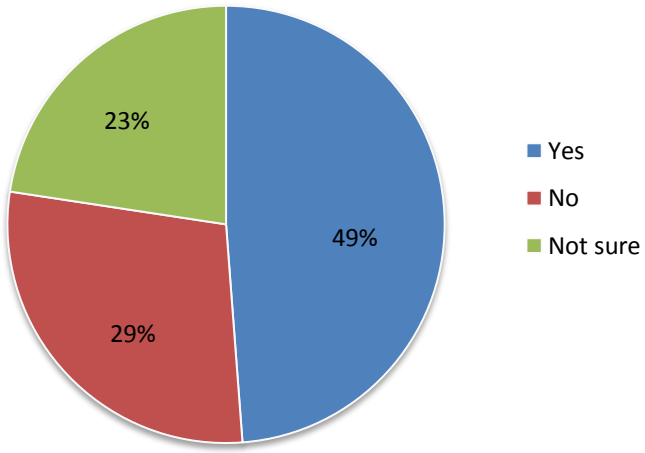


Figure 35: Is the current apprenticeship training model in BC effective in terms of its ability to train skilled workers for your occupation / trade? (n=84)

"Apprentices and journeymen are a great way to become very highly proficient at your chosen field. It is what separates 'handymen' from professionals. More funding and support should be provided to maintain/promote this type of training."

Response from Employee Survey

"Residential contractors do not focus on the technical training required to perform work safely. Without apprenticeship, the risk of serious injury will increase."

Response from Employee Survey

"Residential construction requires workers to be versatile, creative, and able to interact professionally with home owners and other stakeholders. My classroom training was decent, but it did seem to focus more on producing worker drones than proud, professional people with wits as well as manual dexterity."

Response from Employee Survey

"The system currently trains apprentices to be knowledgeable in all their areas instead of the "specialized" approach, which make for better trades people who are multi-skilled. However, more time in school must be provided to add the additional skills and training required for new technologies."

Response from Employee Survey

Other Occupational and "In-house" Training

Two out of three (65 percent) of the business owners surveyed recognized occupational training and continuous professional development (CPD) as important. An even higher number of employees surveyed (four out of five or 81 percent) felt that their companies recognized professional development courses as important.

Many find that CPD is essential in order to stay current with changing building codes and emerging technologies and are willing to take seminars and additional courses to help them become more competitive, so long as the courses / training is relevant and accessible. Some even had suggestions as to how to improve the continuous learning process.

> **"There was a lack of applicable training during my apprenticeship in newer technologies without an option for most people to add new skills or retrain later in their careers. It would be great if a journeyperson was able to add skills with subsidized training (like in apprenticeship). Also, there is an obvious need for a rigorous certification model, so that everyone has a common goal regarding expectation, training outcomes, and enforcement of best practices."**
>
> ***Response from Business Owner Survey***

Three out of four (73 percent) of the business owners surveyed had attended a knowledge-based industry training or CPD course. This percentage was very similar to the results from the employee survey at 71 percent. Programs identified as adding value to companies active in the residential construction sector included:

- Homeowner Protection Office (HPO) seminars;
- CHBA courses;
- LEED AP training / education;
- Building envelope training;
- Courses offering building code updates;
- Industry association run courses and programs;
- Diploma programs from post-secondary institutions;
- Short courses on residential-specific technologies and specialties;
- Interior design, architectural drafting, and related technology;
- First aid and safety training; and
- Business, construction management, and customer service training.

> **"My company values safety training of any kind, as well as supervisory and leadership, personal / professional development (from time management to industry / manufacturer seminars and qualifications)."**
>
> ***Response from Employee Survey***

> **"Anything HVAC/R related in the way of seminars, advanced training, upgrade training."**
>
> ***Response from Employee Survey***

Insights from Industry Consultation

Feedback from consultations with industry through the in-depth interviews and regional focus groups with respect to education and industry training as it relates to the residential construction sector in BC could be categorized into four broad areas or "buckets", as illustrated in Figure 36 below. Information could be tied to the various stages of education and training from *pre-apprenticeship*, through the various *apprenticeship and training* programs, and on to *continuous learning*. The fourth category was around *regulation / enforcement and incentives*, which had an impact on the other three to some extent. The insights gathered through the industry consultation process are presented below under each of the four different areas.

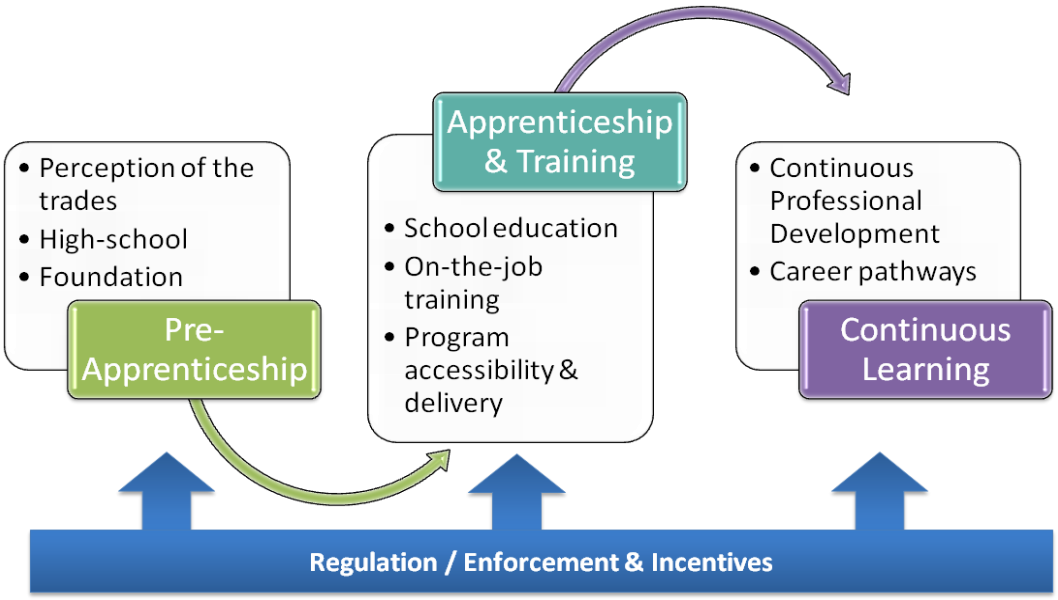


Figure 36: Opportunities and challenges with respect to education and training in BC's residential construction sector, identified through consultation with industry, were categorized as "pre-apprenticeship", "apprenticeship and training", "continuous learning", and "regulation / enforcement and incentives".

Pre-Apprenticeship

Preparatory Education and Hands-On Experience

It was suggested that some youth coming out of high school would do better in the construction workforce if they had a better understanding of what was involved and developed more life skills before they entered the workplace. Preparatory exposure to the trades, more hands-on learning, and pre-apprenticeship training may be helpful in terms of addressing some of the issues.

Some feel that having minimum qualifications or pre-requisites before entering apprenticeship programs would be a good idea. Apprentices spend a lot of time on safety and some of this could be learned before getting into Level 1, potentially as "Work Safe BC" modules in high school. Pre-apprenticeship type programs or courses taught in high school could offer other practical training such as WHMIS, first aid, basic tools including the air gun ticket, traffic flagging, confined space training, fall restraint, and numeracy (e.g., imperial versus metric measurements).

"At the moment, first year (Level 1) of apprenticeship programs focus a great deal of time on developing skills that could be pre-requisites – including areas such as math, physics / science, and safety. By front-loading more of this into high school or preparatory-courses could free up a lot of time in Level 1 for other more relevant curriculum topics."

Interview with Training Provider

Another systemic challenge might result from the structure of the current system which demands a high degree of commitment from youth right from the beginning of the trade / apprenticeship programs. Apprentices have very few options to "shop around", explore their aptitudes and interests, and try out different foundational courses in order to become better aware of the available program options. This results in high dropout rates because the apprentices change their minds as they get further into the programs and decide it's not for them. Well-designed "discover apprenticeship" type programs in high schools might help to address this issue.

Finally, an opportunity was identified for developing an experiential learning program that would encourage youth (at the K-12 levels) to develop construction-related skills, work with their hands, develop understanding of basic mechanical concepts, etc. This could potentially take the form of a summer camp to be supported through a municipal parks and recreation department.

Apprenticeship and Training

Lack of a "Culture of Apprenticeship" in Residential Construction

It was stated that there is a lack of apprenticeship culture in the residential construction sector in BC. A variety of reasons were provided for this. Some companies have found that as apprentices move up through their programs, there is an inflationary effect on wage expectations, often disproportionately to what a certified individual can actually do. As such, some feel that apprentices aren't worth the money and can't afford to keep them.

"There should be a unique financial model for residential construction [apprenticeship training] – homebuilders do not want to pay to train their apprentices or employees."

Interview with an Industry Association

It can be a challenge for apprentices to find employers in the residential construction sector. The majority of residential construction companies are small (many are sole operators and most have less than five employees), apprenticeship is seen as a major investment in cost and time. Many business owners are not qualified themselves and are therefore legally ineligible to take on an apprentice.

A recent study put out by the Canadian Apprenticeship Forum found that only 19 percent of employers capable of hiring apprentices actually do – a point that was reinforced as an issue for residential construction in particular (although survey findings from this study show that of the business owners surveyed, 50 percent had an apprentice working as a full-time employee). This contributes to the issues around low completion rates for some apprenticeship programs. It was suggested that there needs to be closer linkage between employers and available apprentices (via a job posting board, instructor testimonials, information about how to hire an apprentice and what is involved, etc.).

While many companies stated that they often “hire for attitude and train for skill”, some companies choose not to train apprentices on more than one thing as they are afraid of “training their competition” in case they leave and become independent sub-contractors. As such, it was suggested that employers need to be given some sort of incentive to train an apprentice on more than one thing.

Ideas such as “apprentice share” programs were suggested by some however, others were concerned that such a structure would not work because companies are worried about losing their workers to the competition. There’s the mentality that once a company has spent time training an apprentice a certain way, they are more efficient at their work and don't want to give him or her up to others in the industry.

The lack of regulations requiring certified and/or qualified trades to be working on residential construction projects and limited union involvement in the sector are additional factors that affect the lack of apprenticeship “culture”.

The Need to Update Programs and Curriculum with Linkage to Building Code

There was some concern that apprenticeship programs are not being updated regularly enough in terms of addressing the need for emerging skills and new technologies – particularly in-line with changes to building codes in the province.

Others stated that some of the program curriculum being taught is outdated and is taking up valuable instruction time when it’s not relevant to the needs of the industry in BC and the work that is done on site. For example, it was mentioned that in the second year for concrete forming apprenticeship program, trainees are still being taught how to use systems and machinery that we haven’t been used on the site over a decade.

In addition, some apprenticeship programs don’t go far enough in terms of their technical training. As an example, it was noted that instructors are currently having to “force-feed” their Level 2 plumbers hydronic heating over 5 days when it should take closer to two weeks for students to grasp the important technical components required for working with these specialized technologies; it’s mainly theory that is taking up the majority of the time.

The idea of running an up-to-date “showroom” for apprentices at school was provided in order to give trainees continued exposure to new technologies and to ensure students always familiar with the newest materials when they encounter them in the marketplace.

These issues tie in to the ability of instructors limited budgets, time, and ability to teach expanded and updated curriculums – some of whom are bound by collective agreements and may not have worked in the industry for a number of years.

While apprenticeship programs managed by the ITA do go through annual maintenance cycles and regular review periods (every five years or so), Additional structural issues exist in terms of updating programs as to their relevance to the residential construction sector in BC – particularly if they are Inter-Provincial Red Seal programs where curriculum and program standards are controlled at the federal level, driven by National Occupational Analyses (NOAs). For program changes and modifications to be made to provincial programs, there must be support for these changes documented by industry and brought forward to the ITA through relevant Industry Needs Analyses (INAs) and proposals and the changes to standards must be approved by the ITA’s Standards Review Committee.

In addition, there is no forum at the present time for developing consensus on emerging building code requirements as they relate to training. There is an opportunity for linking this with building inspector education in BC.

Better Alignment Between Industry and Training Providers

It was suggested that there needs to be stronger collaboration between industry, the ITA, and training providers in terms of what is happening in the field and within apprenticeship programs in British Columbia.

> **"The curriculum is not aligned with what the market is demanding – solar water heating is taken on by plumbers, but not covered in the classroom."**
>
> **Interview with Training Provider**

Apprentices should be prepared while in school for the "real world" work environment they are about to enter. Shortened school days are not realistic when compared to the solid work week of the average construction worker. Discrepancies between institution and industry in prerequisite courses and competencies needed before and after apprenticeships were also flagged – an apprentice's proficiency levels in Math and English as examples.

At the same time, every company works slightly differently so it can be a challenge for training providers to deliver programs and courses that meet everyone's needs while still delivering on the specific competencies and qualifications expected of the trade.

A benefit to the industry would be having a designated liaison (e.g., a government, college, or ITA-appointed person) as a point of reference and a feedback loop, to assist apprentices connect with employers and vice-versa, and convert building code resolutions into training programs.

