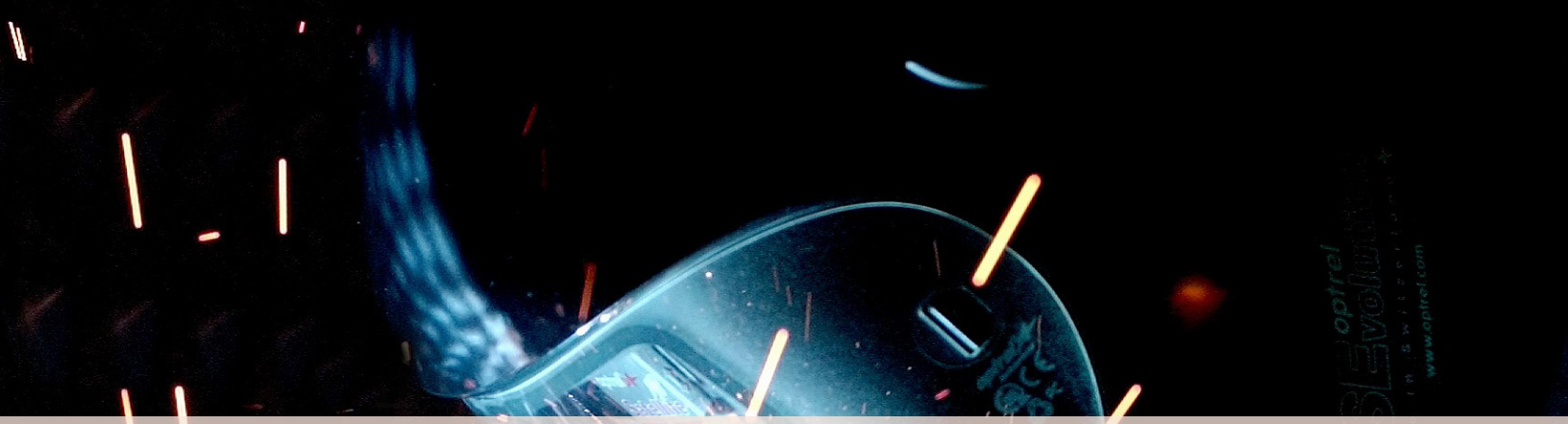

Labour Market Information Research for the BC Manufacturing Sector

FULL REPORT

Canada

British Columbia

Canada Starts Here | BC Jobs Plan

Ference Weicker & Co.

Funding provided through the Canada–British Columbia Labour Market Development Agreement.

Canadian Manufacturers & Exporters

Executive Summary

Purpose of the Study

The objectives of this project, as defined by the Specialized Skills for Manufacturing Steering Committee (SSSM), were to develop an inventory of existing Labour Market Information and Intelligence (LMI) and complete a thorough environmental scan focused on (1) the size and high level characteristics of the sector by sub-sector, region and size of company; (2) the characteristics of the workforce in the sector including level of current employment, staffing by National Occupational Classification (NOC), recent growth, projected growth, and demographic characteristics (age, gender, years of experience in occupation, language, training, and immigration); and (3) the primary occupations and skills identified as in short supply by BC manufacturers.

Method of Study

A detailed work plan was developed during the first phase of the project which defined the research questions, what data was required to address each question, identified the key data sources, and outlined the methodologies that would be used to collect the required data. The approach and data collection tools were then approved by the Steering Committee established for the project prior to commencement of the field research. The methodologies included a review of available labour market information and other data published by Statistics Canada, Industry Canada, Census Canada, BC Stats and others related to the manufacturing sector in BC; a review of past reports, literature and other documents relevant to labour market for the BC manufacturing sector; development of a database of 6,487 companies active in the BC manufacturing sector; a survey of 557 of manufacturing companies in BC (which together account for 19% of employment in the sector; the questionnaire was lengthy and detailed with the average response time amongst those who fully completed the questionnaire being over 48 minutes); and interviews with 18 subject matter experts.

Major Conclusions

The major findings of our review are as follows:

Employment in the Manufacturing Sector

1. Manufacturing is a major contributor to the economy in BC.

Manufacturing is BC's third largest source of employment, directly providing over 179,200 jobs and indirectly supporting hundreds of thousands of others in related sectors. In 2012, the sector was the fourth largest contributor to provincial GDP and was the primary source of exports for BC. GDP in the sector has grown by 43% since 1997 and manufacturing shipments have grown at the rate of 6.2% annually since 2009.

2. **Manufacturing is very diverse, characterized by wide variations in the nature of employment not only across sub-sectors but also within sub-sectors and occupational classifications.**

   BC's manufacturing sector has become increasingly diversified over time, producing an ever widening range of value-added products and components. Even within particular sub-sectors, manufacturing operations vary widely in terms of size of operation, labour and capital intensity, level of value-added, level of unionization, and regional locations.

   As a result of this diversity, manufacturing employs workers from a wider range of NOCs and experiences greater variation in the nature of positions within those NOCs than any other segment of the provincial economy. Approximately 40% of BC manufacturing employees are employed in occupations relatively unique to the sector (i.e. the sector employs a majority of the people employed in those professions) while 60% work in occupations which are not unique to manufacturing and processing. Amongst those unique to the sector, the most common occupations are machine operators, manufacturing labourers and manufacturing managers and supervisors; even within these occupations, the nature of positions varies widely across operations depending upon the manufacturing process, machinery, products produced and other factors. Amongst those occupations which are not unique to manufacturing, the leading occupations in the sector include trades and other production-related positions, administrative support services, transportation and material handling, management, sales and service, mechanics, equipment operating, engineering and science, and other technical positions.

3. **A majority of manufacturing jobs are permanent, full-time positions located in the Lower Mainland and Southwestern region which are filled by men over the age of 35.**

   The wood, food, paper, transportation equipment and machinery sub-sectors employ the greatest numbers of workers. The Lower Mainland/Southwest region of the province accounts for 64% of the number of manufacturers and 67% of the number of people employed in the sector. According to the survey:

   - The vast majority of workers are employed on a permanent, full-time basis (94%).
   - Almost one-third (33%) are under the age of 35, 43% are between the ages of 36 and 54 years, and 24% are aged 55 years and older.
   - Women account for less than one-fifth of the workforce and 4% of manufacturing employees are Aboriginal.
   - While temporary foreign workers make up considerably less than 1% of the work force, 8% of the workers have immigrated to Canada in the past five years.
   - Approximately 8% of manufacturing employees commonly work in a language other than English, usually in Mandarin or Cantonese (51%), Tagalog (14%) or Spanish (11%).
   - Approximately 16% of workers possess credentials or professional designations other than trade certificates which are either required or important for their positions and 13% of workers have a university degree.

- A little more than half of manufacturers employ tradesworkers, most of whom (65%) are journeypersons followed by apprentices (18%). About 17% of tradesworkers are neither journeypersons nor apprentices. Overall, 73% of journeypersons were credentialed prior to being hired by their current employer. The most common trades include welder, machinist, industrial mechanic (millwright) and metal fabricator.

Labour Market Conditions and Outlook

4. While the BC labour market for manufacturing has tightened somewhat over the past two to three years, conditions remain balanced.

Employment has recovered, but remains below the levels which existed between 2000 and 2008. After declining by 20% over a two year period from 2007 to 2009, employment in the sector has grown at the rate of 3.7% annually. This rate is similar to the growth rate reported by the employers that were surveyed (average employment growth of 19% over the past five years).

Most subject matter experts and employers indicate that current labour market conditions are balanced. This is consistent with the results of the survey, which indicate that the rate of new hiring is consistent but moderate, the level of staff turnover is comparatively low, the majority of that turnover is employer driven (e.g. seasonal, cyclical, or performance related) rather than worker driven, and the level of inter-firm poaching remains low (most new hires were either unemployed or working outside the sector at the time).

5. Employers, selected experts and secondary sources anticipate that conditions will likely tighten somewhat over the next few years, which could create shortages amongst skilled workers and semi-skilled workers.

The key factors expected to contribute to some further tightening of labour market conditions include:

- Growth in existing operations (nearly 60% of surveyed employers expect higher employment over the next five years). Surveyed employers project that employment within their organization will grow by 13% over the next three to five years (about 3% per year). Nearly 60% of surveyed employers expect higher employment while 22% expect employment demand to stay at current levels. Increased employment demand is believed to be driven primarily by increases in the volume of goods produced. In comparison, the Canadian Occupational Projection System projected that employment in positions associated with the manufacturing sector would grow at the rate of about 1.3% per year.

- Aging of the existing work force (increasing replacement demand). Nearly one-quarter of the work force is 55 years or older and will need be to be replaced over the next eight to ten years with new workers or through productivity improvements.

- Increased competition for workers from other regions. Strong demand for resources combined with implementation of major project currently proposed would increase the demand for skilled workers in northern BC and Alberta.

6. **There is growing uncertainty within the sector regarding how significant future shortages in manufacturing will be.**

   The survey and key informant interviews detected a certain cynicism regarding the potential for future labour shortages. Both employers and key informants have long heard about the impact that major projects and the aging of baby boomers will have on access to workers. Although conditions have tightened somewhat with the economy recovery, the predicted shortages have not materialized. Although employers remain somewhat concerned about the potential for shortages, they are becoming less convinced of the inevitability or significance of those shortages.

   According to employers and key informants, the magnitude of future shortages will be a function of:

   - Market conditions, including the strength of the demand for BC-made goods in the United States, within Canada's domestic market, and in other key markets including Asia.
   - Factors that affect the cost competitiveness of BC manufacturers including the value of the Canadian dollar, level of productivity, labour rates, and various input costs such as raw materials, transportation, power and border-related costs which pose a financial burden on Canadian manufacturers exporting goods to large US markets.
   - The extent to which proposed major projects proceed in the resource and construction sectors;
   - The strength of the international competition;
   - The influence of government programs, regulations, policies and agreements; and
   - Labour market participation rates (e.g. extent to which older workers remain in the workforce and participation rates increase amongst under-represented groups).

7. **At a growth rate of 1.3% to 3% per year in employment, it is projected that the manufacturing sector in BC will need to attract from 58,000 new workers to 88,000 new workers through 2020.**

   Over 40,000 of the new hires will be workers needed to replace people who are retiring or otherwise leaving the manufacturing work force. The leading types of positions in terms of the projected number of new workers that will be required over the next eight years include machine operators, trades and other production positions, labourers in manufacturing and processing, managers and supervisors in manufacturing and utilities, administrative support, mechanics, sales and service, and engineers and related occupations.

Skills Shortages

8. Occupational skills shortages will likely be most significant in the trades (journeypersons), managers and supervisor positions, technicians, engineers, and machine operators and assemblers.

The occupations which employers expect will be the most difficult to fill going forward include journeypersons (identified by 20% of employers), managers and supervisors (15% and 14%, respectively), technicians (13%), engineers (12%) and machine operators and assemblers (10%). The table below provides a detailed listing of the leading occupations in each category, the projected number of new hires required through 2020, the percentage of employers indicating that these positions will be difficult to fill, and the sub-sectors which most commonly identified difficulties. Most of these positions are not unique to the manufacturing sector but rather are shared with other sectors.

Occupational Skill Shortages

Category	Leading Occupations		Projected Demand	Employers Reporting Difficulty	Sub-sectors Most Commonly Identifying
Trades (Journeypersons)	• Welder • Machinist • Millwright • Fabricator (fitter) • Electrician	• Mechanic • Sheet metal • Carpenter • Heavy Equipment	5,200	20%	• Machinery • Fabricated metal • Wood & paper • Electrical • Transportation
Managers and Supervisors	• Senior management • Production supervisors	• Sales and marketing • Administration	9,600	Managers 15%; Supervisors 14%	• Computer & electronic • Food & beverage • Plastics & rubber • Wood & paper • Electrical equipment
Technicians	• Electronics • Equipment maint. • Process engineers • Programmer/software	• Designers • Quality Control • Robotics • Food/forestry	2,000	13%	• Electrical • Transportation • Machinery • Plastics
Engineers	• Electrical and electronics • Mechanical • Civil	• Industrial • Process/ systems • Chemical	2,000	12%	• Electrical • Machinery • Computer • Transportation • Metal
Machine Operators and Assemblers	• CNC machines • Printing Press • Industrial sewing • Food/beverage • Assemblers • Tool and die	• Gluers • Fabrication • Forklift • Metalworking • Fitters • HEO/Drivers	12,000	10%	• Transportation • Machinery • Fabricated metal

The nature of the skills shortages does not vary widely by region with the exception that employers in southern interior and northern interior were significantly more likely to identify skilled tradesworkers as being in short supply. Employers, particularly those in the northern interior, noted that their work force is aging and the region has not been successful in attracting and retaining younger workers (youth outmigration remains a major issue in the north). Larger employers, particularly those with 50 or more employees, will need to fill more positions and were significantly more likely to identify skills shortages in the areas of journeypersons, management, and engineers than were smaller employers.

9. **Some shortages will result from simply not having enough workers with the needed education, training or certifications (e.g. an anticipated shortage of engineers or journeypersons in particular trades). However, most shortages will be a consequence of the fit between the experience, education or training of applicants and the unique needs of the employer.**

   The results of the research indicate that skills requirements vary widely from employer to employer, particularly for positions related to management, supervision, machine operation, and assembly. Although positions may share a similar title, the duties and nature of skills required can vary widely across employers depending upon the products produced, nature of the production process, equipment used, level of value-added, and other factors. The result is that, while there are workers available who have experience, education or training in a particular area (e.g. machine operator), employers will still report a shortage because they do not see that experience or training as directly relevant to the their type of operation. This is reflected in the survey finding that the area where applicants most commonly fall short is not in their education, training, certifications, or work experience per se, but rather in their experience or familiarity with the employer's type of operation. The wide variation in nature of positions across employers makes it much more difficult for education and training programs to prepare workers for these positions and for employers to meet their needs by hiring workers away from another employer.

   The issue of fit is more prevalent among smaller employers than larger employers. Larger employers (e.g. 50 or more employees) have much greater capacity to train and develop their workers (e.g. hire workers with some experience or training in the position and then provide further training or orientation to enable the new worker to transfer his or her existing skills to the employer's operation). Large employers also tend to have greater management capabilities and systems and are usually better able to compete for workers. In contrast to this, smaller employers (which account for 96% of manufacturing establishments and about one-half of employment) tend to have less standardized operations, invest less in staff training and development, and consequently rely more on the willingness and ability of new employees to learn on the job. The challenge is to provide smaller employers with the tools and resources they need to train new and existing workers.

10. **Key trends in the industry are affecting the skill requirements of employers.**

    The results of the research indicate that:

    - Increasing sophistication of manufacturing processes is raising the skill requirements of the industry. For example, greater use of automation and robotics is leading to increased demand for technicians, technologists and programmers. The increasing rate of technological change is change creates the need for regular skills updating.

    - Increasing diversity in the nature of manufacturing operations combined with the accelerating rate of technological change increases the need for employers to provide training, mentoring, orientation and other assistance to enable workers to transfer their existing skills and learn new skills.

    - Rising skill requirements increases the need for workers with more advanced soft skills and essential skills, who are adaptable and oriented towards continuous

learning and are capable of responding to changing needs of manufacturing employers. The implication for educators and trainers is that programs must not only impart occupational skills that workers can apply in the workplace in the short-term but also prepare students for a lifetime of continuous learning. The challenge is less about making people "job ready" and more about better preparing people to develop in the workplace.

- Some positions require workers whose expertise and skill sets cross traditional trades. For such positions, it may be more important that workers have specific levels of skills and experience rather than full credentials. Educators and industry work may need to together to identify the skill sets in demand, develop clearly defined career paths with stages of skills development for candidates, and develop modular-based trades and certification programs which would allow for faster training and integration for candidates who do not require full credential programs, and would better enable employers and students to obtain the specific skill sets required for the diverse occupations in the sector.

11. Employers will use a variety of strategies to address shortages.

In response to developing skill shortages, employers indicated that they plan to provide more training, invest in new equipment or technology, and outsource some functions or processes. Some employers may also increase wages or benefits, more aggressively promote job openings, increase overtime of existing workers, hire new immigrants or temporary foreign workers, or slow the rate of business growth.

Implications for the Future

12. The future strength of the manufacturing sector in BC will be determined, in large part, by the ability of the sector to attract, develop and retain skilled workers and improve productivity.

The subject matter experts, including representatives of the various manufacturing sub-sectors, indicated that there are opportunities for the various sub-sectors within manufacturing work together to address broad systemic labour market issues. Both employers and subject matter experts believe that there is a need for industry, educators and government to work more together closely to:

- Improve staff development activities implemented by employers, particularly smaller employers. Employers would benefit from training incentives (e.g. training tax credits, incentives, or wage subsidies) as well as increasing access to tools and resources that would help them in their staff development activities.

- Increase investment in innovation and productivity. Capital investment, which improves productivity, is an important means of strengthening competitiveness and easing potential future skill shortages. Subject matter experts recommended that government remove barriers to private sector investment and provide financial support in the form of tax credits or rebates for training expenditures to facilitate employer investment in labour productivity and innovation.

- Attract new workers into the sector by creating greater awareness of career and employment opportunities. Potential targets include youth as well as under-

represented groups. Employers recommended development of a website and materials to promote employment opportunities in the BC manufacturing sector and promoting careers in manufacturing to youth, Aboriginal people and other target groups.

- Enhance the effectiveness of existing education and training programs in preparing workers for industry in the short-term and in the longer-term. For example, employers recommended better tailoring existing training programs to meet employer skills requirements, integrating more hands-on training and experience into programs, enhancing delivery of existing education and training programs (e.g. by ensuring the equipment is up-to-date and relevant to industry, encouraging further professional development of instructors, designating Centres of Excellence for training, and introducing a system-wide quality assurance program and accreditation process for training programs), revising student recruitment strategies and career paths, and increasing the level of communication, collaboration and coordination between industry and educators.

- Increase recognition of the BC manufacturing sector as an important industry with many high-skilled, high-paying, and interesting job opportunities. Experts noted that there is a lack of awareness and understanding on the part of government and the public as to the importance of the manufacturing sector and its contribution to GDP and employment.

- Facilitate greater labour mobility and credential recognition (regionally, nationally and internationally) and enhance use of immigrant and foreign worker programs. Steps could be taken to facilitate more streamlined, faster processing of applications under the Temporary Foreign Worker Program and Provincial Nominee Program. The federal and provincial governments should continue working to improve the LMO process to hire temporary foreign workers when available labour in the province will not suffice, to encourage labour mobility within the province's development regions, and to continue to facilitate immigration as a source of recruiting skilled workers. It was recommended that industry and government work together to establish qualifications frameworks to identify transferable and common skills as well as the unique skills obtained through each subsector, and to develop faster skills assessment practices for screening internationally-trained and educated applicants.

- Improve the educational system in BC by strengthening education in the essential skills, better integrating the trades during secondary school, greater promotion of trades and technical studies, and providing guidance to students regarding skills requirements, possible career paths, and realistic wage and work expectations.

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The Sustainable Specialized Skills for Manufacturing (SSSM) Labour Marketing Partnership Project is the result of a strong partnership between Canadian Manufacturers & Exporters (CME) – British Columbia, the Government of Canada and the Province of British Columbia's Ministry of Jobs, Tourism and Skills Training Labour Market Programs Branch

The primary goal of the SSSM project was to identify where skills shortages might exist within the manufacturing sectors in British Columbia. An added benefit of the study was the production of a comprehensive profile of manufacturing in the province.

There are many people to thank for seeing this project through to a successful completion. First, CME's Training and Education (T&E) Committee were strong drivers to have this project completed. The committee was expanded to have broader representation from outside CME's membership and thus became the SSSM Steering Committee. CME would like to thank the committee for all their energy and time commitments; their sound direction and intelligent input.

Hugh Alley, First Line Training	**Craig Fisher, Mustang Survival**
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In addition, CME would like to thank the over 500 manufacturers and 20 subject matter experts who participated in the survey and offered their insights into the issue of a BC manufacturing skills shortage.

A special thank you is reserved for Joan Westran, Program Manager with the Labour Market Programs Branch of the Ministry of Jobs, Tourism and Skills Training for her guidance and support.

CME expects that the results of the project will help demonstrate the importance of manufacturing for B.C.'s economy and the need for urgent policy development to help further strengthen manufacturing as an integral part of our economic future.

Sincerely,

Marcus Ewert-Johns
Vice President, British Columbia
Canadian Manufacturers & Exporters

List of Acronyms

ACE-IT	Accelerated Credit Enrollment in Industry Training
AJCTC	Apprenticeship Job Creation Tax Credit
BCCA	BC Construction Association
CANSIM	Canadian Socio-Economic Information Management System
CIC	Citizenship and Immigration Canada
CMC	Canadian Manufacturing Coalition
CME	Canadian Manufacturers and Exporters
CMN	Canadian Manufacturing Network
COPS	Canadian Occupational Projection System
FCR	Foreign Credential Recognition
FSWP	Federal Skilled Worker Program
GDP	Gross Domestic Product
HR	Human Resources
HRSDC	Human Resources and Skills Development Canada
IEC-BC	Immigration Employment Council of BC
ITA	Industry Training Authority
LFS	Labour Force Survey
LMI	Labour Market Information and Intelligence
LMO	Labour Market Opinion
MAL	Manufacturing Automation Laboratory
MiHR	Mining Human Resource Council
NAICS	North American Industry Classification System
NSERC	Natural Sciences and Engineering Research Council
NOC	National Occupational Classification
NOC-S	National Occupational Classification for Statistics
NWPTA	New West Partnership Trade Agreement
OECD	Organisation for Economic Development and Cooperation
PNP	Provincial Nominee Program
SSA	Secondary School Apprenticeship
SSSM	Specialized Skills for Manufacturing
STEP	Skilled Trades Employment Program
TFWP	Temporary Foreign Worker Program
TRU	Thompson Rivers University
TSSP	Targeted Skills Shortage Program

I. Introduction

A. Purpose and Scope of the Study

The objectives of this project, as defined by the Specialized Skills for Manufacturing Steering Committee (SSSM), were to develop an inventory of existing Labour Market Information and Intelligence (LMI) and develop a thorough environmental scan focused on:

- The size and high level characteristics of the sector by sub-sector, National Occupational Classification, geography and size of company;
- The characteristics of the workforce in the sector including current employment, recent growth, projected growth, and demographic characteristics (age, gender, years of experience in occupation, language, training, immigrants, etc.); and
- The primary occupations and skills identified as in short supply by BC manufacturers.

For the purposes of this study, the SSSM defined the manufacturing sector to include companies in BC classified under the North American Industry Classification System (NAICS) codes 31 – 33. Based on input provided by the SSSM as well as a review of available secondary data, the study objectives were translated into a series of research questions including:

- What are the key characteristics of the manufacturing sector and major sub-sectors in BC?
- What are the characteristics of the existing workforce?
- What is the current status of the labour market?
- What is the future outlook in the short and medium term? What are the major drivers of employment growth in the manufacturing sectors?
- In what areas do skills shortages exist and will they be most severe?
- What actions are currently being taken or planned to address skills shortages in the short and medium term? What additional actions could be taken?

The results may be used in preparing a labour market strategy to address labour and skill shortages in the BC manufacturing sector.

B. Method of Study

A detailed work plan was developed during the first phase of the project which determined what data was required to address each of the research questions, identified the key data sources, and outlined the methodologies that would be used to collect the required data. The methodologies included:

- **A review of available labour market information and other data** including data published by Statistics Canada, Industry Canada, Census Canada, BC Stats and others related to the manufacturing sector in BC.

- **A review of past reports, literature and other documents** on major drivers of employment growth in the manufacturing sector, the labour market outlook in the short and medium term, current and projected skills shortages, and possible strategies and actions to address skills shortages. Appendix I contains a listing of the past reports, literature, labour market information, and other documents that were reviewed.

- **Development of a database of 6,487 companies active in the BC manufacturing sector.** The population list, which is estimated to include over 90% of the manufacturing companies in BC, was designed to include a broad representation of employers of various sizes from all manufacturing sub-sectors included in the scope of the study. The population list was drawn from numerous databases including WorkSafe BC data, the BC Food Processors member directory, the BC Forestry Innovation Investment's member directory, the membership list and distribution lists of Canadian Manufacturers & Exporters British Columbia, the Government of British Columbia's BC Supplier Directory, Furniturelink and other sources.

- **A survey of 557 companies active in the manufacturing sector in BC.** Email invitations were sent to employers on the population list for which email addresses were available. The invitations provided target companies with a link to an online questionnaire and described other options for completing the survey questionnaire, including by telephone with a representative of Ference Weicker & Company. The e-mail addresses were obtained through a mixture of secondary sources (e.g. other databases and company websites) as well as by telephoning a sample of manufacturers for which telephone numbers but no email addresses were included in the database, with a particular focus on employers known to be large (as reported in the WorkSafe BC data).

  As indicated, a maximum of 4,053 companies were contacted (this figure is significantly overstated in that one cannot assume that, just because the invitation did not bounce back, the email was necessarily received and viewed by the target recipient). As indicated in the table below, 16% of the companies that may have been reached responded in some way to the invitation to participate in the survey.

  Of the 652 companies that visited the website, 405 fully completed the survey and 152 substantially completed the survey (the respondent may have skipped a section which he or she perceived as not particularly relevant to their operation or for which they did not have data readily accessible). The questionnaire was lengthy and detailed (the average response time over 48 minutes amongst those who fully completed the questionnaire). Recognizing the potential time constraints, the questionnaire was structured such that the key study questions were presented in order of importance with key issues addressed in the first sections; all 557 respondents included in the analysis fully completed these sections.

Table 1. Calculation Of Survey Response Rate

Province	Total	
Companies Contained in the Database	6,487	
Companies For Which Email Addresses Were Obtained	4,766	
Not Contacted (e.g. email bounced and no telephone number, wrong number or not in service, or otherwise couldn't contact)	713	
Maximum Number of Companies Contacted	4,053	
Response	**Number**	**%**
Completed	405	10.0%
Substantially Completed	152	3.8%
Respondents Included in Analysis	**557**	**13.8%**
Begun But Not Substantially Completed (results not included in analysis)	95	2.3%
Total Number of Respondents	**652**	**16.1%**
Refused or Unsubscribed	419	10.3%
Did Not Respond	2,982	73.6%
Total	**4,053**	**100.0%**

At a confidence level of 95%, the sample of 557 manufacturers who completed or substantially completed the survey achieves a margin of error of about ±3.5%. A more detailed description of the 557 employers surveyed is included in Chapter III.

- **Conducted telephone interviews with a sample of 18 subject matter experts.** A population list was developed of 37 representatives believed to be familiar with human resources in the manufacturing sector. Not all of these representatives believed they were in a position to comment on the labour market or were available for an interview. Interviews were conducted with 18 experts, representing a response rate of 49%. The subject matter experts included twelve representatives from industry associations, sector councils or business groups, three representatives from educational and training institutions, two representatives of regional economic development agencies, and one representative of the federal government.

C. Challenges and Limitations

The major challenges that were faced and steps taken to mitigate the impact of these challenges are as follows:

- **No up-to-date population list of BC manufacturers was available.** The provincial government's BC Manufacturer's Directory has been discontinued. A variety of sources were used to compile a population lists, including a *Freedom of Information Act* request to WorkSafe BC, in order to develop an up-to-date population database of manufacturing employers in the province. To increase the number of manufacturers who could be contacted by e-mail, an extensive review of websites was undertaken complemented with telephone calls to manufacturers to identify appropriate contact people and obtain email addresses.

- **The initial response rate to the survey of employers was low.** The impact of a low response rate is a large non-response bias which would affect the validity of the findings. To achieve a higher response rate, employers and other intermediaries

were followed-up with multiple times both by email and by telephone. A particular emphasis was placed on increasing the response rates within under-represented sectors.

- **The completion rate for the survey varies somewhat across questions.** The response rate tends to be lower for the questions of less importance, which were contained in the later sections of the questionnaire. To reflect the level of response, the number of clients responding to any particular question is identified in the tables throughout this report.

D. Structure of the Report

This report is divided into four chapters. Chapter II uses secondary data to develop an overview of the manufacturing industry in BC, including a description of the sub-sectors, employers, current workforce, recent and anticipated growth rates, and key issues related to human resources. Chapter III summarizes the major findings of the employer survey and subject matter expert interviews related to the labour market conditions for manufacturing in BC. Chapter IV uses the results of the secondary and primary research to directly answer each of the study research questions.

II. Overview of the Manufacturing Sector in BC

This chapter uses secondary data to present a profile of the manufacturing in BC in terms of shipments, exports, regional distribution, contribution to GDP, leading sub-sectors, employment, current and projected demand by type of position, characteristics of employers and employees, and key issues facing the sector.

A. Characteristics of the Manufacturing Sector in BC

1. Annual Value of Shipments

The manufacturing sector has recovered strongly from the economic downturn, experiencing an average annual growth in shipments of 6.2% since 2009. Growth has been particularly strong for durable goods, which has grown at the rate of 8.6% as compared to the 3.8% growth of non-durable goods.

As of 2012, the shipment value of the BC manufacturing sector totalled $39.3 billion as indicated in Table 2 on the following page. In 2012, durable goods accounted for 52% of the value of manufacturing shipments in BC.

British Columbia's manufacturing sector has historically been dominated by forest products. While wood and pulp and paper products continue to represent important sub-sectors, BC manufacturers have grown and diversified to produce a wide variety of products ranging from computers, aircraft parts, and scientific instruments to food and beverage products, nutraceuticals, pharmaceuticals, clothing and textiles, and transportation equipment.[1]

In 2012, nearly three quarters of BC's annual shipment value (75%) could be attributed to the ten largest manufacturing sub-sectors (total shipment value for 2012 and percentage of total shipment value for all manufacturing sub-sectors included in parentheses[2]):

1. Food Manufacturing ($7.0 billion or 18%);
2. Wood Product Manufacturing ($6.6 billion of 17%);
3. Paper Manufacturing ($4.5 billion or 11%);
4. Primary Metal Manufacturing ($2.5 billion or 6%);
5. Machinery Manufacturing ($2.1 billion of 5%);
6. Transportation Equipment Manufacturing ($1.8 billion or 5%);
7. Non-Metallic Mineral Product Manufacturing ($1.2 billion or 3%);

1 Canadian Manufacturers & Exporters BC. *Manufacturing BC – Outlook 2020*. Page 3.

8. Plastics and Rubber Products Manufacturing ($1.1 billion or 3%);
9. Computer and Electronic Product Manufacturing ($1.05 billion or 3%); and
10. Furniture and Related Product Manufacturing ($0.8 billion or 2%).