Need for More Flexibility in Program Scheduling and Delivery

"Block release" training has proven to be an issue for the residential construction sector. Depending on the current state of the economy and the available work in residential construction, either it is too hard for employers to let apprentices go back to the classroom for training or they get stalled out and are unable to find an employer to take them on.

> **"Block release training is a challenge. Trainees often don't want to stop working in order to return to school so they continuously defer going back to the classroom. Many eventually drop out of their programs."**
>
> ***Interview with Training Provider***

> **"Block-release has a bad reputation with employers. There needs to be a laddering process like in South Africa and Australia."**
>
> ***Interview with Industry Association / Organization***

Flexibility in terms of program delivery was consistently identified as essential to apprenticeship program success. Multiple formats were suggested during the consultations, and some were only applicable for certain trades. These included:

- Breaking the "block" into shorter periods of training (e.g., break an 8-week block into two 4-week blocks);
- Continuous part-time training (e.g., 4 days in the workplace, 1 day in classroom per week);
- Hybrid programs that comprise some online and some in-classroom training;

- "As-available" training such as 16 weeks of evening classes or in 2 week segments every 6 months to coordinate with seasonality, work flow, etc.; and
- Weekend classes.

When it comes to making courses available on weekends and evenings, the acceptability of these formats by the trainees and instructors must be considers, as well as practical considerations such as available classroom and training / shop space.

Another option could be to send trainees to school initially (for one year or so), then out into the field to work for a couple of years for hands-on work experience, followed by more schooling. The issue around seasonality and flexibility in terms of training was also raised, particularly for more Northern and colder climates. Having trainees complete more classroom / theory in the winter months makes more sense.

There are also some structural considerations and challenges when it comes to program delivery and access. Many training providers won't run programs unless they have a certain minimum number of participants registered – a funding challenge in-line with the ITA's requirements for minimum enrolment levels. The more specialized a program, the harder it might be to get the required minimum enrolment.

Accessibility and delivering training to people in more rural and remote communities is a challenge in terms of having the appropriate number of students and instructors to run courses. Offering programs in "hubs" is one opportunity while making course more accessible through the online options. Mobile training has also been used in the province to mixed success. It was pointed out that internet access and online learning doesn't work for everyone so this is not a viable option in all cases.

In addition, the current waitlist system was flagged as an issue. At present, it is possible for one apprentice to be registered on multiple waitlists at schools around the province. As such, waitlists are often artificially inflated and trainees from outside the region can take spots in apprenticeship programs away from locally-based individuals. This is particularly a challenge for more rural communities with smaller populations where access to local institutions is important in order to avoid losing them to other areas.

Modularized Training and Certification

The concept of "modularizing" apprenticeship training and education could add some value, particularly for employers so they would be able to see what type of work experience a qualified tradesperson has gained during his training (e.g., for a carpenter, that could include framing, forming, scaffolding, and a range of other activities).

By potentially linking this modularized training with sub-tickets or endorsements for each module completed (similar to how a driver's license has such designations), this could allow workers to gain experience in different categories and possibly receive various levels of "certifications" at different stages of the apprenticeship program.

> **"It would be good to introduce a modular format so that skills are usable upon completion of the section instead of learning a little bit of everything over 4 years. This would make people more valuable during the training process."**
>
> ***Interview with Training Provider***

> **"Both the current and old apprenticeship systems suffer from low completion rates. The modular approach could help create useful skills along the way."**
>
> ***Interview with Training Provider***

To move in this direction, the apprentice would be required to log hours according to the duties / work performed on the job in different areas. There would also need to be someone supervising and verifying this work experience (i.e., a journeyperson, employer, instructor, etc.). The apprentices "log book" could be broken out by section in order to record the hours by each activity and location, which would then be signed off by the employer / trainer. This already occurs within some trades (particularly for resource-based and energy-related trades such as power-line technicians where safety is a serious concern), there has to be a commitment by the employer / trainer to provide oversight throughout the training.

While good in principle, it does create challenges – particularly for smaller companies focused on residential construction who may not have the capacity for directly overseeing the hours (although in theory, apprentices should always be directly supervised by a journeyperson). Another challenge exists with respect to the tracking and verification of hours has to do with mobility of the worker – particularly if they are spending time working with different companies in multiple locations throughout their apprenticeship experience.

Continuous Learning

The Importance of Laddering and Pathways to Continuous Learning

At the moment, the pathways to continuous learning and professional development for workers in residential construction and trades are somewhat limited. The current system trains people to get their first job there is very little in place to help individuals move beyond that.

It was suggested that more training should exist throughout the apprenticeship programs to help trainees become successful in developing their careers moving forward. This could offer two discrete directions – one that ultimately ends up in an office-oriented position as an engineer or technologist, the other in the field as a "master" crafts-person. To make the industry attractive to a broader spectrum of young workers, it needs to demonstrate a clear path to opportunities in construction management, business ownership, entrepreneurship, mastership of a trade, advanced technical training, diplomas and degrees, and pathways to ongoing professional development.

While the Canadian Construction Association's Gold Seal and CHBA BC's programs provide construction management skills that are very important for those looking to run their successful businesses and that are not offered elsewhere, there is no institute in BC for master-level education in the trades (unlike in Europe for example).

> **"A Master tradesperson program would fill the need for a channel for people to keep moving up. Right now, trade programs are essentially a one-stop-shop."**
>
> ***Interview with Industry Association / Organization***

Advanced-level, "mastership" designations may also help in raising the professional image and countering negative perceptions of the industry. At the moment, there are limited options to build towards higher education where someone could, for example, start out as an electrician apprentice and eventually obtain a university degree in engineering through an established education pathway. This, in turn, could attract a whole new demographic into the trades and provide goals and targets for apprentices and workers to strive toward in their careers.

> **"Mastership programs promote professionalism and workers can keep rising."**
>
> **Interview with Industry Association / Organization**

While continuous, advanced level learning was recognized by industry as important, many felt that there is a need to ensure that people have the ability to get solid, more fundamental, broad qualifications first (Red Seal or otherwise), and then train them to a specific advanced level specialization. There may be a role for government in helping to minimize the costs to education / training so that industry can then provide the master-level, advanced skill sets.

It was noted however that it will be difficult in BC to build on the laddering principle (similar to what happens in Germany and elsewhere) because there is no formal licensing for the industry with respect to required learning or standard solutions to codes.

Regulation / Enforcement and Incentives

Added Costs and Liabilities for Employers Training Apprentices

At the present time, many apprentices find it hard to get their first job because employers want people who are skilled already. Many employers consider it an added liability to take on workers and apprentices as training requires an investment of their time and resources and has inherent additional risks. Some feel that the low apprenticeship completion rates in the residential construction sector are largely due to a lack of stable employers that are willing and/or able to take on apprentices for the duration of their programs.

Regardless, there is a need to provide better on-the-job experience and mentorship for many apprentices working in the field today. Many feel that there needs to be incentives (e.g., tax breaks) for employers for hiring apprentices, specifically allowing employers to focus on the training aspects of bringing on apprentices as it requires an investment of their valuable time.

> **"If the government provided more incentives to train apprentices, then it would be the driver of the industry."**
>
> ***Interview with Training Provider***

CPD as a Requirement to Licensing

Many in the industry feel that there is an issue with respect to continuous professional development (CPD) and learning within the residential construction sector. Once a tradesperson gets his/her certificate of qualification, there is no requirement for additional education or professional upgrading of skills and knowledge.

> **"It is difficult to get builders to attend CPD programs and seminars as there is really no requirement for them to do so."**
>
> ***Interview with Industry Association / Organization***

Some feel that there should be mandatory training and CPD requirements to qualify for ongoing licensing – as is the case for professional engineers, accountants, and architects who must renew their right to practice on an annual basis by obtaining CPD credits.

As such, support exists amongst those consulted for the new HPO licensing amendments requiring continuous professional development and for the concept of the PBI. There is a need to raise the bar for the industry through licensing linked to a CPD requirement that would, in turn discourage those who practice at sub-standard levels or work at discounted rates because they are not properly qualified or experienced. This in turn may drive some of the value in apprenticeship programs in general for residential construction and encourage employers to hire apprentices.

"BC absolutely needs licensing for builders and required meaningful technical continuing education. This will create a top-down approach to creating demand for good education."

Interview with Training Provider

This issue was also extended to include renovators. Renovators are considered by many in the industry to require the largest knowledge base in the construction sector – renovators have to identify problems, take structures apart, and put them back together correctly. As such, they also present the most "risk" to the consumer / homeowner.

The need for developing more recognized certification and licensing standards for renovators was highlighted in order to provide a sense of professionalism and raise the bar for the industry as a whole. This could also potentially be mandated through HPO with warranty providers to act as "gatekeepers".

"The plan to achieve a universal standard in requirements, licensing, and certifications has to be multi-faceted to minimize underground economy and those looking to skip the rules."

Interview with Industry Association / Organization

The Role of the Building Inspector

The demand for building inspectors in British Columbia is primarily in urban centres (in the Lower Mainland, Southern Vancouver Island, and the Okanagan) in-line with where the vast majority of building permits are being issued. Buildings in that region tend to be more engineered and complex. However, building inspectors play a very important role in more rural parts of the province where courses and training for builders is not as readily available and inspectors are often involved in giving advice and instruction with respect to the building code, new technologies, and construction best practices.

With many technical and complex building code changes coming into effect, builders and trades will be increasingly looking to building inspectors for advice in order to get sign-off on their projects. At the same time, building inspectors may be unaware of the current standards and best practices and may be unfamiliar with new technologies. Certainly, it was heard from education providers that it is very difficult to develop technical education curricula in the absence of common consensus on building code interpretations.

Currently in BC, the building code is subject to a range of interpretations across the many local jurisdictions. Although the Building Officials Association of BC (BOABC) administers an interpretations committee[16], the request log has not been updated since 2004[17]. Industry feedback suggests that the lack of an established process for establishing acceptable interpretations of the building code is resulting in questionable building practices and an impediment to developing the necessary technical training courses.

"Clear up the mayhem of code interpretation most of which is not based on building science. Need consensus on acceptable interpretations and a body to oversee interpretations and manage an appeals process."

Interview with training provider

16 http://www.boabc.org/EN/main/about/120/121/interpretations.html

17 http://www.boabc.org/assets/About~Us/code_idx_index.pdf

When it comes to training building inspectors, there are issues around new technologies and code changes that include energy performance and building envelope, seismic considerations, and window and door labeling requirements. The province's college and university programs are, for the most part, responsible for providing the training and education required for building inspectors in-line with the changes.

Education, training, and certification for building inspectors is a particular challenge in more rural locations throughout the province (i.e., the North, in the Kootenays, and on Northern parts of Vancouver Island). There is also a shortage of the more qualified building inspectors due to the lack of people wanting to live in these more rural locations. This reality suggests the importance of providing support for building inspector training and certification to ensure the building code and best practices are adhered to – particularly in more rural regions where these professionals play a critical role in educating those working in the residential construction industry. In addition, many building inspections are done through the Internet now and as such, require builders to be technology-savvy. Seasoned builders frequently rely on their younger employees for support with this.

> **"There are many aspects of the new codes that builders are oblivious to – new fire rating standards and spatial separations, door and window performance, and lateral load requirements. Also, my experience is that none of the building officials know how to review them."**
>
> ***Interview with building science expert***

The value of administering builder licensing through a government organization is multi-fold. Not only do government agencies carry the necessary enforcement "teeth" but also linkages through to other regulatory activities such as building code interpretation.

> **"We estimate that if BC required mandatory licensing or certification testing of building/plumbing inspectors/plans examiners as the other jurisdictions in Canada require, our membership would grow conservatively from the current approx. 700, to approx. 850 members. BC is the only jurisdiction in Canada which does not have mandatory requirements for licensing or certification of building officials."**
>
> ***Interview with Building Officials Association of BC***

Need for More Transparent and Accountable Logging of Training Hours

As was described earlier in this section, the tracking of hours for apprentices in many residential construction trades is not overly transparent and issues with accountability exist. Accountability for the apprentice lies with the trainer / employer and, at present, it's up to the employer and apprentice to gain and track experiences in different areas of the program – the ITA does not specify the amount of work that must completed within a specific range of areas. There may even be an opportunity for training providers / instructors to do site visits and ensure apprentices are gaining a range of experiences while working on various projects.

Many feel that there needs to be more regulation and enforcement around signing off on required hours for apprentices during their work for employers in order to ensure that the log book becomes a transparent and accountable tool for employers and apprentices moving forward. Some suggested a need for more regulation preventing an apprentice from being a self-employed contractor while another thought the creation of an "Ethics Committee" within ITA to provide oversight in this area would be beneficial. In fact, many professions have a "Code of Conduct", and this may be a first step to articulating the values of the homebuilding industry.

"The system for logging hours needs to be revamped to avoid fraudulency. There is zero accountability for those who are an illegitimate apprentice (as in they don't have their ticket) and who have signed off on their 'experience'. The institution that really needs to get involved is the federal government with respect to taxation for malpractice."

Interview with Contractor / Tradesperson

"In order to fix the fraudulency of signing people off on work they haven't actually done there needs to be a revolt."

Interview with Contractor / Tradesperson

To a lesser degree, some feel that there should be new regulations brought in that would see a licensing body ensure that only contractors / builders can get a permit to for building or renovating a house based on a set of standards or criteria that have to be in place to drive apprenticeship training (e.g., there must be a journeyperson on staff).

Current & Future Demand Drivers

This section discusses several indicators and demand drivers that directly or indirectly have a strong impact on the residential construction sector in British Columbia. These drivers include the:

- Overall health of BC's economy, housing prices, and incomes;
- Continuing high rates of international immigration and inter-provincial in-migration;
- Growing dependency ratios due to the aging or "graying population"; and the
- Slow but steady growth in household formation.

The Health of British Columbia's Economy

The Credit Union Central in its economic analysis for BC (September 2012) concluded that:

- Investment in residential construction should post modest gains in the next three years before ramping up in 2016 to exceed the high set in 2007. Most of this spending is new construction. In contrast, spending on renovations will climb to new highs each year.
- Industries forecast to grow faster than the economy's overall rate will be construction, forestry, wood products and primary metal manufacturing, and retail-wholesale trade services. Growth laggards are mainly in the public sector, including utilities, along with pulp and paper manufacturing, and accommodation-food services.
- Employment growth by industry generally follows those growth trends with overall job growth below 2 percent annually.

While Credit Union Central are bullish on the future economy in BC, significant uncertainties and risks are evident, especially for global events, commodity prices, and an uncertain economy in the United States. The consensus, however, is that both Canada and BC will grow, however, slowly over the next two decades. There will be bumps in the road regardless.

The Construction Sector Council in its 2013 LMI report for British Columbia concluded that:

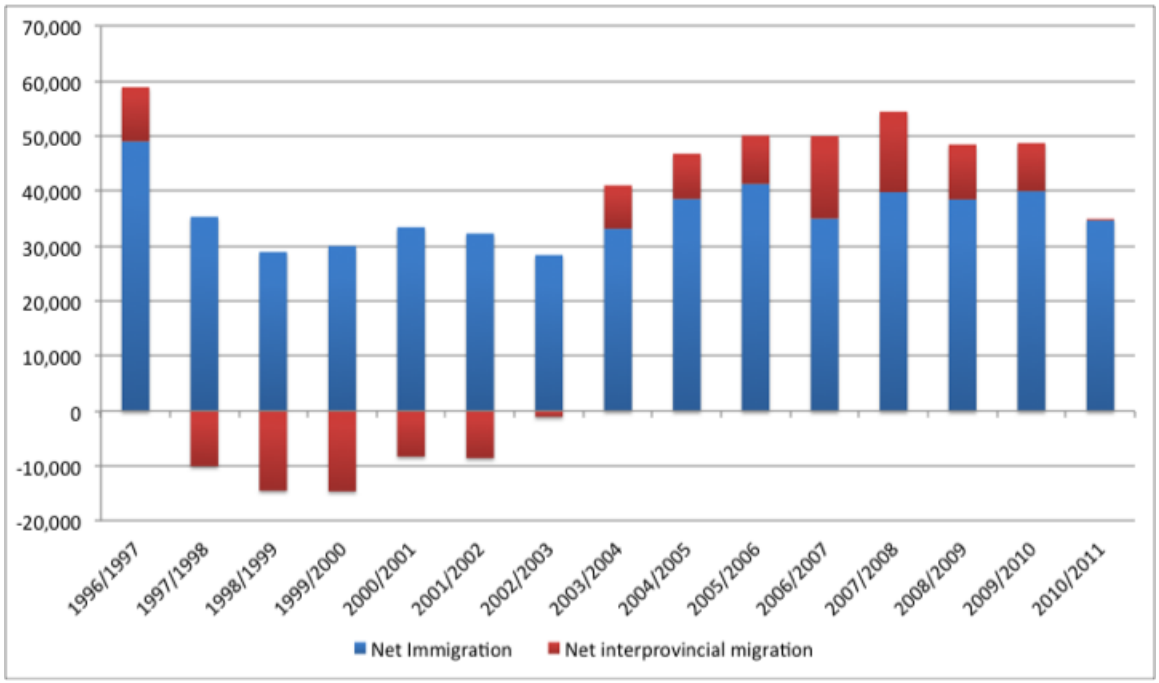
- Housing starts will rise across the scenario from 2013 to 2016. The projected gains recover the large loss in housing starts during the 2008–2009 recession. Starts regain their past peak by 2014.
- Employment in residential construction is estimated to rise by more than 12,000 jobs from 2013 to 2021. These gains recover lost jobs, as employment in 2012 was down close to 10 percent from the 2007 peak. Jobs in housing-related work surpass their past peak by 2015.
- The current economic environment contains more risks than usual for future labour market conditions. Changing housing market conditions, commodity prices, and fiscal policy all have the potential to alter expected outcome.
- Unemployment is the usual first source for hiring. Unemployment rates in construction fell well below average levels during the construction expansion that ended in 2007. By 2012, overall construction unemployment had returned to long-term average levels, but with important differences. Residential employment was down and unemployment levels were above average, while non-residential work had increased, absorbing most of the available skilled and specialized trades in that sector. These conditions, which continue currently, may ease initial recruiting challenges in the housing sector in the South, while hiring for the big projects in the North are facing increased challenges.

The key question is the extent large mega industrial construction projects in the North will affect the overall BC economy and the residential construction industry more specifically. These spillover affects will likely be small. Most of these northern projects are capital intensive and workers will likely be brought in to the province and will live in camps. The exceptions are the BC Hydro transmission line construction on both the Northwest and the Northeast regions and the port development activities coming on stream in Prince Rupert. If approved, the Site C hydro-electric project will also have a strong impact on labour and skilled human resources demand over the next decade.

That being said, communities such as Prince George and Kamloops are already feeling a crunch for labour as skilled and unskilled workers are recruited for industrial mining, oil and gas, and mill operations, as well as for construction projects tied to building pre-fabricated housing for temporary camps in-line with some of these major projects by companies such as “Northern Trailer” (Horizon North Logistics Inc.).

Continuing Strong Immigration and In-migration

Historically speaking, BC has had relatively stable levels of immigration, and to a lesser extent inter-provincial in-migration, for the last decade (see Figure 37). In addition to an overall healthy economy in British Columbia subject to global uncertainties, it is expected that the province will continue to benefit from strong levels of immigration. In fact, the BC “lifestyle” may be one of the province’s strongest drivers influencing the residential construction industry.

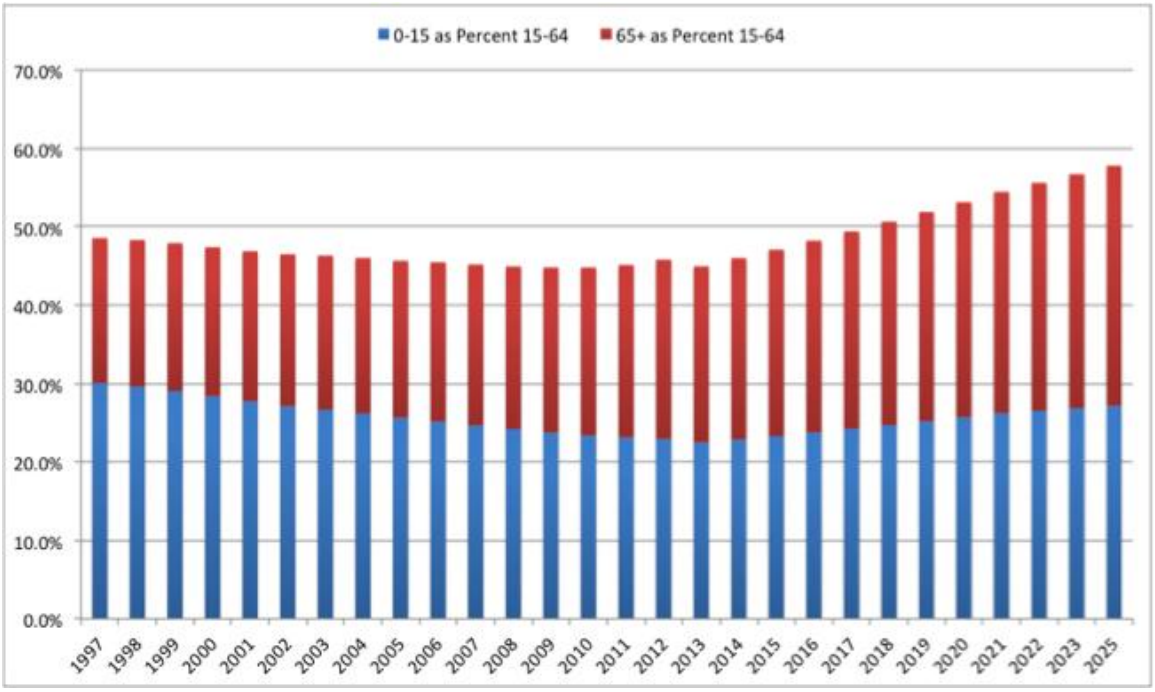


Source: Statistics Canada CANSIM Table 051-0050

Figure 37: British Columbia international immigration and inter-provincial in-migration, 1996-2011.

Ageing Population

British Columbia's population is ageing and this trend acts as a critical driver of the type of residential construction activity happening in the province. This "graying" of the population is having a strong influence on housing demand in terms of the type of housing formations that will be constructed in the province over the next decade (see Figure 38).



Source: Statistics Canada CANSIM Table 051-0001 and High Population Projections for British Columbia

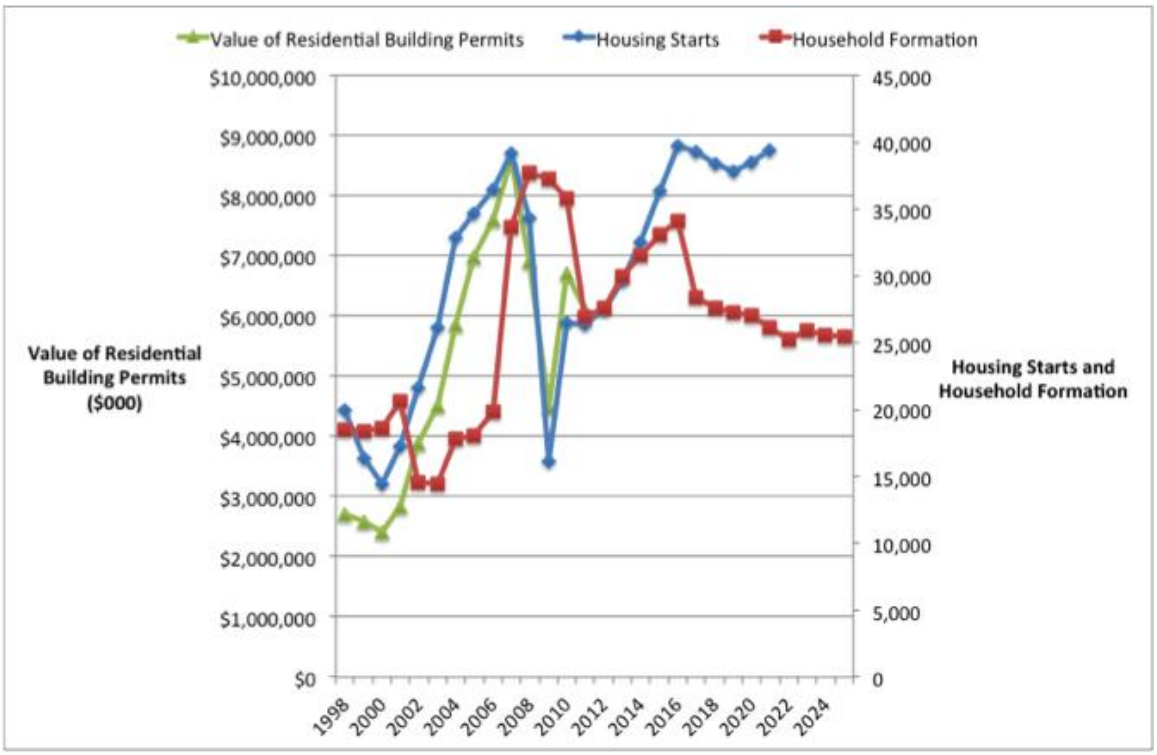
Figure 38: Growing dependency ratios due to a "graying population".

Household Formation Projections and Housing Demand

This section examines projections to 2025 by BC Statistics on household formation and compares household formation pathways to historical and forecast trends in both housing starts and residential construction investment.

In preparing its household formation projections, BC Statistics worked closely with Statistics Canada on the development of various credible population projection scenarios.

As shown in Figure 39, both housing starts and residential construction investment have followed highly similar pathways from 1998 to 2012. The figure also includes the Construction Sector Council forecasts from 2013 to 2021. The Construction Sector Council argue that housing starts will reach a "take off" period in 2017 due to the forecast strong economy in British Columbia and some pent up demand associated with the construction decline associated with the 2008/09 recession. This conclusion is both possible and plausible, although GLOBE's analysis presented here takes a slightly slower and more linear pathway that is more rigorously linked to household formation trends, including the BC Statistics projections.