Table 2. BC Manufacturing Shipments by Sub-sector, 2002-2012 ($ Millions)

NAICS Code	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Annual Growth 2009-12
Non-Durable Goods												
311 Food Manufacturing	4,617.23	4,835.72	4,794.58	5,241.93	5,507.31	5,469.26	5,494.29	5,801.03	5,997.46	6,301.17	7,049.34	6.7%
312 Beverage and Tobacco Product Manufacturing	1,131.30	1,274.88	1,099.68	1,181.03	1,179.16	1,204.23	1,215.44	1,198.70	1,174.63	1,153.09	x	--
316 Leather and Allied Product Manufacturing	14.38	31.49	x	x	24.01	36.25	18.64	11.65	x	x	x	--
322 Paper Manufacturing	5,338.82	5,642.96	5,833.61	5,606.97	5,556.05	5,829.16	5,378.32	4,393.07	5,026.22	5,198.80	4,477.97	0.6%
323 Printing and Related Support Activities	893.22	977.93	879.43	997.04	990.02	889.34	805.41	622.22	616.96	619.93	x	--
326 Plastics and Rubber Products Manufacturing	1,167.69	1,255.17	x	1,310.82	1,368.62	1,325.67	1,123.77	974.87	1,053.74	1,170.92	1,056.72	2.7%
Sub-total, Non-Durable Goods	**16,246.82**	**17,490.63**	**17,152.97**	**18,304.79**	**18,401.23**	**18,649.24**	**18,049.87**	**16,838.81**	**17,868.24**	**18,691.58**	**18,832.30**	**3.8%**
Durable Goods												
321 Wood Product Manufacturing	11,481.30	10,693.48	12,411.76	11,720.08	10,701.16	8,120.47	6,824.16	4,726.84	5,695.07	5,944.22	6,550.2	11.5%
327 Non-Metallic Mineral Product Manufacturing	1,182.90	1,292.65	1,426.25	1,609.63	1,989.29	1,995.16	1,830.58	1,330.02	1,327.40	1,310.63	1,153.49	-4.6%
331 Primary Metal Manufacturing	1,587.97	x	2,034.38	2,025.76	3,077.58	3,011.59	2,615.37	1,924.31	2,234.63	2,697.16	2,525.1	9.5%
332 Fabricated Metal Manufacturing	1,738.71	1,957.95	1,954.83	2,156.11	2,291.90	x	x	x	x	x	x	--
333 Machinery Manufacturing	1,743.90	1,824.42	1,993.00	2,207.09	2,389.07	2,227.97	1,978.01	1,569.44	1,726.37	2,085.23	2,145.38	11.0%
334 Computer and Electronic Product Manufacturing	1,076.32	1,265.02	1,379.87	1,268.56	1,612.88	1,472.87	1,413.88	1,134.76	1,095.62	1,055.58	999.21	-4.2%
336 Transportation Equipment Manufacturing	1,579.18	1,521.56	1,243.52	x	1,497.03	1,674.89	1,398.27	971.56	1,097.90	1,360.41	1,825.11	23.4%
337 Furniture and Related Product Manufacturing	759.24	890.44	x	1,081.84	1,163.05	1,069.10	1,062.32	886.39	847.62	831.93	787.23	-3.9%
339 Miscellaneous Manufacturing	789.32	846.81	788.89	842.38	926.79	1,078.45	1,177.69	1,082.00	1,170.07	1,184.51	x	--
Sub-total, Durable Goods	**22,363.32**	**22,281.09**	**24,454.00**	**24,577.84**	**26,078.63**	**23,769.21**	**21,384.70**	**15,958.97**	**17,673.78**	**19,167.87**	**20,451.57**	**8.6%**
31-33 All Manufacturing	**38,610.13**	**39,771.72**	**41,606.97**	**42,882.63**	**44,479.86**	**42,418.45**	**39,434.57**	**32,797.78**	**35,542.02**	**37,859.44**	**39,283.87**	**6.2%**

Source: Statistics Canada. Table 304-0015 - Manufacturing sales by NAICS and province, annual (dollars)[3]. x - suppressed to meet the confidentiality requirements of the Statistics Act. Shipment values for subsectors 313, 314, 315, 324, 325, and 335 are not shown as data has been suppressed.

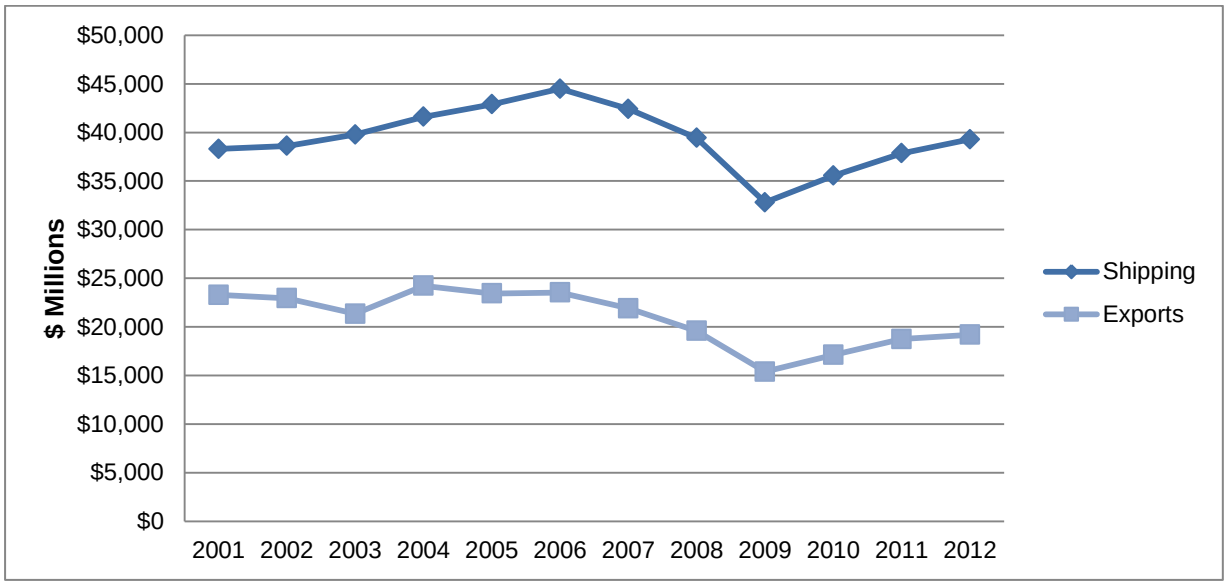
3 Statistics Canada, Table 304-0015 - Manufacturing Sales, by North American Industry Classification System (NAICS) and province, annual (dollars). Accessed November 2013. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3040015

2. Exports of Manufactured Products

The economy of BC is heavily dependent upon exporting, with exports representing over 15% of BC's gross domestic product (GDP). The importance of manufacturing to the provincial economy is highlighted by the fact that manufactured products account for over 60% of the total value of goods exported ($19.2 billion of BC's total exports of $31.9 billion in 2012) from BC.

The value of exports from BC as a percent of shipments has undergone a gradual decline over the past decade, from a high of approximately 59% in 2002 to approximately 49% in 2012. Some of the factors that have contributed to this decline include the rising value of the Canadian dollar over the past ten years, the impact of the economic downturn in the United States on the demand for goods, and growth in the domestic market for a widening range of goods manufactured in BC.

Figure 1. BC Shipping Values Relative to Exports (NAICS 31-33)



Source: Exports -Industry Canada Trade Data Online. Manufacturing shipment values - Statistics Canada. Table 304-0015 - Manufacturing sales, by North American Industry Classification System (NAICS) and province, annual (dollars).

Dependence on export markets varies widely by manufacturing sub-sector. Not surprisingly, manufacturing sub-sectors related to BC's primary industries such as forestry and mining are most heavily reliant on exports, with the value of exports equal to approximately 85% of BC's wood products shipments, 81% of BC's paper product shipments, and 74% of BC's primary metal product shipments. Manufacturing sub-sectors which are predominantly export-oriented but unrelated to BC's primary industries include computer and electronic products manufacturing, machinery manufacturing, and leather and allied products manufacturing. The following table provides a comparison of the export values to shipment values for each of BC's leading manufacturing sub-sectors for the year 2011.[4]

4 2011 data was chosen for comparison due to some 2012 values being suppressed to meet the confidentiality requirements of the Statistics Act.

Table 3. BC Manufacturing Exports Relative to Shipments by Sub-sector, 2011 ($ Millions)

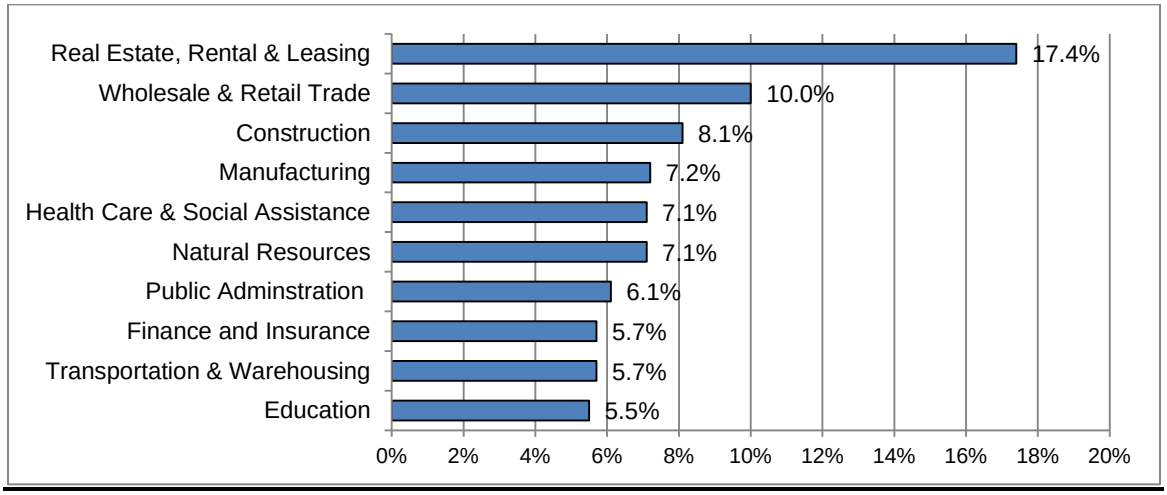
Sub-sector	Exports	Shipments	Export Reliance
311 Food Manufacturing	$1,419.91	$6,301.17	22.5%
312 Beverage and Tobacco Product Manufacturing	$77.52	$1,153.09	6.7%
316 Leather and Allied Product Manufacturing	$8.05	$14.86	54.2%
322 Paper Manufacturing	$4,188.56	$5,198.80	80.6%
323 Printing and Related Support Activities	$59.46	$619.93	9.6%
326 Plastics and Rubber Products Manufacturing	$313.04	$1,170.92	26.7%
321 Wood Product Manufacturing	$5,025.36	$5,944.22	84.5%
327 Non-Metallic Mineral Product Manufacturing	$137.01	$1,310.63	10.5%
331 Primary Metal Manufacturing	$2,004.30	$2,697.16	74.3%
333 Machinery Manufacturing	$1,353.73	$2,085.23	64.9%
334 Computer and Electronic Product Manufacturing	$877.48	$1,055.58	83.1%
336 Transportation Equipment Manufacturing	$578.43	$1,360.41	42.5%
337 Furniture and Related Product Manufacturing	$110.74	$831.93	13.3%
339 Miscellaneous Manufacturing	$244.01	$1,184.51	20.6%

Source: Industry Canada, Trade Data Online.

3. Contribution to GDP

Manufacturing is a significant contributor to the BC economy in terms of GDP. The GDP of the manufacturing sector totalled $13.8 billion in 2012, which represented 29% of BC's GDP contributed by all goods-producing industries and 7% of the total provincial GDP, making it the fourth largest economic sector after real estate, rental and leasing (17%), wholesale and retail trade (10%) and construction (8%).[5]

Figure 2. Leading Sectors in Terms of GDP at Basic Prices, 2012



5 Statistics Canada, *CANSIM Table 279-003 Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories*. Accessed January 2014.

B. Overview of the Leading Sub-sectors

BC's manufacturing industry is diverse and broadly-based, and includes 21 industry groups which encompass a wide variety of activities, ranging from the manufacture of clothing, plastics, computers, and aerospace products, to more traditional activities such as food processing or pulp, paper and lumber production. The following paragraphs provide a more detailed profile of the some of the leading sub-sectors of the BC manufacturing industry.

1. Food and Beverage Processing

BC is home to 14.4% of Canadian food manufacturers (1,069 establishments), including 757 employers and 312 non-employers/indeterminate establishments. The province's subsector is dominated by micro employers with 1-4 employees (220 or 29%) and small employers with 5 to 99 employees (466 or 62%), with a small minority (67 or 9%) of medium-sized employers with 100 to 499 employees. BC is home to only 4 large food manufacturing employers (0.5%) with 500 or more employees.[6]

In terms of shipment value, food manufacturing is BC's largest manufacturing sub-sector, contributing $6.3 billion in 2011, and representing 17% of BC's total manufacturing shipment activity. In 2011, BC food manufacturers produced $2.03 billion in meat products; $1.04 billion in other manufactured food products (including coffee and tea, flavoured syrups, preserves, snack foods and other prepared foods); $639 million in baked goods and tortillas; $559.3 million in animal food; and $517.6 million in fruit and vegetable preserves and specialty food products. (The value of dairy products and seafood products manufactured in 2011 was suppressed to meet the privacy requirements of the *Statistics Act*).[7]

Some of the many diverse products produced by BC food and beverage manufacturers include:

- Meat products, including those produced from cattle, pigs, sheep, lambs, chickens, turkey, bison and fallow deer raised on BC farms and ranches;
- Preserves and specialty products manufactured using BC berries, tree fruits, nuts and grapes;
- Preserves and specialty products using BC farm and greenhouse-grown vegetables;
- Seafood products manufactured using BC's groundfish, shellfish including shrimp, prawns, geoduck clams, and crab, herring, sardines, hake and marine plants;
- Milled grains and oilseeds from products grown in the province's northern range;
- Dairy products;
- Herbal and botanic products as well as nutraceuticals;

6 Industry Canada, Canadian Industry Statistics. *Establishments: Food Manufacturing (NAICS 311).*Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=311&lang=eng

7 Statistics Canada. *CANSIM Table 304-0015.* Accessed December 2013.

- Ethnic, organic and functional foods;
- Sugar-confectionary and cocoa products;
- Baked goods and tortillas;
- Food preparations for use in manufacturing;
- Sauces and soups; and
- Animal food and specialty pet food.[8]

BC is also home to 316 beverage and tobacco manufacturing establishments, with 216 employers and 100 non-employer/indeterminate establishments, representing 29% of beverage and tobacco manufacturers in Canada- the second highest in Canada following Ontario. Of the 216 employers, the vast majority are micro with 1 to 4 employees (86 or 40%) or small with 5 to 99 employees (120 or 56%). There are 10 (5%) medium-sized employers with 100 to 499 employees and no large beverage or tobacco manufacturers in BC.[9]

Beverage and tobacco manufacturing contributed $1.15 billion in shipments in 2011, representing 3% of BC's total manufacturing shipment activity. BC breweries and wineries represent a significant portion of the shipment value, with $500 million, and $278 million in shipments in 2011.