Source: BC Stats and Statistics Canada

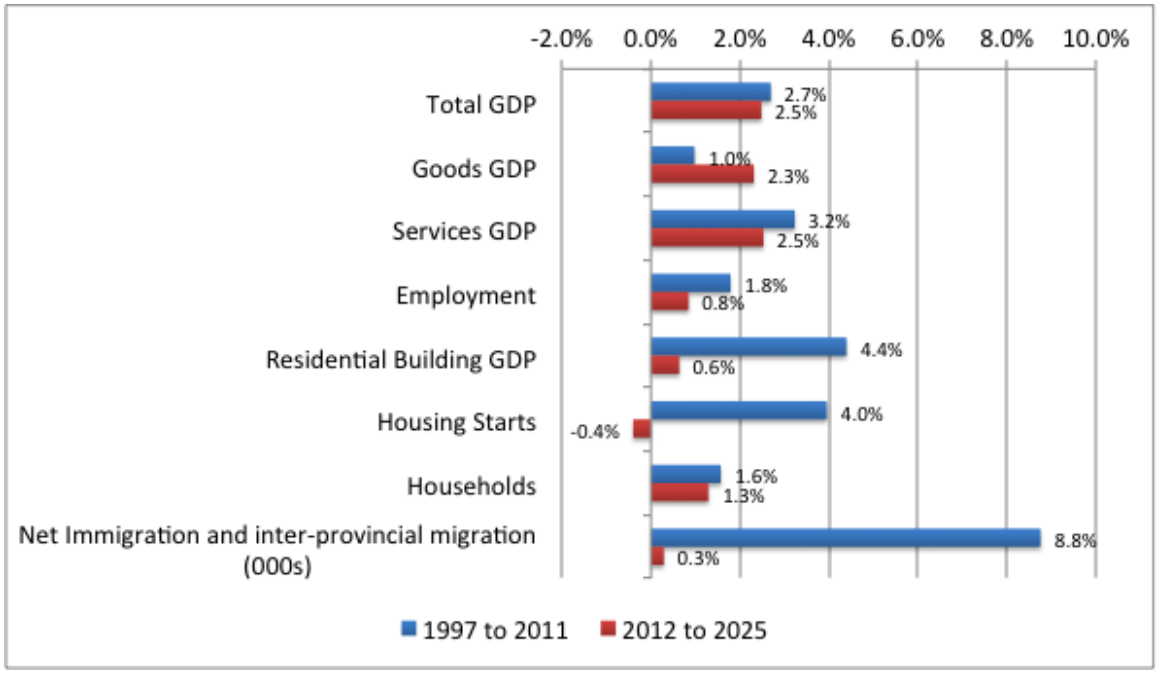
Figure 39: Slow but Continuous Growth in Household Formation British Columbia

Informetrica's forecasts for housing starts are significantly lower than that of the Construction Sector Council. Based on a discussion with the President of Informetrica, the reasoning behind this is that new household formation (and hence forecast housing starts) in British Columbia could be tempered by stronger growth and hence greater population increases in Alberta. This strong growth in Alberta, in the opinion of Informetrica, may weaken to some extent the potential population growth in British Columbia if significant in-migration to Alberta occurs or if potential in-migrants to British Columbia otherwise move to Alberta.

The strong growth in northern major industrial projects is expected to help grow the provincial GDP and corporate profits, but Informetrica expects a minimal longer-term impact on population and household formation (and hence residential construction growth). Figure 40 below shows annual rates of growth from 1997 to 2011 and projected annual growth from 2012 to 2025.

While real GDP annual growth is projected to be 2.5 percent from 2012 to 2025, overall employment and the residential construction industry is projected to show a considerable annual growth rate decline in this period, attributable to lower net international immigration and inter-provincial in-migration and household formation.

Informetrica's relatively pessimistic projections for British Columbia are premised on the firm's views of lower commodity prices in the outlook period and an increasing growth of the Alberta economy that is tied to oil sands developments. The recent softening of prices for bitumen within North America and the growing number of major industrial and resource projects in Northern BC may show these pessimistic Informetrica's projections to be unrealistically low.



Source: Informetrica Ltd.

Figure 40: Annual rates of growth based on leading indicators by Informetrica projections, British Columbia.

Informetrica's forecasts when compared with GLOBE's projections and those of the Construction Sector Council, provide interesting boundaries by which to better understand this industry's medium and longer-term future.

In the following sub-section on residential construction occupational forecasts, GLOBE has applied two sets of forecasts including a model tied to BC Stats household formation projections and that of the Construction Sector Council. It is believed that these two forecasts are the most credible to work with and while interesting, Informetrica's future metrics are too much on the low side for this exercise.

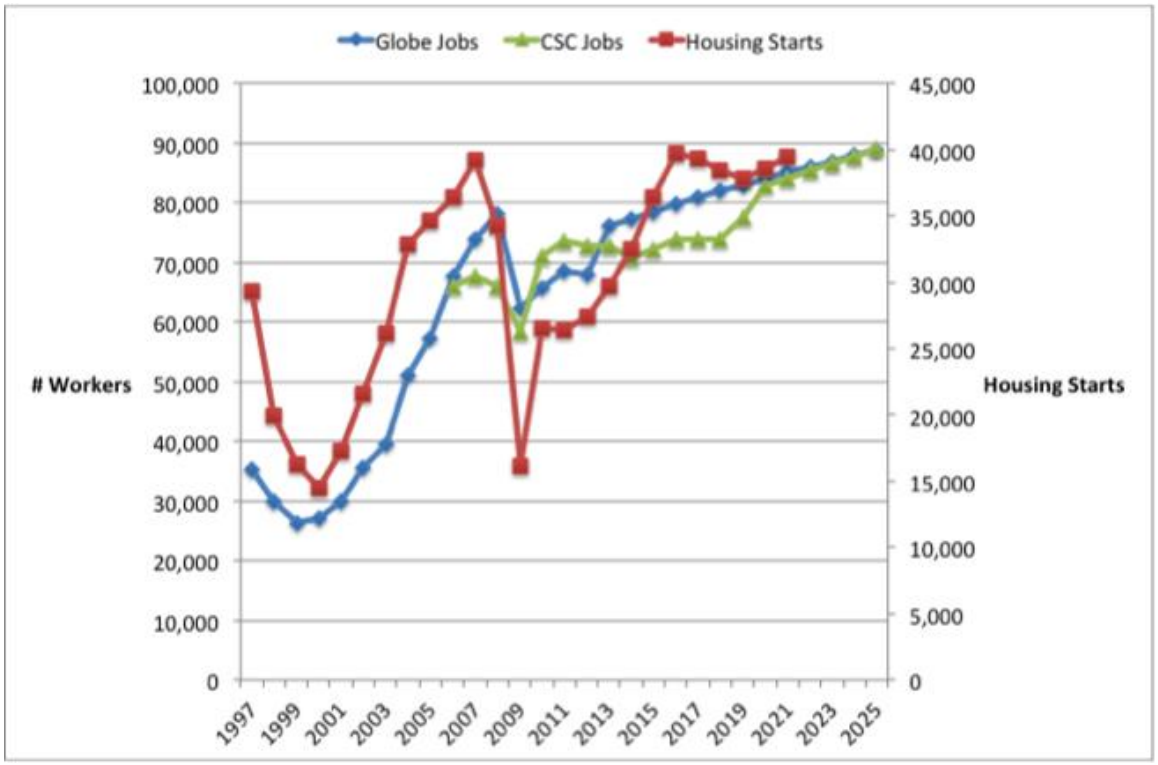
Similar charts for the BC Development Regions are shown in Appendices C and D (in the Appendices Document) summarizing key data for residential construction, business establishments, and household formation / residential construction trends.

Occupational Forecasts for the Residential Construction in BC

This section provides residential building construction activity and related specialty trades occupational forecasts to 2025. In developing these forecasts, GLOBE examined housing employment and investment projections by the Construction Sector Council, Credit Union Central, and BC Statistics (for household formation), which are key demand drivers. GLOBE also examined demolitions and future projections provided by Informetrica.

The occupation forecasts for BC's residential construction industry to 2025 are shown on Figure 41, with a detailed breakout by occupation in Figure 42. The occupational forecasts are rigorously tied to the BC Statistics household formation projects (and expected future housing demolitions), as well as occupation forecasts that are more directly tied to the 2013 Construction Sector Council projections.

Both projections are similar in nature but not identical. The Construction Sector Council forecasts show a spike in housing activity (and hence employment) in 2017 whereas GLOBE's forecasts, based on BC Statistics household formations, follow a more linear trend and are moderately higher in the earlier years of the forecast period.



Source: BC Stats, Statistics Canada and the Construction Sector Council LMI 2012.

Figure 41: Residential construction occupation trends and projections, 1997-2025.

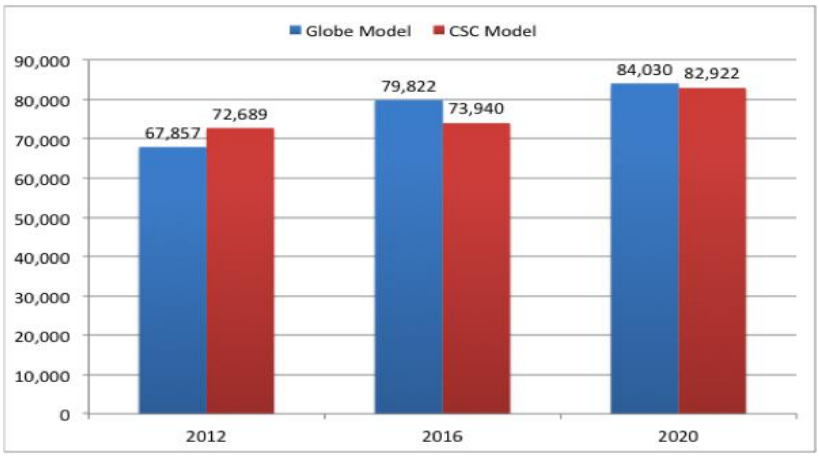
Occupation	2012	2016	2020	2025
Carpenter	13792	16224	17080	18073
Trade helpers and labourers	9960	11716	12334	13051
Electrician	5447	6407	6745	7138
Painter and/or decorator	4974	5851	6160	6518
Contractors and/or supervisor	4758	5597	5892	6235
Construction manager	4482	5272	5550	5873
Plumber	3488	4103	4319	4571
Plasterer, drywall installer and/or finisher	2984	3510	3695	3910
Heavy equipment operator (except crane)	2332	2743	2888	3056
Roofer and/or shingler	2218	2609	2747	2907
Residential and/or commercial installer and/or servicer	1723	2026	2133	2257
Floor covering installer	1663	1956	2059	2179
Bricklayer	911	1072	1128	1194
Tilesetters	900	1058	1114	1179
Concrete finisher	829	975	1026	1086
Refrigeration and/or air conditioning mechanic	769	904	952	1007
Glazier	641	754	793	839
Construction estimator	618	727	765	810
Insulator	521	613	645	683
Gasfitter	379	445	469	496
Crane operator	339	399	420	444
Heavy-duty equipment mechanic	168	198	208	220
Driller and/or blaster	128	151	159	168
Sub-total	64,021	75,311	79,280	83,894
Other Occupations	3,836	4,511	4,750	5,026
Total	67,857	79,822	84,030	88,920

Source: Statistics Canada and BC Stats

Figure 42: Residential construction occupation forecasts by trade, 2012-2025.