Some of the many products produced by BC beverage and tobacco manufacturers include craft-brewed beers, ciders and spirits including whiskey, vodka and other spirits; wines; soft drinks; fresh glacial spring water; and a variety of fruit and vegetable juices.

2. Wood and Paper Products

Forestry products represent the largest combined manufacturing sub-sectors of the BC economy, shipping some $11 billion in manufactured products in 2011, about 90 percent of which was exported.[10] Of the BC manufacturing sub-sectors, wood product manufacturing is the second largest, contributing $5.94 billion in shipment activity in 2011, and paper manufacturing is the third largest, contributing $5.19 billion. In 2011, BC manufacturers produced $4.07 billion in shipment activity through sawmills and wood preservation; $950 million in value-added manufacturing of veneer, plywood and engineered wood products; and $1.06 billion in shipment activity for other wood products including millwork, wood containers and pallets.[11]

There are approximately 1,294 wood product manufacturing establishments in BC with 838 employers and 456 non-employers/indeterminate establishments, comprising 23% of all wood product manufacturing establishments in Canada. Of the 838 employers, 265

8 Government of British Columbia, Trade and Invest in BC Website. Accessed December 2013. http://www.britishcolumbia.ca/Buy/Goods-and-Services/Agrifoods.aspx

9 Industry Canada. Canadian Industry Statistics. *Establishments: Beverage and Tobacco Product Manufacturing (NAICS 312).* Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=312&lang=eng

10 Government of British Columbia, Trade and Invest in BC. *Forestry*. Accessed December 2013. http://www.britishcolumbia.ca/Buy/Goods-and-Services/Forestry.aspx

11 Statistics Canada. CANSIM Table 304-0015. Accessed December 2013.

(32%) are micro with 1 to 4 employees, 492 (59%) are small with 5 to 99 employees, 79 (9%) are medium with 100 to 499 employees, and 2 (0.2%) are large, with 500 or more employees.[12] BC is also home to 86 paper manufacturing establishments, including 60 paper employers and 26 non-employers/indeterminate establishments, comprising 10% of Canadian paper manufacturers. Of the 60 employers, 10 are micro with 1 to 4 employees (17%), 24 are small with 5 to 99 employees (40%), 23 are medium with 100 to 499 employees (38%), and 3 are large, with 500 or more employees.

BC is the world's largest exporter of softwood lumber products and is also a major supplier of softwood pulp and related paper products. Some of the diverse solid wood and pulp and paper products produced by BC manufacturers include:

- Commodity projects such as lumber, plywood, oriented strand board, particleboard and medium-density fibreboard;
- Value-added products such as treated lumber for landscaping and outdoor use, engineered wood products, shakes and shingles, posts and poles, log and timber-frame homes, pre-fabricated housing, moulding and other wood products for interior finishings, furniture and mass timber products for larger-scale construction;
- Biofuels such as wood pellets;
- Wood pulp for further processing; and
- Various types of paper including newsprint, stationery, sanitary paper, paper bags, corrugated and solid fibre boxes.

3. Primary Metal Manufacturing

British Columbia's abundant natural resources include deposits of gold, silver, copper, lead, zinc and molybdenum. The majority of BC's metal exports are shipped to Japan (34%), followed by the US (24%), China (15%) and South Korea (12%).[13] Metal manufacturing contributed over $2.69 billion in shipment activity in 2011. Of that total, BC metal manufacturers contributed $1.15 billion through the production of architectural and structural metals, $977.8 million in the manufacture of plate work and fabricated structural products, $967.2 million in ornamental and architectural metal products, and $195.2 million in the fabrication of metal doors and windows.

There are 79 primary metal manufacturing establishments in BC, including 58 employers in BC and 21 non-employers/indeterminate establishments, comprising 10% of Canadian metal manufacturers. Among the 58 employers, 17 are micro with 1 to 4 employees (29%), 34 are small with 5 to 99 employees (59%), 5 are medium with 100 to 499 employees (9%), and 2 (3%) are large with 500 or more employees.[14]

12 Industry Canada. Canadian Industry Statistics. Establishments: Wood Product Manufacturing NA(CS 312). Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=321&lang=eng

13 Government of British Columbia, Ministry of Energy and Mines and Responsible for Core Review. Foreign Destinations of Major Metals from British Columbia. Accessed December 2013. http://www.empr.gov.bc.ca/Mining/MineralStatistics/MineralSectors/Metals/MarketsandPrices/Pages/MarketDestination.aspx

14 Industry Canada. Canadian Industry Statistics. Establishments: Primary Metal Manufacturing (NAICS 331). Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=331&lang=eng

BC manufacturers are engaged in a variety of manufacturing activities including the operation of metal foundries, and the manufacture of value-added metal products. Some of the diverse metal products produced by BC manufacturers include:

- Primary metals for further processing;
- Architectural and structural metals;
- Plate work and fabricated structural products;
- Pre-fabricated metal buildings and components;
- Boiler tanks;
- Metal cans, boxes and other containers;
- Metal coating, engraving and heat-treating of products;
- Spring and wire products; and
- Metal windows and doors.

4. Machinery Manufacturing

Machinery manufacturing contributed $2.08 billion in shipment activity in 2011, including $102.4 million in engine, turbine and power transmission equipment and $173.7 million in materiel handling equipment.[15]

As of 2012, there are 815 machine manufacturing establishments in BC, with 518 employers and 297 non-employers/indeterminate establishments representing approximately 11% of all machinery manufacturers in Canada. The vast majority of employers are micro, with 1 to 4 employees (226 or 44%), or small with 5 to 99 employees (431 or 83%). There are 50 medium-sized employers (10%) with 100-499 employees, and 3 large employers (0.6%) with 500 or more employees.[16]

Some of the machinery products manufactured by producers in BC include:

- Agricultural, construction and mining machinery equipment;
- Sawmill and woodworking machinery equipment;
- Ventilation, heating, air conditioning and commercial refrigeration equipment;
- Engine, tuner and power transmission equipment;
- Material handling equipment; and
- General-purpose machinery equipment.

15 Statistics Canada. CANSIM Table 304-0015 - Manufacturing sales, by North American Industry Classification System (NAICS) and province, monthly (dollars). Accessed December 2013.

16 Industry Canada. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=333&lang=eng#est2

5. Transportation and Equipment Manufacturing

Transportation and equipment manufacturing, contributed $1.36 billion in manufacturing shipment activity in 2011. Of the $1.36 billion, $33.4 million was attributed to the manufacture of motor homes, travel trailers and campers, $16.1 million to the manufacture of motor vehicle gasoline engines and engine parts, $10.2 million to the manufacture of motor vehicle transmission and power train parts, $135.4 million to other motor vehicle parts, and $354.5 million to the manufacture of aerospace products and parts.[17]

There are 545 transportation and equipment manufacturing establishments in BC, including 312 employers and 233 non-employers/indeterminate establishments, representing 18% of all transportation equipment manufacturers in Canada. Of the 312 employers in BC, 131 (42%) are micro with 1 to 4 employees, 160 (51%) are small with 5 to 99 employees, and 12 (4%) are medium with 100 to 499 employees. There are no employers with 500 or greater employees.[18]

Some of the various products produced by transportation and equipment manufacturers in BC include aerospace products and parts; motor vehicle trailers; motor vehicle parts including transmissions and power trains; motor homes, travel trailers and campers; and ship and boat building and repair.

6. Non-Metallic Mineral Product Manufacturing

Non-metallic mineral product manufacturing contributed $1.31 billion in shipment activity in 2011. The only sub-sector category for which shipment value data was not suppressed was glass and glass product manufacturing, which contributed $161.8 million in shipment activity.[19]

There are 409 non-metallic mineral product manufacturing establishments in BC, with 357 employers and 112 non-employers/indeterminate establishments, representing 15% of all non-metallic mineral product manufacturers in Canada. Of the 357 BC employers, 106 (30%) are micro with 1 to 4 employees, 241 (68%) are small with 5 to 99 employees, and a very small minority (10 or 3%) are medium-sized with 100 to 499 employees. There are no employers in this subcategory with 500 or greater employees.[20]

Some of the goods produced by BC manufacturers in this subsector include clay products; glass and glass products; cement and cement products; and lime and gypsum products.

17 Statistics Canada. CANSIM Table 304-0015 - Manufacturing sales, by North American Industry Classification System (NAICS) and province, monthly (dollars). Accessed December 2013.

18 Industry Canada. Canadian Industry Statistics. *Establishments: Transportation Equipment Manufacturing (NAICS 336).* Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=336&lang=eng

19 Statistics Canada. CANSIM Table 304-0015 - Manufacturing sales, by North American Industry Classification System (NAICS) and province, monthly (dollars). Accessed December 2013.

20 Industry Canada. Canadian Industry Statistics. *Establishments: Non-Metallic Mineral Product Manufacturing (NAICS 327).* Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=327&lang=eng

7. Miscellaneous Manufacturing

Miscellaneous manufacturing contributed $1.18 billion in manufacturing shipments in 2011. Information on the shipment value of categories of goods produced in the miscellaneous manufacturing sub-sector has been suppressed to meet the confidentiality requirements of the *Statistics Act*.

There are 1,556 miscellaneous manufacturing establishments in BC, with 918 employers and 638 non-employers or indeterminate establishments, comprising 17% of all miscellaneous manufacturing establishments in Canada. Among the 918 BC employers, the vast majority are micro with 1 to 4 employees (506 or 55%) or small with 5 to 99 employees (404 or 44%). There are 8 medium-sized employers (0.8%) with 100 to 499 employees.[21]

Examples of products produced by BC manufacturers in this subsector include medical equipment and supplies; jewellery and silverware; sporting and athletic goods; doll, toy and game manufacturing; office supplies; and signs.

8. Plastics and Rubber Products Manufacturing

Plastics and rubber products manufacturing contributed $1.17 billion in manufacturing shipment activity in 2011. Information on the shipment value of categories of goods produced in the plastics and rubber products manufacturing sub-sector has been suppressed to meet the confidentiality requirements of the *Statistics Act*.

There are 321 plastics and rubber products manufacturing establishments in BC (representing 12% of all rubber and plastics manufacturers in Canada) with 234 employers and 87 non-employers/indeterminate establishments. Of the 234 employers, 55 (24%) are micro with 1 to 4 employees, 169 (72%) are small with 5 to 9 employees and 10 (4%) are medium with 100 to 499 employees. There are no rubber and plastics manufacturers in BC with greater than 500 employees.

Examples of products produced in this subsector include plastic packaging materials; plastic pipe, pipe fitting and profile shapes; polystyrene foam products; urethane and other foam products; and plastic windows and doors.

C. Employment in the Manufacturing Sector

1. Employment by Manufacturing Sub-sector

BC's manufacturing sector directly employed 179,200 people in 2012, making it the third largest employer in the province after wholesale and retail trade and construction, as indicated in the table below.

Table 4. BC Employment by Sector, Annual Averages in 2012 (Thousands of Persons)

Industries	Employment ('000s)

21 Industry Canada. Canadian Industry Statistics. *Establishments: Miscellaneous Manufacturing (NAICS 339).* Accessed December 2013. https://www.ic.gc.ca/app/scr/sbms/sbb/cis/establishments.html?code=339&lang=eng

Trade	357
Construction	193
Manufacturing	179
Finance, Insurance, Real Estate & Leasing	142
Transportation and warehousing	129
Public administration	102
Primary industries	72
Utilities	15
Other service industries	1,124
All industries	**2,313**

Source: Statistics Canada, *CANSIM Table 282-0088*, Labour Force Survey (unpublished data).

Among those employed in the manufacturing sector in 2012, 61% were employed in the production of durable goods and 39% were employed in the production of non-durable goods. An overview of BC manufacturing sector employment by year and by sub-sector is provided in the table on the following page. The food manufacturing and wood product manufacturing subsectors are the sector's largest sources of employment, with each sub-sector accounting for approximately 15% of all manufacturing jobs. Other sub-sectors which are significant sources of employment include fabricated metal product manufacturing (9%), paper manufacturing (7%), transportation equipment manufacturing (7%), miscellaneous manufacturing (6%), printing and related support activities (5%), and petroleum and coal product manufacturing (5%).

The economic recession had a significant detrimental impact on employment in the manufacturing sector, with employment levels declining by almost 20% over two years from 199,400 people in 2007 to 160,800 in 2009. The wood product manufacturing (a loss of 16,900 jobs which represented 39% of sub-sector employment in 2007) and paper manufacturing (a loss of 4,200 which represented 28% of sub-sector employment in 2007) accounted for over half of the total decline in employment.

Since 2009, BC manufacturing employment has grown at the rate of 3.7% per year including 3.1% in the non-durable goods sub-sectors and 4.0% in the durable goods sub-sectors. As indicated in Table 5 on the following page, the annual rate of growth has been highest in the electrical equipment, appliance and component manufacturing (36%), computer and electronic product manufacturing (20%), and machinery manufacturing (19%) sub-sectors.

Table 5. BC Manufacturing Employment by Sub-sector, Annual Averages 2002 to 2012 (Thousands of Persons)

NAICS Sub-sector Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	%	Annual Growth 2009-2012
Non Durable Goods													
311 Food Manufacturing	23.4	26.7	25.2	25.9	19.0	22.3	24.3	24.9	22.5	24.0	27.2	15%	3.0%
312 Beverage and Tobacco Product Manufacturing	3.3	4.3	5.6	5.0	4.8	5.2	6.0	4.0	4.8	6.3	4.6	3%	4.8%
313 Textile Mills & 314 Textile Product Mills	3.3	1.8	1.9	2.1	-	1.6	-	-	2.5	2.2	1.5	1%	--
315 Clothing Manufacturing 316 Leather and Allied Product Manufacturing	5.2	5.5	9.3	5.1	6.1	7.0	5.6	3.2	3.3	4.5	3.8	2%	5.9%
322 Paper Manufacturing	16.7	14.1	11.8	12.1	15.0	15.0	13.1	10.8	9.8	9.2	12.0	7%	3.6%
323 Printing and Related Support Activities	8.3	7.7	7.6	7.8	8.0	6.0	9.0	7.5	6.5	7.7	8.7	5%	5.1%
324 Petroleum and Coal Product Manufacturing	8.3	7.7	7.6	7.8	8.0	6.0	9.0	7.5	6.5	7.7	8.7	5%	5.1%
325 Chemical Manufacturing	6.3	7.0	8.3	6.3	5.9	5.6	6.7	5.6	4.9	4.4	7.0	4%	7.7%
326 Plastics and Rubber Products Manufacturing	5.6	7.1	7.4	6.7	7.3	8.8	5.0	5.9	4.0	4.1	4.5	3%	-8.6%
Sub-total, Non-Durable Goods	72.4	76.1	78.2	71.3	67.4	72.2	72.1	64.0	60.1	63.1	70.2	39%	3.1%
Durable Goods													
321 Wood Product Manufacturing	43.5	48.4	45.7	45.1	43.8	43.7	33.6	26.8	28.7	30.1	26.7	15%	-0.1%
327 Non-Metallic Mineral Product Manufacturing	6.6	5.5	7.5	6.5	8.1	8.2	7.5	7.4	7.3	7.5	6.2	3%	-5.7%
331 Primary Metal Manufacturing	6.6	5.5	7.5	6.5	8.1	8.2	7.5	7.4	7.3	7.5	6.2	3%	-5.7%
332 Fabricated Metal Product Manufacturing	13.0	13.5	14.2	17.9	14.8	15.2	16.3	12.7	12.7	11.3	15.5	9%	6.9%
333 Machinery Manufacturing	9.9	8.6	9.4	9.8	8.8	8.7	6.3	6.3	7.7	9.3	10.6	6%	18.9%
334 Computer and Electronic Product Manufacturing	9.9	9.9	9.8	7.8	8.1	7.1	6.6	4.4	6.9	6.2	7.6	4%	20.0%
335 Electrical Equipment, Appliance and Component Manufacturing	3.0	2.7	3.9	3.0	3.2	2.6	4.3	1.8	2.3	2.1	4.5	3%	35.7%
336 Transportation Equipment Manufacturing	13.2	11.9	11.4	9.1	9.5	12.2	10.1	9.9	9.2	9.0	11.9	7%	6.3%
337 Furniture and Related Product Manufacturing	8.2	6.4	8.0	8.1	10.3	10.9	10.0	10.6	10.0	7.3	8.8	5%	-6.0%
339 Miscellaneous Manufacturing	9.0	11.0	11.3	9.6	12.7	12.8	12.9	11.5	13.5	11.9	11.3	6%	-0.6%
Sub-total, Durable Goods	122.0	127.2	127.8	123.5	125.9	127.2	112.6	96.8	105.7	100.8	109.0	61%	4.0%
31-33 All Manufacturing	**194.4**	**203.3**	**206.0**	**194.8**	**193.3**	**199.4**	**184.8**	**160.8**	**165.8**	**163.9**	**179.2**	**100%**	**3.7%**

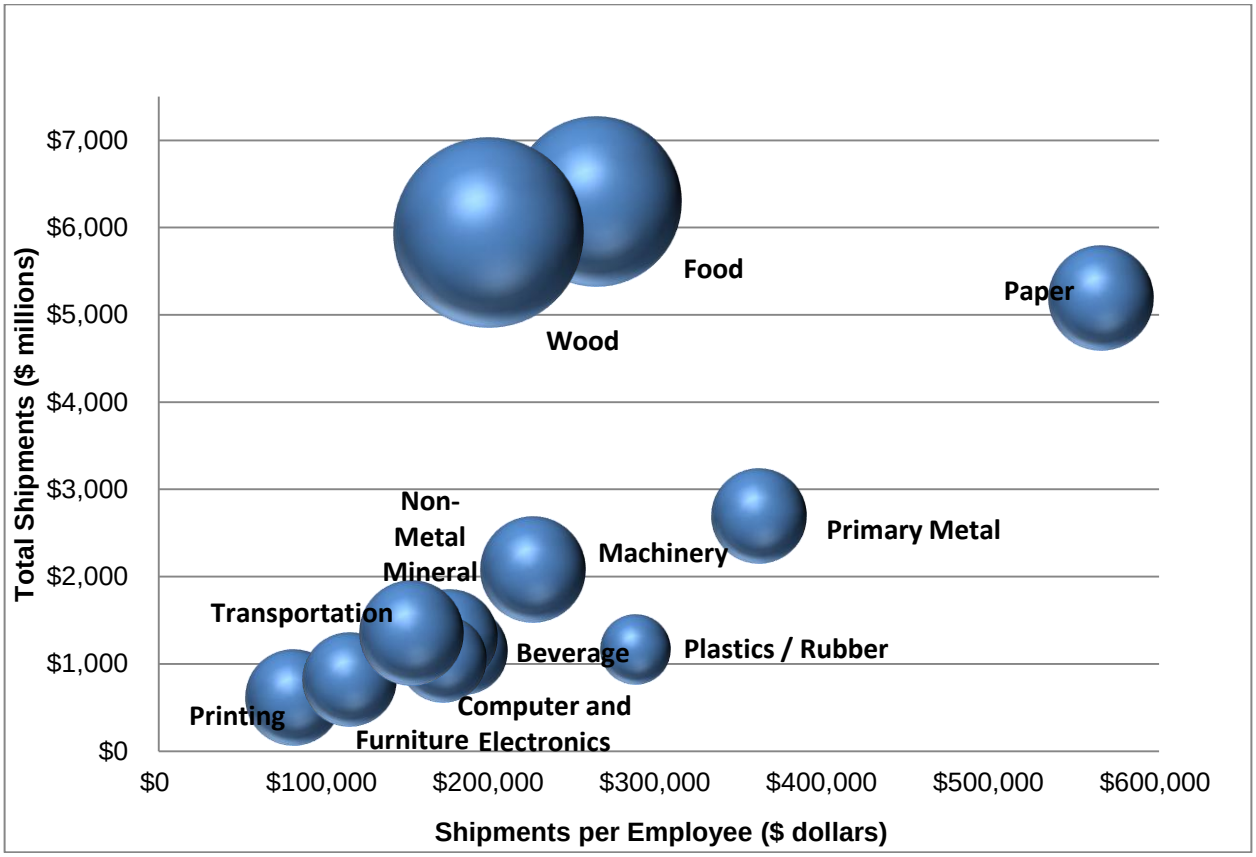
Source: BC Stats, *British Columbia Employment by Detailed Industry, Annual Averages.*[22]

22 BC Stats, *British Columbia Employment by Detailed Industry, Annual Averages.* Accessed November 2013. http://www.bcstats.gov.bc.ca/StatisticsBySubject/BusinessIndustry/BusinessCountsEmploymentByIndustry.aspx

2. Shipments per Employee

The value of manufacturing shipments per employee is a measure of labour intensity. In the following figure, the size of the bubbles corresponds to the number of people employed in the sub-sector, the total value of annual shipments is shown by the position of the bubble along the X-axis, and the shipment value per employee is shown by the position along the Y-axis. As indicated, food products, wood products and pulp and paper manufacturing are the sub-sectors with the largest total shipment values. The value of shipments per employee varies widely across the sub-sectors, being highest in capital intensive processing sectors such as the pulp and paper sub-sector ($565,000 in shipments per employee) and the primary metal sub-sector ($359,000) and lowest in labour intensive sectors such as printing ($81,000 in shipments per employee) and furniture manufacturing ($113,000). The average value of shipments was approximately $230,000 per employee for the manufacturing sector overall in 2011.

Figure 3. Shipment Value per Employee by Sub-sector, 2011[23]



Sources: BC Stats, *British Columbia Employment by Detailed Industry, Annual Averages,* Statistics Canada. Table 304-0015 - Manufacturing sales by NAICS and province, annual (dollars).

23 Data for 2011 was used as shipment values for numerous sub-sectors in 2012 had been suppressed.

3. Employment by Size of Employer

Of the 7,175 manufacturers with employers in BC in 2012, 96% have 99 or fewer employees and 40% have 4 or few employees. Only 15 employers have 500 or more employees.

Table 6. Number of BC Manufacturing Employers, by Size Category and Sub-sector, 2012

Sub-sector	Number of Employers by Number of Employees						Average Number Employees
	Micro (1-4)	Small (5-99)	Medium (100-499)	Large (500+)	Total	%	
311 Food Manufacturing	220	466	67	4	757	10.5	36
312 Beverage & Tobacco Product Manufacturing	86	120	10	0	216	3.0	21
313 Textile Mills	11	7	0	0	18	0.3	12
314 Textile Product Mills	50	52	1	0	103	1.4	
315 Clothing Manufacturing	110	91	3	0	204	2.8	17
316 Leather & Allied Product Manufacturing	13	10	0	0	23	0.3	
321 Wood Product Manufacturing	265	492	79	2	838	11.7	32
322 Paper Manufacturing	10	24	23	3	60	0.8	200
323 Printing and Related Support Activities	273	241	7	1	522	7.3	17
324 Petroleum and Coal Product Manufacturing	4	13	2	0	19	0.3	458
325 Chemical Product Manufacturing	86	123	8	0	217	3.0	32
326 Plastics and Rubber Products Manufacturing	55	169	10	0	234	3.3	19
327 Non-Metallic Mineral Product Manufacturing	106	241	10	0	357	5.0	17
331 Primary Metal Manufacturing	17	34	5	2	58	0.8	107
332 Fabricated Metal Product Manufacturing	338	566	9	0	913	12.7	17
333 Machinery Manufacturing	202	296	18	2	518	7.2	20
334 Computer and Electronic Product Manufacturing	85	119	15	1	220	3.2	35
335 Electrical Equipment, Appliance and Component Manufacturing	59	64	7	0	130	1.8	35
336 Transportation Equipment Manufacturing	131	160	21	0	312	4.3	38
337 Furniture and Related Product Manufacturing	213	315	10	0	538	7.5	16
339 Miscellaneous Manufacturing	506	404	8	0	918	12.8	12
All Manufacturing (31-33)	**2,840**	**4,007**	**313**	**15**	**7,175**	**100.0**	**25**
Percent	**40%**	**56%**	**4%**	**--%**	**100%**		

Source: Industry Canada, Canadian Industry Statistics. *Establishments: Manufacturing (NAICS 31-33).* Accessed December 2013.

In 2012, the 7,175 manufacturers employed an average of 25 people. The average number of employees per employer ranges from 12 employees amongst manufacturers in the textiles sub-sector to a high of 458 employees amongst manufacturers in the petroleum and coal sub-sector.

Although manufacturers with over 100 employees accounted for only 4% of employers, it is estimated that they accounted for 51% of the number of people employed in the sector in 2012. Conversely, it is estimated that the 40% of manufacturers with 1 to 4 employees accounted for only 4% of the number of people employed in the sector.

4. Employment by Development Region

BC manufacturers are predominantly located in the Lower Mainland/Southwest region of the province, which accounts for 64% of the number of manufacturers and 67% of the number of people employed in the sector. The next largest regions, both in terms of number of manufacturers and number of employees, are the Vancouver Island/Coast region (14% of employers and 11% of employees) and the Thompson Okanagan (13%

and 7%, respectively). An overview of the regional representation by total numbers of manufacturing employees and employees is shown in the following table.

Table 7. Regional Representation of Manufacturers in BC, 2012

Development Region	Number of Manufacturers	% of BC Manufacturers	Employment	% of Manufacturing Employment	Average Number of Employees
Mainland/Southwest	4,628	64.4%	120,200	67.1%	26
Vancouver Island/Coast	967	13.5%	18,800	10.5%	19
Thompson/Okanagan	934	13.0%	13,000	7.3%	14
Cariboo	235	3.3%	11,300	6.3%	48
Kootenay	235	3.3%	4,900	2.7%	21
North Coast & Nechako	51	0.7%	4,600	2.6%	90
Northeast	71	1.0%	2,100	1.2%	30
Total	**7,187**	**100%**	**179,200**	**100%**	**25**

Source: BC Stats, Business Counts and Employment by Industry, Number of Businesses – Manufacturing

As indicated in the table below, manufacturing employment in the Lower Mainland remained relatively stable from 2002 until 2007, when it was negatively impacted by the economic recession in 2008, but has recovered significantly in 2012 and is on par with previous employment levels. Manufacturing employment in the Vancouver Island/Coast region declined from 2002 to 2007 but has been relatively stable since then. Employment in southern BC (i.e. the Kootenay and the Thompson Okanagan development regions) increased from 2002 to 2007 but has declined since then as has employment in northern BC (i.e. in the Cariboo, North Coast, Nechako and Northeast Development Regions).

Table 8. Manufacturing Employment by BC Development Region, Annual Averages 2002 to 2012 (Thousands of persons)

Development Region	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Vancouver Island/Coast	22.5	22.2	22.0	20.5	21.5	18.7	19.7	18.5	19.7	18.1	18.8
Mainland/Southwest	118.7	127.0	123.5	119.3	117.8	124.2	119.5	102.7	102.1	103.0	120.2
Thompson/Okanagan	23.3	23.6	25.6	26.7	24.6	24.7	22.4	19.1	20.6	20.9	17.3
Kootenay	7.2	7.6	10.1	8.5	7.7	8.3	4.7	4.6	7.7	6.1	4.9
Cariboo	13.4	14.1	15.1	10.3	14.1	14.3	10.2	8.1	8.4	8.8	11.3
North Coast & Nechako	7.0	7.0	8.2	7.5	6.2	7.1	7.0	6.3	5.5	4.8	4.6
Northeast	2.2	1.8	1.6	2.0	1.5	2.1	x	x	1.7	2.1	2.1
All of BC	**194.4**	**203.3**	**206.0**	**194.8**	**193.3**	**199.4**	**184.8**	**160.8**	**165.8**	**163.9**	**179.2**

Source: BC Stats, Employment by Industry for BC Development Regions - Annual Averages.[24]

D. Leading Positions and Worker Characteristics

1. Number of People Employed in Manufacturing by NOC

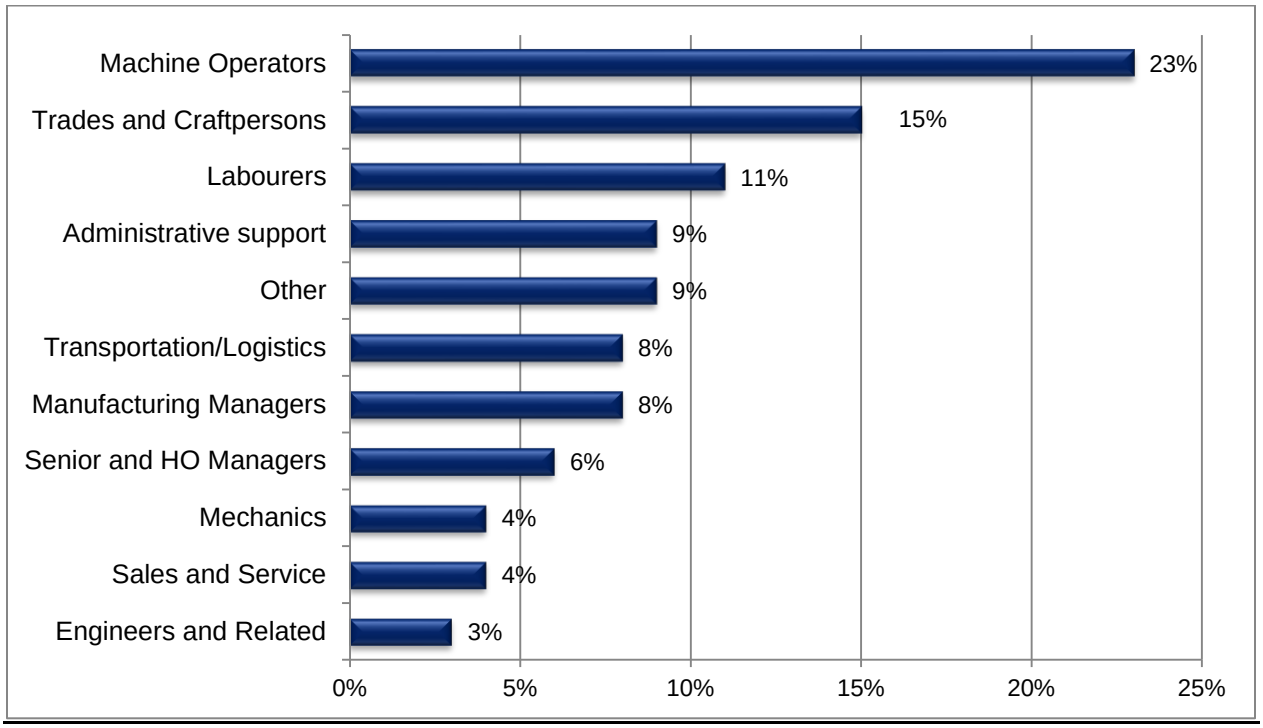
Data obtained from Work BC's *BC Regional Occupation-Industry Employment Forecast 2010-2020* can be used to derive a detailed breakdown of employment in the BC manufacturing sector by occupation (3 digit NOC code) in 2012. The forecast projected

24 BC Stats, Employment by Industry for BC Development Regions - Annual Averages. Accessed November 2013. http://www.bcstats.gov.bc.ca/StatisticsBySubject/BusinessIndustry/BusinessCountsEmploymentByIndustry.aspx

that there would be 167,746 employees in the BC manufacturing sector in 2012, which is approximately 11,500 fewer than the 179,200 actually reported by BC Stats in their *Employment by Industry for BC Development Regions - Annual Averages*.[25] The data presented in this section is based on the Work BC estimate of 167,746 employees in 2012.