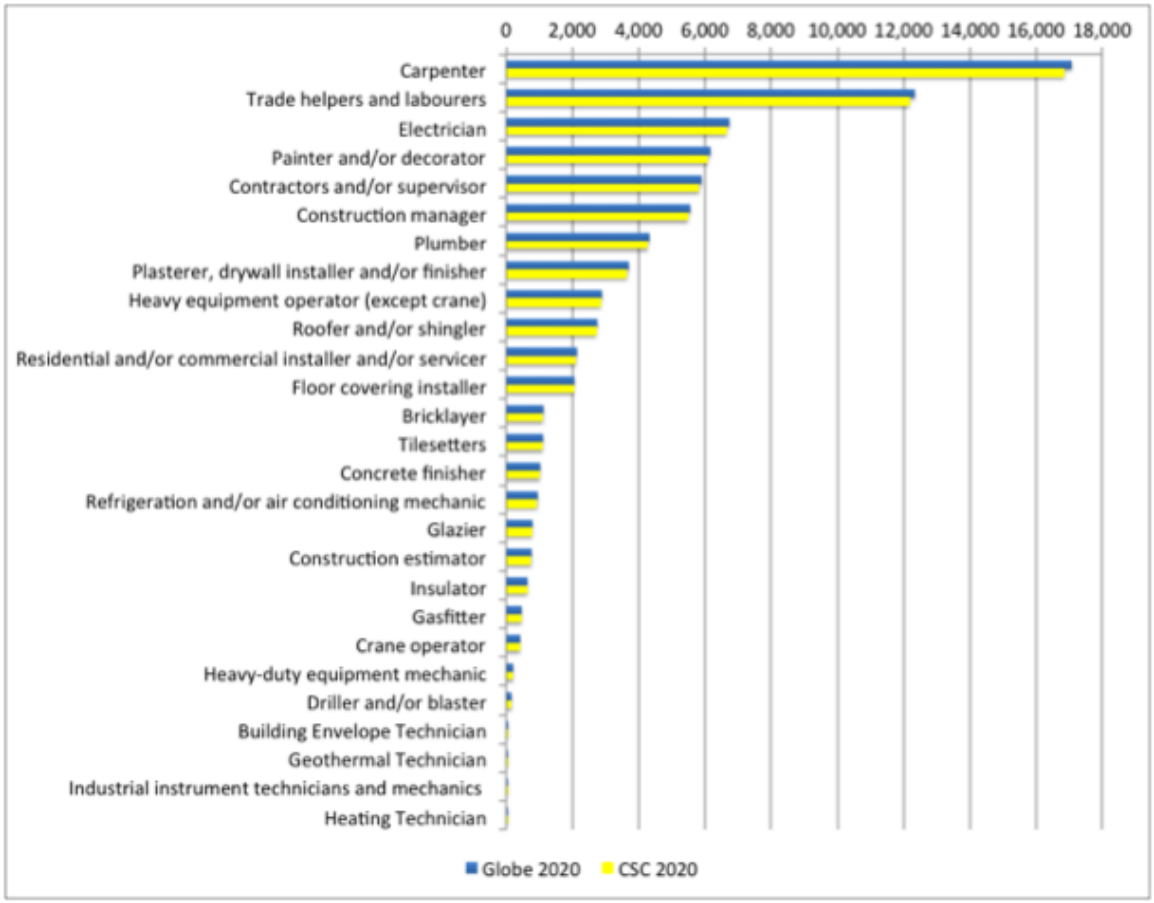
Comparison to Construction Sector Council Forecasts

Figures 43 and 44 show both GLOBE's occupation forecasts that is rigorously tied to the BC Stats household formation projections and the forecasts that are more closely linked to the Construction Sector Council LMI for 2012.



Source: GLOBE methodology and the Construction Sector Council

Figure 43: Comparison of GLOBE and Construction Sector Council occupation projections for BC, 2012-2020.



Source: Statistics Canada, BC Stats and the Construction Sector Council, LMI 2012

Figure 44: Detailed comparison of the GLOBE and Construction Sector Council occupation projections for British Columbia, 2012-2020

Alternative Training Delivery Models

This section contains a number of alternative training delivery models that may be worth investigating in greater detail as potential solutions to some of the current challenges for apprenticeship and occupational training as it relates to the residential construction sector in British Columbia. The information below has been categorized in terms of its relevance at different stages in the career path from "pre-apprentice" through "apprenticeship training" to "post-apprenticeship" learning. In addition, some alternative funding models are showcased at the end of this section. More details on each of these models are presented in Appendix L.

Pre-apprentice

Integration of Trade Skills into High School Curriculum

Exposing youth to construction trades can happen at an early stage enabling students to build their technical skills, an appreciation of the trade and connection into the industry. A number of high schools offer such courses around the province. In Prince George and Burns Lake, Grade 11 and 12 students can take two semesters in the Career Technical Centre (CTC) at the College of New Caledonia (CNC)[18] and two at high school, graduating with both your Grade 12 and a CNC Certificate of completion. Generally, those programs in which students got to work on a house were viewed as optimal:

> **"In Fort St. John, they have a residential grade 11/12 program where the students for one semester they go and build a house and learn everything."**
>
> ***Prince George focus group***

Industry feedback suggests that high-school leavers are not adequately prepared for the residential construction industry. To improve student employability, high schools can offer, at a minimum, Occupational First Aid and basic safety training (e.g. WHMIS) irrespective of whether the school has any vocational courses. In fact, WorkSafe BC has a Student WorkSafe19 course that is designed to fit into Grade 10 Planning. However, most high schools do not offer such courses despite the fact that the majority of BC schools offer comparable courses such as Level 1 Food Safe. Ideally, students also need to have exposure to imperial measures and be articulate in calculating with fractions.

> **"We ought to have a minimum qualification before you got into the apprenticeship program. They spend a lot of time on safety and this could have been learnt before."**
>
> ***Burnaby focus group***
>
> **"It ought to be a prerequisite to learn First Aid before you get into a trade. The colleges and industry should make it clear. It's a one-day affair. If you want to do a trade, do First Aid."**
>
> ***Prince George focus group***

18 http://www.cnc.bc.ca/CNC_Programs/ctc.htm

19 Student WorkSafe includes seven lesson plans for teachers and is designed to correspond to learning outcomes in the BC Ministry of Education's Planning 10 curriculum. http://www2.worksafebc.com/Topics/YoungWorker/Resources-Educators.asp?ReportID=33283

For the high-school experience to be compelling for students while delivering productive workers to industry, the high-school training needs to provide:

- Vocational training needs to be sufficient to exempt students from at least one year of college (Apprenticeship Level 1)
- Students need to have completed Occupational First Aid and WHMIS at a minimum

Construction Summer Camps for Youth

Many BC schools do not offer vocational training courses. Colleges, non-profits and industry associations in other jurisdictions offer summer camps, which are designed to introduce students to the trades as a means to circumvent this issue.

For example, the North West College of Construction in Portland, Oregon runs a three-week summer camp for 16 – 21 year olds. During the course, students receive hands-on exploration of 9 potential careers and participate in field trips to working construction sites. Upon completion, students obtain:

- Solid Overview of 9 Construction Career Paths
- Flagging Certification
- First Aid/CPR Training & Certification
- Light Equipment Experience

Pre-apprenticeship Training for Those on Income Assistance

Pre-apprenticeship programs provide solutions to attracting young workers, youth at risk and those on income assistance into the trades. A number of different programs have been in operation in BC and around the world for many decades but it is an under-researched topic, especially from the point of view of organizations that deliver the program to students.

In 2012, Group Training Australia[20] undertook a detailed examination of pre-apprenticeship delivery organizations, their objectives, target groups, training content and student outcomes, and to identify some of the factors critical to pre-apprenticeships achieving their social and labour market outcomes. The resulting study[21] found that course completion rate was high (average 77%) and there was a high translation from pre-apprenticeship into apprenticeship (85%).

Pre-apprenticeships were attractive to the “disadvantaged” (one provider only enrolled homeless youth) and students that competed the pre-apprenticeship program have a higher likelihood of completing their apprenticeship. Training providers reported strong support for employment but this was particularly so where the local provider had strong connections into the local industry. The success of this program therefore relies on close collaboration between the colleges and their local homebuilder community. This aligns with comments from BC builders who know and trust certain instructors to turn out good trainees.

20 Group Training Australia Limited (GTA) is the national association representing a network of around 150 group training organizations (GTOs) located throughout metropolitan, regional and remote areas of Australia. Collectively the national network of group training organizations employs around 35,000 apprentices and trainees and over 100,000 businesses have used a group training organization to manage the employment of their apprentices and trainees. GTA provides advocacy and professional development services for the GTO national network, working closely with the state group training associations. GTA promotes the benefits of the group training model of apprentice and trainee employment and highlights the contribution of the group training network to skills development (http://www.grouptraining.com.au/home.html).

21 Dr Philip Toner, Honorary Senior Research Fellow, Department of Political Economy, University of Sydney, and Chris Lloyd, Wiyanga Pty. Ltd. “Pre-Apprenticeship Delivery Models and Their Labour Market Outcomes”, August 2012 http://www.grouptraining.com.au/_literature_124073/Preapprenticeship_Toner_Report_2012

Apprenticeship

Entry Requirements

To counteract the tendency for trade training to be seen as a "job of last resort", some schools are establishing minimum admissions criteria for foundation and apprenticeship training. For example, the College of the Rockies in Alberta establishes a range of requirements for their 13-week timber-framing program and applicants are required to complete a questionnaire to assess their experience, aptitude and motivation prior to starting the course[22].

> **"Woodwork is viewed as the tail-end, and it reflects in some of the guys we get. It is viewed as fairly easy but it is not."**
>
> ***Prince George focus group***

Flexible Training Formats and Schedules

Traditional apprenticeship models can be restrictive, with trainees required to spend up to ten weeks a year in a face-to-face classroom environment. Although this training is required as part of most formal apprenticeship models, it is perceived as an obstacle for many employers and trainees. A few examples relevant to residential construction trades are included below.

Front-loading and seasonally-oriented training

A number of colleges "front-load" or "back-to-back" apprenticeship training to alleviate the impact of the "block release" approach to apprenticeship training. For example, Thompson River University carpentry program allows first and second level of the apprenticeship training to be done in 30 weeks. By bunching-up the school training, employers can better manage their workforce through economic cycles. For workers in northern BC, the seasonal nature of the work can provide a greater impediment to training. Workers need to be on site during the summer months and in the classroom during the slower winter months.

Course-based training

Nova Scotia Community College (NSCC) has made the shift from block release to course-based learning. Available options include full or part-time classroom delivery, day release, evenings and internet delivery. Apprentices can select a blended approach to training in which they access some of their courses through in-class training and some via the web. Other flexible options such as evening or part-time study programs are implemented on an as-needed basis.

> **"No need to commit 6 weeks to learning all these things. We could have a modularized program that is (say) 3 days a week or in the evenings and not as long as 6 weeks."**
>
> ***Kamloops focus group***

> **"The apprenticeships shouldn't be longer but they ought to be better compartmentalized. It makes more sense to modularize it and sub-ticket people based on what they have learned."**
>
> ***Burnaby focus group***

22 http://www.cotr.bc.ca/timber%2Dframing/cotr_web.asp?IDNumber=154

E-learning

In the case of some trades, there are only a few schools offering apprenticeship training in BC (e.g. only two masonry and bricklaying schools, both in Surrey). There is increasing interest in improving the distance learning capabilities to encourage workers to continue training when they are working in remote locations.

In order to further appeal to the digital generation are some "game-based" systems such as "virtual welding"[23] are already in place. Game-style systems can help with on-site training and may add value to recruitment events by helping to make trades fun. The challenge to programs such as these is that instructors may not be sufficiently comfortable with computer technology and require training.

> **"When it comes to making courses more flexible like on weekends and evenings, it's a great idea but the practical component is more difficult – i.e. classroom space, existing projects take up all the available room."**
>
> ***Interview with training provider***

It should be noted that residential construction is still largely oriented around urban locations, although there are home builders in rural locations and, increasingly, in remote locations as permanent housing starts to develop to support the resource sector. To this end, local institutions such as BCIT have developed on-line courses in trades such as millwright, power engineering, boiler operation simulator and assayer program to support its commitment to economic growth in BC's oil and gas sector. It has yet to implement such programs for its construction trades.

> **"We need a hybrid program because 6 weeks is too long; either 16 weeks evenings or 2 weeks every 6 months. Weekends or evening classes would be beneficial too."**
>
> ***Burnaby focus group***

Continuous intake

Pacific Vocational College (PVC) provides a continuous enrolment for Level 1 technical training for its sprinkler fitting, pipe fitting, gas fitting courses allowing for flexible start and completion dates. PVC is a privately owned technical training college located in Burnaby, BC and offers a range of pipe fitting apprenticeships. The continuous intake model is complemented with a self-paced approach to learning which includes customized videos that are designed to complement the print materials. The videos are developed in-house and capture lectures, allowing students to watch and listen as instructors conduct demonstrations of key concepts and skills. Prior learning credit is instant, uncomplicated and non-controversial. An apprentice can challenge a topic exam at any time without studying the curriculum if they so choose. Upon successful completion (70% or better) they move on to the next topic. Funding is partly from tuition fees and partly from ITA. Completion rates are over 90%.

Mobile training units

Mobile training units are in operation at a number of colleges across Canada. Thompson Rivers University and BC School District #73 in Kamloops operate a state-of-the-art mobile training lab that is designed to help improve access to skills training in the trades for rural and First Nations communities across the interior of British Columbia. The Thompson Interior Mobile Training Trailer[24], was part of an ongoing effort by the school district and the university to create seamless transition opportunities for students to move from secondary to post-secondary education.

The mobile trades training lab, which cost approximately $1.3 million and took one year to build, was housed in a 53-foot trailer unit that expands into a 1,000 square foot training facility. Designed to be

23 Example of a digital welding system http://www.lincolnelectric.com/en-ca/equipment/training-equipment/Pages/vrtex360.aspx

24 http://inside.tru.ca/2007/10/05/school-district-and-university-unveil-mobile-trades-training-lab/

highly flexible, it has the capacity to provide up to 12 training stations for the welding, electrical, plumbing, piping, refrigeration mechanic, heavy duty mechanic, and millwright trades.

Red River College (RRC)[25] also operates two mobile training labs, which it considers to be the backbone of this training initiative to deliver quality applied learning throughout Manitoba. Each lab consists of a 53-foot trailer with pop-out sides that can quickly transform into a 950 square-foot training facility. Diesel generators supply the necessary power to operate electrical equipment, as well as lighting, heating and air conditioning. Supply trailers can connect to the mobile lab, increasing the total facility space to almost 2,000 square feet. The portability of the training labs allows the College to deliver nationally-recognized trade training- such as automotive service technician, carpentry, electrical, machining, pipe fitting, plumbing, welding and industrial mechanics – whatever is required.