Of the 167,746 employees, it is estimated that 69,252 employees (41%) are employed in occupations relatively unique to the manufacturing sector (i.e. NOC codes 091 and 921-961), and 98,494 (59%) are employed by the manufacturing sector, but in occupations that are not unique or very specific to manufacturing sector (e.g. accountants). The leading occupations which are manufacturing-specific include manufacturing managers and supervisors (accounting for 8% of employment in the sector overall), machine operators (23%) and manufacturing labourers (11%). The leading occupations which are not manufacturing-specific include trades and other production-related positions (16%), administrative support services (9%), transportation and material handing (8%), and other managers (6%).

Figure 4. BC Manufacturing Leading Occupations (COPS Data)



Source: *Work BC's BC Regional Occupation-Industry Employment Forecast 2010-2020*

For each NOC, the following table also compares the estimated number of people employed in the manufacturing sector to the total number of people employed in the province. As indicated, the manufacturing sector accounts for 74% of total provincial employment in the occupations considered relatively unique to the manufacturing sector, but only 5% of those employed in occupations that are not unique or very specific to manufacturing sector.

25 Work BC, *BC Regional Occupation-Industry Employment Forecast,* June 2011. Unpublished data tables, accessed with special permission December 2013.

Table 9. Estimated Number of Workers in the BC Manufacturing Sector by NOC, 2012 and 2020

Description	Share of Sector Employment		Share of Provincial Total		Growth to 2020	
	In the Sector	%	Total in BC	% of BC	BC Growth	Est. 2020
Manufacturing Specific Positions						
Manufacturing Managers and Supervisors						
Managers in manufacturing and utilities (91)	6,684	4.0%	10,020	67%	11%	7,450
Supervisors (92)	6,399	3.8%	8,481	75%	19%	6,695
Sub-total, Managers and Supervisors	**13,083**	**7.8%**	**18,501**	**71%**	**10%**	**14,426**
Machine Operators						
Metal and mineral products processing (941)	2,042	1.2%	2,631	78%	10%	2,255
Chemical, plastic and rubber processing (942)	1,630	1.0%	2,801	58%	13%	1,838
Pulp & paper production/wood (943)	8,467	5.0%	9,418	90%	7%	9,019
Textile processing (944)	469	0.3%	760	62%	12%	524
Fabric, Fur/Leather Products (945)	3,527	2.1%	4,428	80%	14%	4,038
Food & beverage (946)	4,969	3.0%	5,989	83%	11%	5,514
Printing (947)	1,692	1.0%	4,121	41%	13%	1,904
Mechanical, electrical and electronics (948)	3,556	2.1%	4,640	77%	13%	4,023
Other assembly and related occupations (949)	8,297	4.9%	11,035	75%	11%	9,249
Machining, metalworking, and woodworking machine operators (951)	3,643	2.2%	4,501	**81%**	12%	4,064
Sub-total, Machine Operators	**38,292**	**22.8%**	**50,323**	**76%**	**11%**	**42,428**
Labourers in processing, manufacturing and utilities	**17,876**	**10.7%**	**24,779**	**72%**	**10%**	**19,635**
Sub-total Manufacturing Specific Positions	**69,252**	**41.3%**	**93,603**	**74%**	**11%**	**76,489**
Positions Not Unique to Manufacturing						
Managers						
Senior management (1)	1,920	1.1%	25,693	7%	12%	2,144
Administrative services managers (11)	1,445	0.9%	19,563	7%	12%	1,616
Sales, marketing and advertising managers (61)	2,599	1.5%	23,152	11%	12%	2,904
Managers in retail trade (62)	1,228	0.7%	56,617	2%	8%	1,325
Other managers (12,13,21,31,41,51,61,71,72,81)	2,181	1.3%	111,786	2%	10%	2,405
Sub-total, Managers	**9,372**	**5.6%**	**236,811**	**4%**	**10%**	**10,394**
Support Services						
Auditors and accountants (111)	1,282	0.8%	42,900	3%	11%	1,428
Human resources (112)	432	0.3%	13,148	3%	14%	492
Computer/IT (217, 218)	2,404	1.4%	47,728	5%	15%	2,762
Other administrative support (121,122,123,124,141,142,143,144,145,146,411)	11,294	6.7%	321,348	4%	12%	12,612
Sub-total, Support Services	**15,412**	**9.2%**	**425,124**	**4%**	**12%**	**17,293**
Engineers and Related Occupations						
Engineers (213/214)	2,974	1.8%	20,344	15%	14%	3,398
Related technical occupations (223, 224)	2,353	1.4%	18,812	13%	11%	2,614
Sub-total, Engineering and Related	**5,327**	**3.2%**	**39,156**	**14%**	**13%**	**6,012**
Transportation and Material Handling						
Longshore workers and material handlers (745)	5,849	3.5%	28,318	21%	10%	6,407
Recording, scheduling and distributing (147)	4,769	2.8%	30,242	16%	10%	5,258
Drivers (741)	2,593	1.5%	65,038	4%	9%	2,826
Other (227,722,736,743)	330	0.2%	14,851	2%	9%	361
Sub-total, Transportation and Material Handling	**13,541**	**8.1%**	**138,449**	**10%**	**9%**	**14,852**
Science and Other Technical Positions						
Science Professionals (211, 212)	720	0.4%	10,285	7%	11%	800
Technical Occupations (215,216,221,222,225,226)	2,305	1.4%	30,718	8%	12%	2,585
Subtotal, Science and Other Technical Positions	**3,026**	**1.8%**	**41,003**	**7%**	**11%**	**3,386**
Sales and Service						

Description	Share of Sector Employment		Share of Provincial Total		Growth to 2020	
	In the Sector	%	Total in BC	% of BC	BC Growth	Est. 2020
Wholesale trade (622,641)	3,052	1.8%	28,826	11%	10%	3,365
Retail (642)	3,344	2.0%	109,372	3%	8%	3,613
Other sales (621,623,661,662)	715	0.4%	111,399	1%	8%	773
Subtotal, Sales and Service	**7,111**	**4.2%**	**249,597**	**3%**	**8%**	**7,752**
Trades and Other Production Positions						
Butchers, bakers and cooks (624,625)	1,998	1.2%	47,084	4%	11%	2,208
Creative designers and craftspersons (524)	2,798	1.7%	15,177	18%	13%	3,168
Contractors and supervisors, trades and related workers (721)	1,628	1.0%	18,375	9%	8%	1,751
Machinists and related occupations (723)	2,760	1.6%	4,200	66%	12%	3,087
Electrical trades and telecommunication occupations (724)	1,781	1.1%	21,411	8%	8%	1,921
Plumbers, pipefitters and gas fitters (725)	782	0.5%	12,503	6%	7%	834
Metal forming, shaping and erecting trades (726)	7,162	4.3%	16,999	42%	9%	7,819
Carpenters and cabinetmakers (727)	3,393	2.0%	36,802	9%	4%	3,543
Heavy equipment operators (742)	738	0.4%	14,453	5%	6%	780
Trades helpers and labourers (761,762)	1,030	0.6%	32,863	3%	6%	1,096
Other construction (728,729,737)	1,236	0.7%	39,178	3%	6%	1,305
Subtotal, Trades and Other Production	**25,306**	**15.1%**	**259,045**	**10%**	**8%**	**27,512**
Mechanics						
Machinery and transportation equipment mechanics (731)	6,362	3.8%	21,903	29%	8%	6,858
Other mechanics (732,733)	718	0.4%	29,920	2%	11%	795
Subtotal, Mechanics	**7,080**	**4.2%**	**51,823**	**14%**	**10%**	**7,653**
Other Equipment Operators and Primary Production						
Upholsterers, tailors, etc. (734)	1,450	0.9%	4,680	31%	12%	1,624
Stationary engineers and power station and system operators (735)	945	0.6%	2,078	45%	9%	1,030
Printing press operators (738)	1,854	1.1%	3,940	47%	10%	2,048
Primary Production Workers (821,822,823,824,825,826,841,842,843,844)	1,625	1.0%	70,427	2%	5%	1,708
Sub-total, Other Equipment Operators and Primary	**5,875**	**3.5%**	**81,125**	**7%**	**6%**	**6,410**
Health Care (321,322,323,341)	**1,314**	**0.8%**	**125,625**	**1%**	**21%**	**1,591**
Miscellaneous						
Cleaners (666)	1,938	1.2%	63,853	3%	12%	2,171
Other	3,192	1.9%	377,908	1%	13%	3,554
Sub-total, Miscellaneous	**5,131**	**3.1%**	**441,761**	**1%**	**13%**	**5,725**
Sub-total, Positions Not Specific to Manufacturing	**98,494**	**58.7%**	**2,089,520**	**5%**	**11%**	**108,582**
Total Manufacturing Positions	**167,746**	**100.0%**	**2,183,123**	**8%**	**11%**	**185,071**

Source: *Derived from Work BC's BC Regional Occupation-Industry Employment Forecast 2010-2020*

A further description of the manufacturing specific positions is provided in a series of tables in Appendix II while a further description of positions not specific to manufacturing is provided in a series of tables in Appendix III.

The BC *Regional Occupation-Industry Employment Forecast 2010-2020* also projects expected growth in the number of people employed in each NOC to 2020. Assuming that the number of people employed in these NOCs grows at the same rate in the manufacturing sector as the rate projected for the province overall between 2012 and 2020 (i.e. 1.3% per year), it is estimated that 185,071 people will be employed in manufacturing in BC in 2020.

The following table uses the available data to estimate the number of new workers that would be needed to fill new positions that will be created, as well as fill existing positions vacated by those leaving the sector (e.g. retirement). As indicated, is it projected that between 55,000 and 60,000 new workers will be required over the eight year period to fill new positions (approximately 17,000 workers) and existing positions (42,000 workers).

The leading types of positions in terms of the projected number of new workers that will be required over the next eight years include machine operators (13,372), trades and other production positions (8,055), labourers in manufacturing and processing (5,968), managers and supervisors in manufacturing and utilities (5,787), administrative support (5,555), mechanics (2,482), sales and service (1,985), and engineering and related (1,951).

Table 10. Number of New Workers Required to 2020 to Fill New Positions and Replace Workers Leaving the Manufacturing Sector

Description	Sector	Increase	Replacement Demand	New & Replacement
Manufacturing Specific Positions				
Managers and Supervisors				
Managers in manufacturing and utilities (91)	6,684	766	2,258	3,024
Supervisors (92)	6,400	565	2,187	2,752
Sub-total, Managers and Supervisors	**13,085**	**1,341**	**4,445**	**5,787**
Machine Operators				
Metal and mineral products processing (941)	2,042	213	492	705
Chemical, plastic and rubber processing (942)	1,630	207	396	603
Pulp & paper production/wood (943)	8,467	553	2,254	2,807
Textile processing (944)	469	55	110	164
Fabric, Fur/Leather Products (945)	3,527	511	1,089	1,599
Food & beverage (946)	4,969	545	1,290	1,835
Printing (947)	1,692	212	377	589
Mechanical, electrical and electronics (948)	3,556	467	762	1,229
Other assembly and related occupations (949)	8,297	953	1,636	2,589
Machining, metalworking, and woodworking machine operators (951)	3,643	421	830	1,251
Sub-total, Machine Operators	**38,292**	**4,136**	**9,235**	**13,372**
Labourers in processing, manufacturing and utilities	**17,876**	**1,759**	**4,209**	**5,968**
Sub-total Manufacturing Positions	**69,252**	**7,237**	**17,890**	**25,127**
Positions Not Unique to Manufacturing				
Managers				
Senior management (1)	1,920	225	660	884
Administrative services managers (11)	1,445	172	457	628
Sales, marketing and advertising managers (61)	2,599	305	753	1,057
Managers in retail trade (62)	1,228	97	350	447
Other managers (12,13,21,31,41,51,61,71,72,81)	2,181	224	668	892
Sub-total Managers	**9,372**	1,022	**2,887**	3,909
Support Services				
Auditors and accountants (111)	1,282	146	342	487
Human resources (112)	432	60	115	175
Computer/IT (217, 218)	2,404	358	447	805
Other administrative support (121,122,123,124,141,142,143,144,145,146,411)	11,294	1,318	2,770	4,088
Sub-total, Support Services	**15,412**	1,881	**3,673**	5,555
Engineers and Related Occupations				
Engineers (213/214)	2,974	424	730	1,155

Description	Sector	Increase	Replacement Demand	New & Replacement
Related technical occupations (223, 224)	2,353	261	535	796
Sub-total, Engineering and Related	**5,327**	685	**1,266**	1,951
Transportation and Material Handling				
Longshore workers and material handlers (745)	5,849	558	1,171	1,729
Recording, scheduling and distributing (147)	4,769	489	1,041	1,530
Drivers (741)	2,593	233	658	891
Other (227,722,736,743)	330	31	91	122
Sub-total, Transportation and Material Handling	**13,541**	1,311	**2,962**	4,273
Science and Other Technical Positions				
Science Professionals (211, 212)	720	80	170	250
Technical Occupations (215,216,221,222,225,226)	2,305	280	490	770
Subtotal, Science and Other Technical Positions	**3,026**	360	**661**	1,021
Sales and Service				
Wholesale trade (622,641)	3,052	313	678	991
Retail (642)	3,344	269	542	811
Other sales (621,623,661,662)	715	59	124	183
Subtotal, Sales and Service	**7,111**	641	**1,344**	1,985
Trades and Other Production Positions				
Butchers, bakers and cooks (624,625)	1,998	210	382	593
Creative designers and craftspersons (524)	2,798	370	664	1,035
Contractors and supervisors, trades and related workers (721)	1,628	123	500	623
Machinists and related occupations (723)	2,760	327	679	1,006
Electrical trades and telecommunication occupations (724)	1,781	140	495	635
Plumbers, pipefitters and gas fitters (725)	782	52	178	229
Metal forming, shaping and erecting trades (726)	7,162	657	1,582	2,239
Carpenters and cabinetmakers (727)	3,393	151	730	880
Heavy equipment operators (742)	738	42	192	234
Trades helpers and labourers (761,762)	1,030	66	191	257
Other construction (728,729,737)	1,236	69	256	325
Subtotal, Trades and Other Production	**25,306**	2,207	**5,848**	8,055
Mechanics				
Machinery and transportation equipment mechanics (731)	6,362	496	1,735	2,231
Other mechanics (732,733)	718	77	174	251
Subtotal, Mechanics	7,080	573	1,909	2,482
Other Equipment Operators and Primary Production				
Upholsterers, tailors, etc. (734)	1,450	175	445	619
Stationary engineers and power station and system operators (735)	945	84	317	402
Printing press operators (738)	1,854	194	513	707
Primary Production (821,822,823,824,825,826,841,842,843,844)	1,625	83	355	438
Sub-total, Other Equipment Operators and Primary	**5,875**	536	**1,630**	2,165
Health Care (321,322,323,341)	1,314	277	327	604
Miscellaneous				
Cleaners (666)	1,938	232	510	743
Other	3,192	362	684	1,046
Sub-total, Miscellaneous	**5,131**	**594**	**1,194**	**1,788**

Description	Sector	Increase	Replacement Demand	New & Replacement
Sub-total, Positions Not Specific to Manufacturing	**98,494**	**10,087**	**23,701**	**33,789**
Total	**167,746**	**17,324**	**41,591**	**58,916**

Source: *Derived from Work BC's BC Regional Occupation-Industry Employment Forecast 2010-2020*

The number of new workers required is, of course, largely a function of the projected rate of growth. If employment in the manufacturing sector were to grow at the rate of 3% per year, rather than 1.3%, the number of workers required over the next eight years would be approximately 88,000 (of whom nearly one-half would be replacement workers).