Mobile units such as those at TRU and RRC are designed to increase accessibility for students in rural areas to training programs, and link training with community-based projects and emerging industries. The programs allow students to remain at home to study, connect with community supports and help build labor capacity in rural and aboriginal communities.

Dual Vocational Training

There are many high-school leavers who fail between the gap between university and vocational training. They are ideal candidates for a work-school hybrid program, which turns out workers with both practical and technical skills to compete in a rapidly changing market, along with a good overall perspective on the nature of their profession.

In Europe, dual vocational training is standard practice and a time-tested economic model now incorporated into law in many countries. After students complete their mandatory years of schooling, usually around age 18, they apply to a private company for a two or three year training contract. If accepted, the government supplements the trainee's on-the-job learning with more broad-based education in his or her field of choice at a publicly funded vocational school. Usually, trainees spend three to four days at work and one to two in the classroom. Students receive a state certificate for passing industry exams, designed and administered by industry groups — a credential that allows transfer to similarly oriented businesses should the training company not retain them beyond the initial contract.

Such a program enables employers to take an active role in the education process and ensure that students are acquiring necessary skills. At the same time, the courses are accredited by colleges for applicability to higher education. This means that an apprentice can earn credits toward his or her degree while earning money, and learning, on the job. Germany is a leader in dual vocational training programs with their Technical and Vocational Training System (TVET)[26] system. Through its Chambers of Industry and Commerce (DIHK), Germany has launched pilot programs all over the world.

The focus on apprenticeship training in the residential construction industry has been to "raise the floor" – looking at ways to introduce qualification requirements where none have existed before. The TVET approach offers a means to "raise the ceiling" – offering a way to attract workers with skill levels beyond what is currently the norm. By laddering into higher education degree and diploma programs, students do not feel that their choice of a trade limits their opportunities. Currently in BC, apprenticeship training does not "count" when students try to enter other higher education programs and as such, they may be reluctant to enter trade training if they fear that their investments in technical training will be wasted should they change their career choice later.

25 Red River College's Mobile Training Labs brochure: http://www.rrc.ca/files/File/coned/Mobile-Training-Labs-brochurenew.pdf. A CBC video segment featuring RRC's mobile training labs http://www.youtube.com/watch?v=H_FrSLIrORw.

26 UNESCO World TVET database: http://www.unevoc.unesco.org/wtdbase_prev3.php?ct=DEU

"Would German-Style Apprenticeships Work in the U.S.? " Business Week article, July 2012 http://www.businessweek.com/articles/2012-07-19/german-vocational-training-model-offers-alternative-path-to-youth

Ontario's Co-Op Diploma Apprenticeship Program[27] is one of several initiatives implemented by the Government of Ontario to increase access to the skilled trades. The program enables individuals to train as apprentices in a specific trade while obtaining an associated college diploma. This initiative adds flexibility to the apprenticeship system, responds to employer needs, and attracts younger people to the skilled trades.

In Germany, the TVET system reaches all the way back to primary school helping to prepare students for the world of work. The TVET system also helps to address the stigma attached to vocational and technical school as a fallback for those who have failed in higher education (see diagram below).

In 2003, the University of Quebec looked at the German TVET system for applicability to Canada generally and Quebec in particular[28]. The study found that the primary success factor of a dual system is its ability to deliver "a proper balance between the process of acquiring vocational qualifications and that of acquiring academic knowledge" which offers a third option for students deciding between an academic or vocational career. A dual system also does not compete against itself. It prevents the potential of new solutions being put out by education systems in order to innovate and to solve the problems of adjusting to the labour market thus undermining the value of existing systems and creating "upward competition" through higher-level training programs.

The benefits of dual training to the residential construction industry include:

- Attract workers that may not otherwise consider residential construction
- Offers a different and more manageable solution to "block release" as trainees spend three to four days at work and one to two in the classroom.
- The program can include skills/occupations that are not covered by traditional vocational education. For example, CAD skills and detailing, new products/technologies, building code changes, etc.
- This initiative adds flexibility to the apprenticeship system, responds to employer needs, and attracts younger people to the skilled trades. The Ontario Co-op Diploma Apprenticeship model is a good case study.

Colleges as Community Hubs

Of all the various sectors in construction in BC, home building is the most regionally specific. The majority of home building companies work in their own community (of the 324 employers surveyed, 93% do not work outside of BC). They are therefore very likely to recruit workers from within their community and as such, a closer relationship between the residential construction sector and local training colleges will have a greater likelihood of optimizing training outcomes. A 2009 position paper from Colleges Ontario[29] calls for the provincial government to establish colleges as community hubs to strengthen the trades. The paper was developed in response to the 2008 economic downturn in Ontario, which was causing disruption to apprenticeship workplace training. Businesses are less able to take on apprentices and registrations drop, as apprentices are often last on a company's payroll and first off.

A number of colleges play a positive role in the community through programs such as:

- Student house building projects: (such as the Green Dream home[30] built by Thompson River University students as part of the CMHC Equilibrium® initiative)
- Student counseling and mentorship where instructors visit apprentices on the job-site to ensure they are getting the right experience (A suggestion from the Nanaimo focus group).

27Ontario Co-op Diploma Apprenticeship Program: http://www.tcu.gov.on.ca/eng/eopg/programs/coop.html. The program guidelines are available at: http://www.tcu.gov.on.ca/eng/eopg/publications/2012_13_coda_program_guidelines.pdf

28 Diane-Gabrielle Trenblay and Irène Le Bot, "The German Dual Apprenticeship System Analysis of its Evolution and Present Challenges", February 2003 http://www.teluq.uquebec.ca/chaireecosavoir/pdf/NRC03-04A.pdf

29 Colleges Ontario, "Transforming Ontario's Apprenticeship Training System Supplying the tradespersons needed for sustained growth", July 2009 http://www.collegesontario.org/policy-positions/position-papers/apprenticeship_transformation.pdf

30 http://www.cmhc-schl.gc.ca/odpub/pdf/66409.pdf

However, in a rapidly changing industry, colleges can also become advocates for world-class training. There are networks of technical training institutions dedicated to sharing best practices and advancing the quality and relevance of vocational training. For example, the International Network on Innovative Apprenticeship (INAP) [31]is an association of researchers and research institutions in vocational education and training. This international network of apprenticeship researchers aims to improve apprenticeship systems and practices through research into, and dissemination of, instances of good practice. Through the activities of the network, governments, employers and training providers will have access to current research findings that will persuade stakeholders of the benefits of apprenticeship, and improve practice in both off the job and on the job training. The network is involved with:

- Developing curricula and qualification system;
- Learning and development theories and models;
- Multiple roles of universities, schools and their teaching and training staff; and
- Measuring competence development.

A closer relationship between the colleges and industry will also enable timely feedback on the quality and currency of the training. Industry feedback suggests that the usefulness and relevance of training varies widely.

> **"Most of us would be happy to send them [apprentices] to courses if they are designed well. Sometimes the feedback from them is not positive."**
>
> **"Instructors need to refresh themselves with what is happening in the field; they are at risk of becoming out of touch with what is happening outside."**
>
> **"The courses overall are old. Some instructors try to keep up with modern material more than others"**
>
> ***Kamloops focus group***

Many of BC's training institutions are also responsible for training building inspectors and could provide a coordinating role in developing consensus on acceptable interpretations of the code training both builders and regulators.

> **"Many technical / complex building code changes that BOABC focuses on, but really relies on colleges / university programs to provide the training / education required for their inspectors in-line with the changes."**
>
> ***Interview with Building Officials Association of BC***

The schools can also play a central role in the recruitment process. They can help match apprentices with employers, host job boards, provide performance reviews, etc.

> **"I would like to have a way where we could work with the colleges and homebuilders where we could have a board and you send us the resumes. There should be a website where you put in the first years' grads and check on their jobs."**
>
> ***Prince George focus group***
>
> **"It shouldn't be too hard to supervise and scrutinize the performance of the current classes as they are not that large relative to university programs."**
>
> ***Nanaimo focus group***

31 http://www.inap.uni-bremen.de/

However, mechanisms need to be in place to prevent "poaching".

> **"We had a website where we put in the people but we had an issue where companies were saying people were poaching their electricians as well as the second and third year guys."**
>
> ***Interview with training provider & Prince George focus group***

Colleges can also work together to manage the wait times for apprentices seeking to complete courses. Currently there is no limit to the number of colleges an apprentice can apply to. Although the wait-lists may be long, the class sizes can vary with some classes being cancelled for lack of enrolment.

> **"Each apprentice has a number and they should only be allowed to register once."**
>
> ***Prince George focus group***

Also, there may be an opportunity to discuss ways to align trade training with college employment structures. For example, the collective agreements for instructors may not be optimized to work with the apprenticeship training programs.

> **"With our collective agreement, we have a 34-week contract with 25 hours a week. It doesn't work for carpentry."**
>
> ***Interview with training provider***

The benefits to the residential construction industry of colleges taking a leadership role as community hubs are:

- Help the scope and content of technical and vocational training to evolve in a timely way.
- Provide feedback-loops from the industry to inform training content
- Advocate for and strengthen the trades' position in the general workforce
- A forum in which stakeholders can participate, share experiences and benchmark with global best practices is critical to ensuring BC's industry remains competitive.

Journeyperson Mentoring

Training the trainer to be an effective mentor is important for optimizing an employer's investment in the apprentice. Given that workplace training represents such a large proportion of an apprentice's education, collectively, industry employers are responsible for the knowledge and productivity of the apprentice.

> **"A lot of the current apprenticeship model is dependent on the quality of the trainer."**
>
> ***Kamloops focus group***
>
> **"Employers should take responsibility for training – they should be liable if training is not complete but this then needs an incentive."**
>
> ***Nanaimo focus group***

Nova Scotia Community College (NSCC) has developed a mentoring program for apprentices and employers. This program will help to support journey people in their role in mentoring apprentices. Likewise, apprentices will also learn the skills of mentoring as they complete the training and move ahead in their careers. Accompanying the program is a "Workplace Mentoring Toolkit"[32] which is a guide for

32 NSCC Workplace Mentoring Toolkit http://apprenticeship.nscc.ca/mentoring/Mentoring.Resource.Toolkit.pdf

teaching and learning in the workplace. The toolkit includes a mentoring log so students can track their interactions with their supervisor. Expanding the apprentice's logbook of training experience to capture specific experiences will better ensure that a range of experiences is acquired.

> **"The logbook needs to be well designed to ensure the apprentice has had a well-rounded experience."**
>
> ***Nanaimo focus group***

> **"There is not a fully developed work plan for apprentices. During work-based hours, apprentices log hours of work experience. It's up to them where they get the experience and the ITA does not specify what type of work they should complete."**
>
> ***Interview with industry association***

The Alberta Blue Seal Program, which is run out of the Northern Alberta Institute of Technology (NAIT)[33], also offers a Business Supervisory Development Certificate Program[34]. The program is designed to develop and strengthen supervisory abilities and aimed at front-line supervisors, managers, and team leaders who need practical skills for dealing with day-to-day management challenges.

> **"In an ideal world, the senior employees ought to be trained to train other apprentices, but that's not what happens."**
>
> ***Kamloops focus group***

Apprentice Share Programs

A 2009 BC study[35] on improving employer participation in apprenticeship training suggests that to improve the flow of workers into the skilled trades and address apprenticeship barriers, policies will need to focus on producing additional work opportunities that are conducive to apprenticeship training, improving the flexibility of apprenticeship work arrangements, correcting information problems regarding skill assessment, and suppressing 'underground' firms.

Examples of apprentice-share arrangements include the programs set up by the Canadian Electrical Joint Training Committee (EJTC)[36] and Australian Group Training Organizations (GTOs). These programs could further benefit from being supported by an interactive user-supported web platform that provides accurate industry and firm-specific information to other firms, workers, prospective workers, and consumers.

Other options may include an industry association, such as CHBA, or a college indenturing apprentices to ensure they are getting the right experience. For example, the College of the Rockies in Alberta secured a variety of apprenticeship work experience placements with the industry partners for their mining apprenticeship program (MAP)[37]. The College is now able to indenture (sponsor), supervise the apprentices and program, and provide the technical training. This solution may be applicable for "un-qualified" sole operators to encourage them to take on an apprentice.

33 http://www.nait.ca/90159.htm

34 http://www.nait.ca/program_home_16881.htm

35 : Eric Hamilton-Smith "Increasing Skilled Trades Employer Participation in Apprenticeship Training in British Columbia", SFU thesis study, 2009

36 http://www.ejtc.org

37 http://www.cotr.bc.ca/map/cotr_web.asp?IDNumber=154

Post-Apprenticeship

Licensing and Continuing Professional Development

The Homeowner Protection Office (HPO) is working with industry, through the Professional Builders' Institute of BC (PBIBC)[38], to develop a proposed new system of qualifications for builder licensing[39]. Moving ahead, the focus continues to be on developing a competencies framework for homebuilders. This includes a process for assessing qualifications and continuing professional development.

The mandate of PBIBC is to increase the professionalism of Residential Home Builders in BC in the business of building and/or selling residential buildings that contain from 1 to a maximum of 4 homes per building, through education, training and certification.

The PBIBC has recommended to government that qualifications for Licensed Residential Builders be prescribed in the following 10 Categories:

- Business Planning and Management
- Human Resource Planning and Management
- Financial Planning and Management
- Project Management and Supervision
- Legal Issues on Housing
- Building Codes
- Construction Technology
- Occupational Health and Safety
- Customer Service
- Communications

The PBIBC (industry) will establish and recommend the 'benchmarks' for education, training and experience needed by a new applicant to satisfy the 'Prescribed Qualifications.'

> **"Problem is that the government does not perceive there to be a problem. However, the professionals are aware that there is with the current qualification model."**
>
> ***Nanaimo focus group***

> **"There are about 5,200 HPO licensed builders in BC – of those I'm guessing that more than half are not trained at all – they shouldn't be grandfathered into a certificate, some don't know what they are doing. Mandatory education will certainly flush these guys out."**
>
> ***Interview with training provider***

The Oregon Construction Contractors Board[40] is responsible for licensing and mandates continuing education. Contractors getting their CCB license for the first time are required to complete at least 16 hours of training on law and business practices, and pass a state test. The person that takes the training and passes the test is the Responsible Managing Individual (RMI) for the license. The RMI must be an owner or employee of the business and exercise management or supervisory authority over the construction activities of the business. Oregon law requires a license must always have a RMI.

38 http://pbibc.ca

39 http://www.hpo.bc.ca/building-bc-2011-year-review/page/1/3

40 http://www.oregon.gov/CCB/Pages/Education.aspx

"The worst thing is the builder who has been doing the same thing wrong for years. These guys are training apprentices wrong and perpetuating the problem."

Interview with training provider

In BC, the PBIBC is now working towards developing a recommendation for a Prior Learning Assessment and Recognition (PLAR) process to allow for broader recognition of education, training and experience required for licensing. PLAR will provide a process to assess and recognize the full scope of prior adult learning, from formal academic programs through to informal learning in the workplace, the community and the private sector will be developed. It is proposed that PLAR would apply when a new license applicant seeks to have their previous experience/education assessed against the benchmarks. This allows for the ability to identify non-traditional training that satisfies the identified benchmarks.

"Master-level" Programs

The complexity of home building is increasing with new codes and standards, higher market expectations and adoption of new technologies and approaches. The Canadian Construction Association runs the Gold Seal program[41] offers continuing education largely focused on developing business skills. On a provincial level, the Alberta Apprenticeship and Industry Training Board established the Blue Seal Program, which is also designed to encourage and recognize business training. The program is open to certified Alberta journey people in a designated trade or occupation. The program is run out of the Northern Alberta Institute of Technology (NAIT)[42], which currently offers a business management certificate program and a supervisory development certificate program.

While developing business and management skills is important, there may also be a need to develop technical skills. A selection of master-level technical programs form other jurisdictions are provided below.

"Agreement on a modularized program that offers a 'master builder' that is distinct from other types of building. "

Nanaimo focus group

"Mastership" certificate

While a number of European Vocational colleges and Technical Institutes offer "Master" level training, they tend to be very technically advanced and do not provide a direct link back to the apprentice-level skills currently offered by BCIT. An interesting alternative is offered by the Chartered Institute of Plumbing and Heating Engineering (CIPHE)[43] - the professional body for the UK plumbing and heating industry. Membership is made up of individuals from a wide range of backgrounds such as consultants, specifiers, designers, public health engineers, lecturers, trainers, trainees and practitioners.

CIPHE administers a multi-tiered qualification system comprising Master, Journeyman and Apprentice Certificates for plumbers. In the UK, Master Certificates[44] were introduced in 2001 by a partnership of unions and professional bodies. There are now Master Certificates for Carpenters, Joiners and Shopfitters. Over 250 Master Plumber Certificates have now been awarded. To apply for the CIPHE Master Plumber Certificate, the following minimum requirements must be met.

41 http://www.goldsealcertification.com/

42 http://www.nait.ca/90159.htm

43 http://www.ciphe.org.uk/

44 CIPHE Master Plumber course details www.ciphe.org.uk/Global/Master%20App%20forms/Background_to_the_scheme.pdf. All CIPHE approved courses are listed at: http://www.ciphe.org.uk/Professional/Professional-Development/Providers-Directory

- The Master Plumber Certificate shall be valid while that person remains a member of The Chartered Institute of Plumbing and Heating Engineering (CIPHE)
- Be qualified to Level 3 and be accepted for City and Guilds Licentiateship
- Be registered as an Engineering Technician with the Engineering Council
- While in membership of the CIPHE the holder of a Master Plumber Certificate is obliged to conform to its Code of Professional Standards
- Photocopies of academic or other certificates must be submitted as evidence of qualifications;
- The applicant has been engaged in the industry for at least 10 years
- Two nominated referees must sign the application. These should be people who know the applicant professionally e.g. manager, client, teacher
- Satisfy the panel of assessors

Recognizing the pivotal role that plumbers play in energy efficient and high performance building, CIPHE also administers the GreenPlumb program is a database of members that have specialized in renewable / sustainable technologies and committed to training and Continuing Professional Development as provided by CIPHE. Training programs include the following certificate programs:

- Energy Efficiency Certificate
- Water Regulations Certificate

Plus the following accredited (where applicable) courses:

- Solar Thermal, Ground Source Heat Pumps, Air Source Heat Pumps, Grey Water Harvesting / Recycling, Rain Water Harvesting / Recycling, Biomass, Water Efficiency

> **"Mastership promotes professionalism and workers can keep rising."**
>
> ***Industry association interview***

While the Canadian Institute for Plumbing and Heating (CIPH) is the Canadian equivalent to CIPHE. The groups in BC most closely affiliated are the Thermal Environmental Comfort Association (TECA), which represents heating contractors, and the Mechanical Contractors Association of BC (MCABC). Any of these organizations could serve as an industry partner in the development of a similar certification program.

> **"There is no such institute in BC. It could attract a whole new demographic into the trades and give it a sense of accomplishment, hierarchy (provide parents with comfort that their sons and daughters do have motivation and goals in their career)."**
>
> ***Training provider interview***

Trade training centres

There are number of trade associations in BC which have established successful certification systems for their members and, separately, have established dedicated training centres for their apprentices. For example, the Masonry Institute of BC[45] has a well-established and industry accepted certification scheme, the Technical Masonry Certification, which is now referenced in the bidding process. It is also very involved with the Trowel Trades Training Association (TTTA)[46], which trains masonry apprentices. However, despite being the largest group of trades people in BC, carpenters are less cohesive and do not readily convene on professional or technical matters except through the Carpenters Union of BC[47] (which is primarily focused on the commercial and industrial sector).

45 http://www.masonrybc.org

46 http://www.ttta.ca

47 http://www.carpentersunionbc.com/

In the US, the Chicago Regional Council of Carpenters (CRCC)[48] offers a range of green and energy efficiency training and support for its labour force out of five purpose-built training centres across Illinois. It includes all aspects of the carpentry trade from home building to industrial forming. The CRCC carpenter-training centre in Elk Grove Village develops green and energy efficient construction techniques. The workshop displays mock-ups, models, samples and product literature (MSDS sheets, environmental product declarations, etc). The CRCC also estimates that approximately 8,000 of their members take advantage of 300 evening and weekend courses offered by the CRCC Carpenter Skill Advancement Program (CSAP) every year. These courses are taught in several languages and are offered at five training centers across the state of Illinois.

Laddering into degree and diploma programs

Raising the profile of vocational education is considered key to advancing professionalism within the construction industry. Providing long-term options for students may dispel some of the perceptions of a career in the trades.

> **"Around the world, trades people are considered professionals except here. In Europe they don't understand the way they are regarded here."**
>
> ***Nanaimo focus group***

There are many programs such as R-2000, BuiltGreen, RenoMark, Canadian Passive House institute, etc. but none contribute towards a college or university credential.

Advanced Housing[49] at Algonquin College in Ontario is a challenging two-year diploma program that teaches students fundamental carpentry skills, energy-efficient design and assemblies, advanced framing techniques, and green building principles, materials, and construction practices.

Programs at Algonquin College are delivered using a variety of instruction modes. Courses may be offered in the classroom or lab, entirely online, or in a hybrid mode which combines classroom sessions with online learning activities. Starting Fall 2013: this is a Mobile Learning Program.

In Europe, the laddering between vocational and academic education is more established. Through the TVET program and other systems, students can not only move within a broad-based education system, but opportunities for educational advancement also exist all the way through to a doctorate degree.

> **"There needs to be a pathway to get the smart kids at a lower grade level and make it appealing to them. In Canada we don't have a structure that allows engineering credit beyond a trade which makes it unappealing. Parents are horrified if you tell their grade 10s to go become carpenters which is not so in Europe."**
>
> ***Prince George focus group***

For example, a Master of Science in Wood Technology is available to students who have worked up through their carpentry apprenticeship as well as university students in forestry science, engineering and related disciplines.

This qualification enables graduates to succeed in high-level positions in all areas of the Swiss and international wood industry, including its suppliers and customers. Possible fields of future employment are manufacturing and engineering, project planning and management, material testing, quality management, consulting, education, as well as research and development. Graduates are qualified to pursue a doctorate degree at a university.

48 http://www.carpentersunion.org/site/epage/114121_837.htm

49 http://www2.algonquincollege.com/perth/program/construction-carpentry-advanced-housing/

Funding models

Solid, stable, and sustainable funding is necessary to continue to develop, implement, and test programs that will advance training opportunities and raise the bar in residential construction. Where funding models have been successful, there has also been strong commitment from government, which is invariably responsible for other duties such as dispute resolution, licensing, etc. However, the short-term prospect for BC is uncertain with a pending election in May 2013.

> **"My real concern here is that the current government does not appear to be in a position to advance CPD requirements. This leaves the entire future of "Raising the Bar" to the priorities of a post-May 2013 election government. I fear that the lack of consensus within the industry on how to move forward may result in the worst possible outcome; an industry without any real change in licensing requirements or regulatory reform."**
>
> ***Interview with training provider***

Communication and Outreach Pilot Projects

A key challenge for the residential construction industry is the number of "non-participating" businesses. According to StatsCan, there are almost 13,700 residential building companies in BC of which 8,700 are sole operators and have no employees. The remaining companies which retain at least one employee total about 5,000, which aligns with HPO's number of licensed builders (just over 5,000). There are only 885 builders, renovators and trade contractors who are members of CHBA. This is reinforced by the industry survey findings in which only 51% of the employer respondents were members of an association. While HPO may be able to reach out to the licensed cohort, the sole operators are largely unreachable through existing channels. It is therefore important to explore ways to reach out to non-participating employers to persuade them to participate in programs to improve their technical knowledge, which may lead to improved uptake in the apprenticeship system.

The discussion paper published by Colleges Ontario[50] proposes that the Ontario government fund a series of pilot projects at colleges to build bridges to builders and boost participation. According to the paper, only one-sixth of Canadian employers with tradespersons are involved in apprenticeship. A study by the Canadian Apprenticeship Forum[51] also notes that the lack of awareness among some employers about the supports available indicates continued efforts to communicate with employers are worthwhile. For example, touch-points with the non-participatory segment of the industry may comprise local authorities via the building permitting process.

> **"There are some builders who are on the 'learn by deficiency' list. The building official takes on the role of educator. Re-inspection fees should be much higher to cover the cost."**
>
> ***Nanaimo focus group***

Communication to the general public is also an important objective.

> **"CHBA and others need to provide education for the public and realtors – no one understands the value of a high-performance well built home. The public can't tell the difference."**
>
> ***Interview training provider***

50 Colleges Ontario, "Transforming Ontario's Apprenticeship Training System Supplying the tradespersons needed for sustained growth", July 2009 http://www.collegesontario.org/policy-positions/position-papers/apprenticeship_transformation.pdf

51 Canadian Apprenticeship Forum, "Employers and Apprenticeship in Canada", June 2011 http://www.caf-fca.org/index.php?page=employer-participation-in-apprenticeship&hl=en_CA (registration required)

Pilot projects are also necessary to understand the costs and benefits of training and apprenticeship in residential construction. The costs to employers associated with the apprenticeship system are currently not known and need to be evaluated. In the light of the global economic downturn employers in Germany, a country that has arguably embraced apprenticeship more than any other, are increasingly withdrawing from apprenticeship provision.

As a result, a German study[52] was published to show that the quality of learning in apprenticeships can be increased without raising costs under certain conditions. The study references the German dual training system which delivers very thorough and technically advanced training, however there are pointers for Canada in the context of developing an economic model, and testing it through pilot projects in order to demonstrate the value of training to residential construction businesses.

The findings in the paper challenge the classical economics of apprenticeship. “Grounded” indicators of quality in apprenticeship are formulated including:

- Learning in productive work processes is a core characteristic of apprenticeships
- The productive work apprentices engage in needs to follow a well thought through sequential logic
- Learning is based on a high degree of autonomy
- Learning is embedded into the business process
- Client satisfaction provides an important quality benchmark
- Commitment to occupation and the company can provide a source of responsibility and quality
- Professional competence is the ultimate goal of learning.