2. Characteristics of Employees

On average, BC employees in occupations unique to processing, manufacturing and utilities:

- Are disproportionately male (73% male and 27% female), as compared to the average for all industries (52% male vs. 48% female). Males make up approximately three-quarters (76%) of machine operators and assemblers in manufacturing, including supervisors, and nearly two-thirds (64%) of labourers.[26]
- Work an average of 32 hours per week, with machine operators and assemblers working an average of 36 hours, and labourers working an average of 36.7 hours per week.[27]
- Receive an estimated hourly wage of $23.58 for all occupations unique to the sector, with an hourly wage of $21.21 for machine operators and assemblers, and an estimated hourly wage of $21.90 for labourers.[28]
- Have, on average, longer tenure than the BC average of 97.6 months. Employees in all occupations unique to manufacturing, processing and utilities have an average tenure of 116.1; machine operators an average tenure of 124.1 months; and labourers an average tenure of 90.5 months.[29]
- Are slightly older as compared to the average age demographics for all industries, with 9% of BC manufacturing employees aged 15 to 24 years, 72% of employees aged 25 to 54, and 19% of employees aged 55 and older.[30]

26 Statistics Canada, Table 282-0010 Labour force survey estimates (LFS), by National Occupational Classification for Statistics (NOC-S) and sex, annual (persons x 1,000)(8,9)
27 Statistics Canada, Table 282-0026 Labour force survey estimates (LFS), by actual hours worked, class of worker, National Occupational Classification for Statistics (NOC-S) and sex, annual (persons unless otherwise noted)(8,9)
28 Statistics Canada, Table 282-0070 Labour force survey estimates (LFS), wages of employees by type of work, National Occupational Classification for Statistics (NOC-S), sex and age group, annual (current dollars)(5,6)
29 Statistics Canada, Table 282-0040 Labour force survey estimates (LFS), job tenure by National Occupational Classification for Statistics (NOC-S) and sex, annual (persons unless otherwise noted)(3,4)
30 Statistics Canada, Table 282-0008 Labour force survey estimates (LFS), by North American Industry Classification System (NAICS), sex and age group, annual (persons x 1,000)(11,13)

E. Results of the Literature Review

A small literature review was undertaken as part of this project, focused on international and national trends in labour and skills shortages, recent studies specifically related to the manufacturing sector, sub-sector or related occupations, and examples of existing initiatives intended to address skill shortages.

1. International and National Trends in Labour and Skills Shortages

Skills shortages and the mismatch between the skills and experience of applicants and those needed by manufacturing employers have been identified as challenges across Canada, the United States, and abroad.

- A 2013 survey of 38,000 employers across 42 countries conducted by Manpower Group found that 38% of employers are experiencing difficulties filling jobs due to a lack of available talent, with the most difficult occupations to fill being skilled tradesworkers, engineers, sales representatives, technicians, accounting and finance staff and management/executives.[31] The reasons most commonly identified by employers included a lack of specific technical competencies (34%), a shortage of applicants (32%), lack of experience (24%) and a lack of soft skills (19%).[32] The proportion of surveyed Canadian employers who reported difficulties in this survey increased by 9% over 2012, to reach a 6 year high.

- A 2011 survey of 1,123 manufacturing employers in the United States conducted by Deloitte and The Manufacturing Institute found that 67% of respondents reported a moderate to severe shortage of skills and qualified workers, with 56% anticipating that shortages will worsen over the next 3 to 5 years.[33] The hardest jobs to fill were identified as being those which have the greatest impact on performance and included skilled production jobs such as machinists, operators, craft workers, distributors, and technicians. It was noted that these occupations also require the most training and education, and are often considered to be most difficult to fill.

  Similar to the findings of this study, Deloitte reported that, while US manufacturing employers recognize the importance of recruiting and developing talent, they largely depend on outdated approaches for recruiting and developing their employees' skills and improving their performance.[34] It was also reported that labour availability does not result in filled positions, as available candidates lack the right skills desired to meet the changing nature and demands of the industry. Many manufacturing employers were identified as having redesigned and streamlined their production lines by implementing more process automation, making it harder for talent to keep up. Respondents also noted that the greatest challenge encountered with their current workers is the inability to problem solve and adapt to changing needs.

  The Deloitte survey recommended that US manufacturers pursue more creative approaches to recruitment and talent management, including new performance tools and more formal training processes. Government and educational institutions were

31 Manpower Group, *2013 Talent Shortage Survey Research Results.* 2013. pg. 8
32 Ibid. pg. 7.
33 Deloitte and The Manufacturing Institute, *Boiling Point? The Skills Gap in US Manufacturing,* 2011. pg. 1.
34 Ibid. page 2.

identified as having a key role in creating clear career paths for students to ensure they receive the right skills and training needed for a career in manufacturing.

- The *2014 Randstad Canada Labour Trends Study* involved an online panel of 800 managers/employers and 1,276 employed Canadians.[35] According to their findings, a lack of skilled trades workers (16.3%), outsourcing of jobs or increases in numbers of international workers (15.2%) and a lack of skilled workers overall (9.9%) were identified as the biggest issues the country's organizations are facing in 2014.

  According to those polled, promotion, compensation, and investment in skills training are critical to properly address the issue of the skills gap/shortage in both the short and long term. Four out of ten people surveyed say that companies need to invest more in skills training for their employees (40%), with another 38% saying that educators need to do more to promote to students industries and job roles that are likely to lead to careers addressing the skills shortage/gap. One in three (32.9%) think that governments need to invest more in skills training for unemployed and underemployed workers, with one-quarter (25.7%) believe governments need to provide better incentives for workers to move into positions that address the skills shortage/gap.

  According to the study, Canadian workers believe that education and perception are core reasons that have led to today's skills shortage. Four in five (79%) survey respondents stated they feel a lack of knowledge of the skilled trades has led to less Canadians considering them a career option, while more than three-quarters (76.6%) felt that a perception of skilled trade work as being less respected and more old fashioned in comparison to 'white collar' work has led to Canadians' reduced interest in these types of roles.

- *Competing in the 21st Century Skills Race,* a July 2012 paper commissioned by the Canadian Council of Chief Executives, highlighted the fact that competition from low-wage countries has long been a challenge for many Canadian manufacturers, but that as the global economy evolves and growing numbers of previously undeveloped economies are now moving up the value chain, the importance of investing in education and skills development becomes more imperative to ensuring Canada is well-positioned to compete.[36] The report studied the achievement of Canadians in three broad skill areas: general literacy and numeracy, the number of students enrolled in science, technology, engineering and mathematics (STEM) programs, and the development of skills that are considered particularly important for innovation, such as critical and creative thinking, collaboration and adaptability. Canada was identified as having a shortage of graduates in STEM programs and was reported to have issues attracting students to these post-secondary fields.[37]

  The report calls for the creation of a National Roundtable on Skills to develop a vision for the future education and training needs of Canadians and to develop a comprehensive strategy to achieve that vision that involves government at all levels,

35 Randstad Canada, *Randstad Canada Labour Trends Study,* February 25, 2014. (2014).
36 Graham Orpwood, Bonnie Schmidt, and Hu Jun. *Competing in the 21st Century Skills Race*. Commissioned by the Canadian Council of Chief Executives, July 2012. pg. 3.
37 Ibid.pg. 11.

as well as the private and non-profit sectors.[38] It was suggested that government and stakeholders work harder to attract and retain students in STEM programs, possibly by rethinking traditional subject boundaries and developing multi-disciplinary approaches to learning that would provide students with relevant and exciting contexts for their education, and by establishing better linkages between education and career awareness.[39]

- The Government of Canada's *Jobs Report: The State of the Canadian Labour Market, 2014* identified a misalignment between the skills of the unemployed and those required by employers, with higher vacancy rates in the skilled trades and science based occupations.[40] Canadian firms were reported to be experiencing more difficulty in hiring than the unemployment situation would normally warrant, indicating that unemployed individuals now have more difficulty filling vacant positions than before the recession. This could be due to lower search intensity on the part of employers (e.g. employers may be hesitant to hire due to economic uncertainty) or employees, or to a misalignment between the skills of the unemployed and those required by employers. In particular, difficulty in hiring has become a more significant issue in certain occupations including skilled trades and science-based occupations.[41] The recruitment difficulties were linked to a lack of an appropriate number of skilled workers on the market at the existing wage.

  Proportionally, Canada was recognized as having fewer graduates in the STEM programs than other OECD countries and was described as lagging in developing business skills. While the number of apprentices completing training and obtaining certification was shown to have doubled from 2000 to 2011, apprenticeship completion rates continue to average only 50% over this period, a rate that is substantially lower than that of community college and university students in Canada, and of apprenticeship students in other comparable countries.

  Canadian managers were also reported to be less educated than their counterparts in the US, which may lead to lower innovation levels. Canada's productivity has stalled over the past decade and continues to lag that of its G-7 peers, particularly the US. For example, between 2000 and 2012, Canada's productivity growth (0.8%) was less than half the rate in the United States (1.9%) and the OECD average (1.7%).This is not a new phenomenon, as productivity in Canada lagged that of most peer countries in the 1990s.

  Going forward, population size and demographics was identified as a key challenge. According to the report, unless labour force participation improves, ageing could contribute to larger skills and labour shortages and increase the economic impact of mismatches. Ongoing technological change, along with the competitive intensity of emerging markets will continue to raise the skills requirements of jobs, consequently the shift towards high-skilled employment is expected to continue. About two-thirds of the job openings in Canada over the next decade are expected to be in occupations that usually require postsecondary education, or in management occupations.

38 Ibid. pg. 4.
39 Ibid. pg. 16.
40 Department of Finance Canada, *Jobs Report: The State of the Canadian Labour Market, 2014.*pg. 4.
41 Ibid, pg. 31.

Skilled immigrants will continue to be an important part of Canada's labour supply. Training, as well as business innovation and adaptation of new technologies, will allow for higher productivity and wages and help realign labour demand and supply. In addition, higher relative wages in expanding sectors and regions encourage mobility and provide incentives for individuals to acquire skills and training to meet the needs of the labour market.

2. Review of Recent Manufacturing Studies

Various labour market studies have been conducted recently related to the manufacturing sector, sub-sectors or associated occupations in BC, Canada, and internationally which comment on potential growth, drivers of growth skills shortages, human resource issues and/or possible strategies to address shortages and issues. The following paragraphs provide examples of these studies.

- The Canadian Occupational Projection System's *Industrial Outlook 2011-2020* projected a rise in world demand for resources and investment-related products, driving growth in manufacturing real GDP in Canada over the next decade.[42] Growth was projected in foreign demand, particularly from the US, as well as in domestic demand, particularly business investment in non-residential structures and in machinery and equipment. It was anticipated that growth in employment would be slower than growth in GDP as manufacturers work to improve productivity in the face of the high Canadian dollar and increased international competition in foreign and domestic markets.

- These findings were supported by a 2012 national survey of Canadian Manufacturing Coalition (CMC) members, wherein members reported that the three most pressing challenges facing companies today were increased competition in primary markets (56%), the strength of the Canadian dollar (47%) and issues attracting and retaining labour (46%).[43] Respondents from BC specifically stated that labour costs, the need to upgrade skills and the aging workforce were the top three issues. CMC members also reported that availability of skilled labour (35%) and labour costs (33%) were the two most important factors in making investment decisions following the strength of local markets (43%).[44] Nearly half of all respondents (49%), and 44% of respondents in BC, reported facing labour shortages today across a wide range of occupations, with most expected to worsen over the next five years. According to the survey findings, occupations such as sales and marketing, skilled production, general management and engineering are deemed to be the most critical for companies' success over the next five years, and are also the occupations for which companies are most concerned about labour shortages. The labour shortage is anticipated to have significant economic repercussions for Canada; 34% of respondents reported that current labour shortages are already constraining their growth. To compensate for these shortages, over the next 5 years, companies are expected to significantly increase their investment in automation to improve labour productivity (35% today increasing to 46% in five years), and 31% of companies report moving production

42 HRSDC, Canadian Occupational Projection System: Industrial Outlook 2011-2020. Retrieved from: http://www23.hrsdc.gc.ca/l.3bd.2t.1ilshtml@-eng.jsp?lid=14&fid=1&lang=en
43 CME, Manufacturing our Future: A Manufacturing Action Plan for Canada, 2012. pg. 2
44 Ibid. pg. 3

and investment to other countries over the next five years (a 22% increase from 9% today).[45]

- Work BC's *British Columbia Trade Occupations Outlook 2010-2020*, produced in 2011, suggested that employment in trades will grow at the rate of 1.2% annually over ten years, resulting in a tightening of labour market conditions.[46] In 2010, employment in the trades totaled 251,000, or 11.1% of provincial employment. By 2020, it is projected that 282,400 workers will be employed in trades occupations, representing 10.9% of total employment in BC. Much of the growth is expected during the mid-term (5 year horizon) driven by variables such as confirmed construction projects.[47]

- The Apparel Human Resources Council conducted a national labour market information study for the Canadian apparel sector in 2011, which identified various factors driving employment growth including regulations, government and social compliance, rising production costs, globalization of retail and the impact of the internet.[48] The study projected shortages in key areas as a result of retirement amongst senior managers and production workers as well as a shift towards greater growth in service occupations than in production occupations.[49] It also highlighted the need to improve transitioning of post-secondary graduates into the workforce, and the need for employee and management-specific functional training. Possible strategies identified included an industry-based training solution or an education based system and providing various forms of financial and technical on-the-job training assistance to employers. The report also suggested that development of further specific functional training was required. Possible examples of this training included resource materials on topics such as entering new distribution channels and new export markets, optimizing the use of sales agents, using the internet for sales and marketing, facilitating financing, and recruiting.[50] A *Labour Market Information Update* issued in 2013 also recommended training programs specifically designed to help the sector replace retiring managers and skilled production workers.