The results from the German study were subsequently processed into a self-evaluation tool to assist companies in their cost-benefit calculation. The paper suggests an intensified integration of apprenticeship training into productive work processes. In order to turn this into quality learning the complexity of tasks needs to be increased over the course of apprenticeship.

Apprenticeship Innovation Fund

To help support ongoing research and testing of models, funding needs to be in place to provide ongoing, stable support. Such a funding system needs to be governed by clear rules of accountability and reporting.

The Ontario Apprenticeship Innovation Fund (AIF)[53] supports the development of high-quality curriculum for new and existing apprenticeship programs and the development of exemption tests for apprentices. AIF also supports the development of tools that enhance traditional classroom delivery and allow apprentices to learn at their own pace. Colleges, approved apprenticeship training delivery agents, and organizations that meet submission requirements are eligible to submit proposals under the AIF. Calls for proposals are sent to all approved apprenticeship training delivery agents from the Ministry of Training, Colleges and Universities.

52 Study: Philipp Grollmann, (Universität Bremen, Bremen, Germany), Felix Rauner, (Universität Bremen, Bremen, Germany) “Exploring innovative apprenticeship: quality and costs” (Germany) http://www.emeraldinsight.com/journals.htm?articleid=1626252

53 http://www.tcu.gov.on.ca/eng/employers/innov_fund.html

Apprentice Income Support Program

For small businesses, the risk of losing apprentices during the training process is a major concern. They also have limited ability to financially support the apprentice while he/she is away at school because the apprentice is not productive. Some larger companies can afford to "top up" the apprentice's EI support or offer other incentives to ensure the apprentices comes back to the company.

> **"An incentive for the contractor to keep as many apprentices in training as possible; the current system is hurtful for the contractor. It's a nightmare losing these guys for up to 8 weeks."**
>
> ***Burnaby focus group***

To address this issue, the Alberta government runs the Alberta Works program to help unemployed people find and keep jobs, help employers meet their need for skilled workers, and help Albertans with low incomes cover their basic costs of living. Alberta Works achieves these goals through its four program areas: Employment and Training Services, Income Support, Health Benefits and Child Support Services. In particular, the Alberta Works Apprentice Income Support program[54] provides financial assistance to apprentices while they are attending full-time technical training.

Eligibility is determined by Human Services (formerly AEI). If EI benefits are not sufficient to cover living expenses or the apprentice does not qualify for EI benefits, and needs additional funds to cover the cost of tuition, books and moderate living expenses, the apprentice may be eligible for financial assistance provided he/she is attending full-time technical training as part of the apprenticeship program, and can demonstrate financial need.

[54] http://humanservices.alberta.ca/financial-support/3192.html#apprentice

Addressing Industry & Training Barriers & Challenges

The most commonly identified barriers and challenges for the residential construction industry and related training are listed in the tables below. Some potential solutions are also listed in the tables beside the corresponding challenges.

Industry Related

Political / Regulatory	
Barriers	**Potential Solutions**
• Additional complexities and risks/liabilities in the building industry tied to evolving building codes and new technologies • No licensing for renovators and requirements homebuilders to pull municipal permits • Low barriers to entry and low value assigned to residential specific trades such as carpentry	• Require licensing for home builders and renovators linked to CPD • Consider developing sub-ticketed trades through a moduralized system • Have industry push for PLAR recognition for those working in the industry who may be experienced but not already recognized through qualifications • Tying building permit applications to trade qualifications and required training
Economic	
Barriers	**Potential Solutions**
• Downward cost pressures on the industry resulting in a trend toward "de-skilling" and specialization • Competition for skilled labour with higher-paying sectors (i.e. ICI construction, natural resource, etc.) • Smaller communities require workers with more diversified skill sets	• Provide opportunities for more diversified work experience throughout an individual's apprenticeship program through tracking and logging hours in different categories and exploring apprentice share options. • Develop retention strategies that go beyond salary to counter competitive wages in other sectors
Social	
Barriers	**Potential Solutions**
• Cultural perceptions with respect to working in the trades • Impending labour shortage due to attrition (retirement) • Shortage of experienced residential construction project managers	• Develop strategies to raise the profile for the benefits of working in the residential construction industry • Develop tools for employers and workers/ apprentices to better connect with one another (e.g. online portals, industry liaisons, etc.) • Make it easier for employers to hire and retain apprentices (training credits, tax incentives, etc.) • Focus on attracting new demographics into the industry and recognize foreign worker credentials through PLAR processes, etc. • Develop pathways for continuous learning in the industry to attract new demographics and shift public perceptions

Technological	
Barriers	**Potential Solutions**
• Lack of home energy performance related skill sets in the trades, from design through to installation and maintenance (building envelope, building science, HVAC, controls)	• More collaboration with equipment manufacturers / suppliers and more education on the "home as a system" as a CPD requirement for all builders and trades • Encouraging an integrated project delivery process on the construction site involving engineers, architects, builders, etc.

"Larger problem is the lack of regulation in the residential sector; you do not need to be ticketed to work in residential construction and the wages reflects this. This makes it hard to attract new workers."

Response from Business Owner Survey

"All contractors (general) and renovators should be licensed and should hold a trade certificate in their related field to apply for building permits."

Response from Business Owner Survey

"Earlier recognition of suitable students for trades starting in the middle school years. Should foster these children in the chosen trades and not only concentrate on streaming them through university. Not everyone is going to be a traditional "professional"."

Response from Business Owner Survey

"New apprentices need to have a better understanding of a construction site, use of basic hand and power tools, communication and basic blue print reading."

Response from Business Owner Survey

Education & Training Specific

Pre-Apprenticeship	
Barriers	**Potential Solutions**
• Shortage of youth with well-developed "life skills" • Lack of understanding and experience with basic tools, numeracy, etc.	• Develop additional pre-requisites and front-end load more skills into high-school and pre-apprenticeship programs (WHMIS, first aid, safety, basic tools, numeracy, etc.) • Develop construction-related summer camps to engage youth (K-12 levels) in trades
Apprenticeship & Training	
Barriers	**Potential Solutions**
• Lack of a "culture of apprenticeship" in residential construction • Affordability issues for both apprentices and employers • Block release issues – the cyclical and seasonal nature of the industry makes it difficult for employers to indenture apprentices when it's slow and hard for apprentices to leave the job site when it's busy • Challenge for employers to spend time training apprentices – considered as an added cost and liability • Colleges and instructors have limited budgets and time for expanding / updating program curriculums • Structural issues related to ITA (e.g., reliance on block release model, minimum enrolment for full funding, etc.) • Lack of regulatory enforcement with respect to tracking and reporting of apprenticeship hours by employers • Limited access to training providers and educators in rural areas	• Incentivize employers to invest in training their apprentices through training credits, tax breaks, etc. • Provide student loans to apprentices going through their trade programs • Provide more flexibility with respect to training in terms of scheduling in-school training / learning (evening / weekends; front-loading with one year in school, then 2 years on the job site, etc.; bulk of school training in the winter months) • Develop "apprentice/employer support hubs" with an industry liaison to connect businesses with apprentices, provide better alignment between training providers and industry, and provide input on current practices, technologies, and building code developments • Enforce the reporting of apprentice training hours and journeyperson requirements • Structure apprentice log books to allow training to be recorded in different areas and consider developing "sub-tickets" or "endorsements" based on this modularized approach • Address waitlist issue with max. registrations per apprentice • Provide more accessible education / training options through mobile trainers/ building inspectors, online programs, etc.
Continuous Learning	
Barriers	**Potential Solutions**
• Limited access to training in rural areas • No well-recognized pathway for ongoing / advanced-level education and training • No requirements for CPD resulting in low participation rates by industry and added risks, liabilities and costs	• Provide more accessible education / training options through mobile trainers/ building inspectors, online programs, etc. • Develop more recognized pathways to learning that go beyond the CofQ / Red Seal to include construction management, business ownership, and laddering into mastership trades, diploma, and degree programs • Link CPD / training requirements to annual licensing of builders and developers and extend to renovators and sub-trades in the province.

"Provide more access to young workers and provide an apprentice pool to allow contractors to draw from."

Response from Business Owner Survey

"Options should be available to give more detailed schooling at night, which can reduce the amount of time employees are needed to be away from work."

Response from Employee Survey

"Waitlists to get into classes have always been a problem."

Response from Business Owner Survey

"Schooling should allow for students to specialize their education if they only plan on doing one segment of the work. An example would be framers who only do framing and need more education directly in that field."

Response from Business Owner Survey

"I am finding that most of the journeymen carpenters I have employed over the past few years are lacking very basic hands-on skills in residential construction aspects. The problem with the apprenticeship program is that most times these apprentices are sponsored by major commercial outfits which don't see them practicing skills in other areas."

Response from Business Owner Survey

"I think that the schooling end of the apprenticeship program is okay. In my opinion, the companies that train our new tradespeople for the future do not train them fully. For example, some of the plumbing companies have their apprentices install drainage lines for the entirety of their training because it's grunt work. They never train them on how to install water lines or how to install final fixtures. After the apprentices have their required hours for on-the-job training, they are now considered a journeyman plumber and yet they can't even replace a hot water tank."

Response from Business Owner Survey

Conclusions

The findings for this study confirm that the residential construction sector plays a very important role in BC's economy and that apprenticeship and trades training are critical supports for ensuring the overall quality and professionalism of the industry as a whole.

The fact that half of the business owners surveyed for this study had apprentices employed on a full-time basis within their companies attests to the fact that the relationship between the employer and trainee in the career development pathway for construction is of critical importance. At the same time, three out of four business owners felt that at least some changes would help to improve the overall system.

Barriers and challenges with respect to apprenticeship and occupational training in BC can be organized into four main categories as described in more detail previously in this report, tied to the various stages of education and training, from pre-apprenticeship, through to actual apprenticeship and training programs and on to continuous learning. Identified challenges include:

- The lack of understanding and experience with basic tools, numeracy, and other "life skills" among youth;
- The lack of a "culture" of apprenticeship in residential construction;
- Affordability issues for both apprentices and employers around the current training model;
- Block release issues tied to the cyclical and seasonal nature of the industry;
- Challenges for employers to spend time training apprentices – considered as an added cost and liability;
- The limited budgets, time, and capacity to expand / update program curriculums for training providers;
- Structural issues with respect to ITA funding and the traditional delivery model;
- The lack of regulatory enforcement with respect to tracking and reporting of apprenticeship hours by employers;
- The limited access to training providers and educators in rural areas;
- No well-recognized pathway for ongoing / advanced-level education and training; and
- No requirements for continuous professional development resulting in low participation rates by industry and added risks, liabilities and costs for the industry as a whole.

While there are indications that apprenticeship training does not go far enough, at the other end of the spectrum, it does not address the skills gap of under-trained and non-certified workers currently involved in the residential construction sector in BC.

While this may ultimately be a regulatory issue that can be addressed through licensing linked to continuing professional development, training providers have the ability to create and deliver stand-alone programs as "stop-gaps". This is a good way to gauge industry support and adjust curriculum "on-the-fly" if necessary. The success of continuing education courses is conditional on industry support and programs / courses need to be developed in close cooperation with industry representatives with subsequent commitment to provide participants. Sometimes, the capacity crunch is short-lived and by the time the courses are available, the problem has passed.

Another course of action is to focus not only on training flexibility but also offer continuity. This is especially important during such a rapidly changing time in the industry and to ensure training investment dollars are retained in the industry during inevitable cycles. Historically, BC's construction industry has suffered from the loss of skilled workers to other provinces during economic lulls and has found that it is very difficult to get them back.

By providing a range of training opportunities in terms of depth and breadth, as well as targeting different career stages, it is possible to improve retention, foster greater commitment to program completion, and improve resiliency. For example, in Switzerland, it is possible for a vocational carpentry trainee to begin his/her trade training at 16 years of age and, through a series of distinct but connected programs, advance his/her training experiences through to a Masters in Wood Technology should he/she so desire.

Additional opportunities related to education and training for the residential construction industry in BC include developing:

- Job portals and training information websites to help connect employers, job seekers, and apprentices and inform key industry stakeholders;
- More pre-apprenticeship and foundational skills programs that target youth with construction-related work / life skills;
- A mentoring skills program and resources to help "train the trainers";
- An apprentice share program to help alleviate some of the challenges for the small business owner in residential construction to take on apprentices for extended time periods;
- Detailed and comprehensive record / log books to record an apprentices experiences and competencies in different areas; and
- More flexible program delivery and scheduling opportunities, including blended learning, mobile training, and alternatives to the block release structure.

An industry liaison can also go a long way by acting as a resource coordinator to connect employers with training providers and trainees; playing a supporting role to raise the profile of the residential construction industry in BC; coordinating industry support for residential-related programs and curriculum updates; and advocate for funding / incentives, regulation and licensing, and program flexibility and accessibility.

The home building industry is attracting an increasingly diverse workforce for whom flexibility and accessibility in the learning process is becoming increasingly important. It is this "new face" of the industry which will benefit from the experience and knowledge of qualified professionals working in the industry. The opportunity and timing for raising the bar for the residential construction industry in BC in terms of quality and professionalism has never been better.

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