- The Industry Association for Applied Science Technologists and Technicians of BC (ASTTBC) produced a report entitled *A Strategic Direction for Technology Education and Skills in British Columbia* in 2013. The report focuses on technology and technical occupations as defined in the National Occupational System Classification codes 021, 022 and 321 - defined as "high technology" occupations by BC Stats. The report projected that, as a result of growth in the technology sector, 25,000 new job openings were projected by 2020 which represents significant growth over the 150,000 people employed in these occupations in BC in 2012.[51] In response to the projected growth in demand for workers over the next eight years, the report provided the following ten recommendations:

45 Canadian Manufacturers & Exporters, *Canada's Manufacturing Labour Market,* December 2012. pg. 13
46 Work BC, *British Columbia Trade Occupations Outlook 2010-2020.* November 2011. Pg. 2-3
47 Ibid. pg. 11.
48 Apparel Human Resources Council, *Pressing Ahead: Canada's Transforming Apparel Industry 2011 Labour Market Information Study.* pg. 12.
49 Apparel Human Resources Council, *Pressing Ahead: Canada's Transforming Apparel Industry 2011 Labour Market Information Study.* pg. 12.
50 Ibid. pg. 14.
51 ASTTBC, *A Strategic Direction for Technology Education and Skills in British Columbia. 2013.* Pg. 11.

1. Develop a clear, strategic direction for technology education and skills in BC, including clear, high-level leadership and championing.

2. Develop a clear technology education and training plan and capacity for BC – annual and multi-year – that is tied to labour market demand.

3. Develop a comprehensive program to promote technology careers, skills and education in BC.

4. Increase high school technology career preparation programs and teaching, and emphasis on STEM within curriculum.

5. Support small business HR innovation capacity and provide incentives for employers to hire, retain and train technical graduates and workers.

6. Support the recognition of skills and employment of internationally trained professionals and mature workers.

7. Increase Aboriginal participation and success in technology education and careers.

8. Increase the participation and career advancement for women in selected technology education and careers.

9. Increase the utilization and recognition of the talents of technology professionals.

10. Increase access to useful technology occupation labour market information. [52]

- The *British Columbia Forest Sector Labour Market & Training Needs Analysis* undertaken by the Coastal Forestry Workforce Initiative examined the current and forecasted needs of the BC forest industry and broader forest sector through 2022.[53] Employment in the forest industry (which was defined as all BC operations involved in forestry, logging, road building, multi-phase operators and pulp and paper manufacturers excluding wood product manufacturers) is projected to increase by 3,036 jobs between 2012 and 2022, which represents an increase of 10.7%. Growth is projected highest for workers employed in maintenance occupations (23%), followed by management/administration (10%) and production (9%). The main findings of the study were that the overriding challenges facing the broad forest sector were an ageing workforce and challenges recruiting workers due to negative perceptions of an industry in decline, remote work locations and the seasonal nature of the work. It was suggested that the forest industry has not done a good job of attracting new recruits - the current supply of skilled workers is inadequate and the province's industry training and apprenticeship system does not meet their needs. The vast majority of employers found it "difficult" hiring workers in priority occupations - competition for workers was cited as the primary reason for hiring difficulties (41%), followed by remote work locations (31%) and a lack of long

52 ASTTBC, *A Strategic Direction for Technology Education and Skills in British Columbia. 2013.* Pg. 11.
53 LMI Insight and R.A. Malatest & Associates Ltd. *British Columbia Forest Sector Labour Market &Training Needs Analysis.* Prepared for BC Coastal Forestry Labour Market Information Working Group. October, 2013.

term/consistent employment (28%). Skills and training requirements were reported to vary by region, complicating efforts to develop an industry-wide training program.[54]

- The *Northern British Columbia's Perfect Storm: Resource Labour Market Information Report 2013*, commissioned by the Resource Training Organization (RTO), provided current and forecasted employment trends in BC's resource sector.[55] The scope of the report included the following industries: forestry, mining, oil and gas, paper manufacturing, primary metal products, utilities and wood product manufacturing. The key driver of employment growth in the north was identified as the emergence of several potential liquefied natural gas projects. Factors described as contributing to labour and skills shortages in the sector included the small labour force, competition from other regions of Canada and the world, difficulty retaining young people and attracting highly skilled people to the north, aging of the northern workforce, declining unemployment rates, significant economic growth and major projects planned or underway. Key industries in the resource sector were said to be chasing the same skilled workers including operators, trades workers, technicians and professionals and common shortages were identified across oil and gas, mining, forest products and shipbuilding and repair.[56] Across the resource sector, top occupations for job openings included labourers (19,887), steamfitters and pipefitters (3,589), truck drivers (3,466), heavy equipment operators (3,128), managers and supervisors (3,103), welders (2,904), millwrights, machinists and instrument technicians (2,527) and industrial electricians (924).[57]

  The key workforce challenges shared by resource industries were aging workforces, the small rural and remote populations and labour forces, lower educational attainment levels, negative perceptions of the industries and careers, difficulties attracting new Canadians and others to remote areas, the need for better coordination among service providers and better collaboration between them and industry, stiff competition for talent from other regions inadequate capacity and flexibility among training providers, and a lack of innovation and quick response in BC's traditional apprenticeship training models.

- The Food Processors Human Resource Council conducted a national *2011 Food and Beverage Labour Market Information Study*. The study projected 21,437 job openings over 2011 to 2014 (including 5,481 jobs in western Canada) to account for retirement replacement (10,000 jobs) and industry growth of 4.6%. Across Canada, 40% of projected openings were for general labourers (8,549), skilled workers (2,831) and professionals with post-secondary education (2,197). One in four workers was identified as an immigrant, 60% of workers are male, and 73% of the workforce is employed on a permanent, full-time basis. The study's survey of employers found that 59% of employers indicated that there is a lack of candidates with proper training, and 44% of manufacturers surveyed use incentive programs to attract and retain staff.

- The Mining Industry Human Resources Council (MiHR) in partnership with the BC Mining HR Task Force produced the *British Columbia Hiring Requirements and*

54 Ibid, pg. 2.
55 Jothen, Kerry. *Northern British Columbia's Perfect Storm: Resource Labour Market Information Report 2013.*
56 Ibid. pg. iii.
57 Ibid. pg. iv.

Available Talent Forecasts - Exploration, Mining, and Stone, Sand and Gravel in 2012.58 The document presents forecasts of hiring requirements and available talent for the BC exploration, mining and stone, sand and gravel sectors. Strong demand from Asia was identified as a key driver of growth. While fluctuations in GDP growth for mining are characteristically volatile, the industry appears to be rebounding. The greatest labour demand was identified in trades and production occupations, with the greatest hiring requirements projected for technical occupations. Given the requirements for education an experience in these roles, it was suggested that finding talent may prove difficult. Key workforce challenges identified include an ageing workforce, with relatively few workers in the mid-career range (ages 25 to 34 and 33 to 44). The cumulative hiring requirements over the next 10 years was projected to be 16,770 workers under a baseline scenario, 19,860 workers in an expansionary scenario and 13,340 workers in a contractionary scenario.[59] Under all projection scenarios, the majority of demand will be due to replacement of retiring and non-retiring workers leaving the industry.

- TD Economics produced a special report entitled *The Curious Case of Canada's Ailing Manufacturing Sector* on February 20, 2014.[60] The report identified a range of factors as impacting the growth and performance of the manufacturing sector including currency, the cost structures (e.g. labour, raw material, transportation, power and border costs), capacity constraints, economic conditions in key export markets, and the strength of the domestic market. According to TD Economics, domestic demand (which accounts for about half of manufacturing sales in Canada), is expected to growth at the rate of 2% over the next few years. The wood, machinery, chemical and primary metals sub-sectors are expected to be the fastest growing for Canada overall.

- The Business Council of British Columbia's *BC Economic Review and Outlook - January 2014* reports the marked decline in the Canadian dollar will have a positive impact on exports.[61] When the loonie was at or near parity, some employers cut costs and took other initiatives to increase competitiveness. Those who were successful stand to benefit more with the effective price reduction on their products sold in the U.S. or offshore but priced in U.S. dollars. The strengthening of the U.S. economy is predicted to lead to growth in demand and demand for BC goods in China is expected to be sustained. On the domestic side, consumer demand is anticipated to improve and the diminished Canadian dollar is expected to reduce cross-border shopping and help keep more consumer dollars within the domestic economy.

- To draw attention to human resources issues, in December 2012, Canadian Manufacturers and Exporters (CME) produced a report entitled, *Canada's Manufacturing Labour Market: A Reality Check for Canadian Industry and Government.* In the report, CME outlines how Canadian manufacturers have adopted a variety of tactics to offset the labour and skills shortages, including increasing expenditures on training, using the immigration system, use of overtime, outsourcing

58 BC Mining Industry Human Resources Council, British Columbia Hiring Requirements and Available Talent Forecasts - Exploration, Mining, and Stone, Sand and Gravel. 2012.
59 Ibid, pg. 19.
60 TD Economics, *Special Report - The Curious Case of Canada's Ailing Manufacturing Sector.* February 20, 2014
61 Business Council of British Columbia, *BC Economic Review and Outlook - January 2014.* Pg. 1.

of activities, and investing in new machinery and equipment to improve productivity and automate production. These efforts, however, will not be sufficient to address the labour and skills shortage, and support from governments at all levels is needed to facilitate the development of the domestic labour pool and increase the supply of foreign workers. Despite the importance of attracting investment and maintaining manufacturing employment in Canada, a significant majority of respondents in a recent CME survey reported that government efforts aimed at increasing retention and attraction of staff from 2009 to 2012 have remained the same level as before, or worsened (84%).[62]

3. Examples of Existing Initiatives

The literature review included a brief review to identify examples of various types of initiatives, programs and strategies designed to address skills shortages. A number of examples, grouped by primary objective, are provided in the following table.

Table 11. Examples of Current and Potential Programs or Initiatives Designed to Ease Labour or Skills Shortages

Examples of Programs and Initiatives By Type of Objective and Focus	
Objective: Increase Access to Education and Training Programs	
Provide training tax credits, incentives or other support available to employers	• **Apprenticeship Job Creation Tax Credit (AJCTC).** Employers of apprentices registered in Red Seal trades who are in the first two years of their apprenticeship contract are eligible to claim this tax credit. The AJCTC is a non-refundable tax credit equal to 10% of the eligible salaries and wages payable to eligible apprentices in respect of employment after May 1, 2006. Employers can claim a maximum of $2,000 per year for each eligible apprentice.[63] • **BC Training Tax Credits.** The BC provincial training tax credits provide refundable income tax credits for employers and employees who are engaged in apprenticeship programs administered through the Industry Training Authority (ITA). There are three main elements to the tax credits: 1) basic credits for non-Red Seal training programs; 2) completion credits for both Red Seal and non-Red Seal training programs; and 3) enhanced credits for First Nations individuals and persons with disabilities.[64] • **Competitiveness Consulting Rebate from Northern Development.** Small and medium-sized manufacturers in northern BC can receive a rebate of up to 50% for a yearly maximum of $30,000 for the cost of external business consulting projects. Projects must focus on increased productivity, new or incremental revenues, profitability and/or job creation.[65]
Increase access to training and education throughout BC	• **ASPECT Targeted Skills Shortage Program (TSSP).** Program has space for up to 1,200 eligible employees in every region in BC. Each employee can be provided up to a maximum of $1,500 ($7,500 per employer) to be used for training courses specific to the employers' workplace need. Manufacturing employers must have fewer than 100 employees to qualify.[66]

62 Ibid. pg. 4
63 Canada Revenue Agency: Apprenticeship Job Creation Tax Credit. http://www.cra-arc.gc.ca/tx/ndvdls/tpcs/ncm-tx/rtrn/cmpltng/ddctns/lns409-485/412/jctc-eng.html; CITO: Grants and Tax Credits. http://bccito.ca/training-means-business/grants-and-tax-credits-employers-industry
64 Province of British Columbia. Training Tax Credit For Employers. http://www2.gov.bc.ca/gov/topic.page?id=0D8636D5ECA0476F888043C3B9D77DCB; CITO: Grants and Tax Credits. http://bccito.ca/training-means-business/grants-and-tax-credits-employers-industry
65 Northern Development, Competitiveness Consulting Rebate: Program Overview. http://www.northerndevelopment.bc.ca/funding-programs/business-development/competitiveness-consulting-rebate/
66 ASPECT Targeted Skills Shortage Program http://www.aspect.bc.ca/tssp

Examples of Programs and Initiatives By Type of Objective and Focus	
	• **The Canadian Manufacturing Network online resources and services.** The CMN operates an online Skills and Learning Portal with a catalogue of training programs available online including technical skills, foundational skills, business skills etc.[67]
Objective: Improve Awareness of Employment Opportunities	

67 Canadian Manufacturers Network, *Skills and Learning Portal, http://www.emccanada.org/group_spaces/canadian_manufacturing_network*

Examples of Programs and Initiatives By Type of Objective and Focus	
Promote employment opportunities in the BC manufacturing sector to potential employees in BC and other regions	• **Canadian Apprenticeship Forum and Skills Canada "Skilled Trades: A Career You Can Build On" campaign and "Careers in Trades" website.** Developed in 2006, this national website is designed to provide facts about a career in the skilled trades and more information on the apprenticeship process. Students, parents, educators and employers can order career awareness materials including pamphlets, booklets, guides and posters.[68] • **BC Government "Discover Trades" website.** Discover Trades BC is an initiative funded by the BC Government to provide secondary students, parents and educators easy access to LMI on the trades, possible career options, and training and education programs in the province.[69] Materials include teacher resources for grades 4-6, 7-9 and Planning 10. In development are 3 student surveys "Discover Your Trade" for grades 4-6, 7-9 and 10-12.[70] • **CME "Discovery Program" in Manitoba.** The program was designed to introduce high school aged students to a variety of career paths in the manufacturing sector, while encouraging first-hand experience from research to development to product launch. Student teams participate in a province-wide competition to compete for scholarships and bursaries in excess of $30,000. The program is sponsored by Red River College, the University of Manitoba and the Winnipeg Technical College.[71] • **Career Campaigns.** The BC and Alberta governments also have extensive online promotional materials aimed at youth: the BC Jobs Plan (Skills) and the TradeUp Alberta Websites. These comprehensive web portals explain what types of career opportunities exist in the construction trades, the training and processes required to enter in those fields and other tools and resources to facilitate and encourage individuals to pursue careers in fields which will be in high demand. The BC Jobs Plan (Skills) website has tools for students, parents, employers, and individuals changing their career and incorporates real life stories from trades workers to show how their path to a career in the construction trades.[72] The TradeUp Alberta website similarly provides detailed tools and descriptions of different types of trades careers and information and targets primarily youth. The website provides a central information source for apprenticeship and other related construction careers. Information is provided for 33 in-demand construction occupations and the site provides access to 27 videos highlighting opportunities and careers in the industry.[73] • **"Prince George: Dreams. Opportunity. Affordability." New Immigrant Marketing Campaign.** The Prince George Chamber of Commerce received funding from the Immigrant Employment Council of BC (IEC-BC) Employer Innovation Fund to develop a community outreach multi-media advertising campaign designed to recruit and retain skilled new Canadians and their families from the lower mainland and island regions of BC to a prosperous life in Prince George. The campaign will include TV and print advertising within cultural stations and publications, and social media with materials adapted to the first language of each target cultural community as well as English. In addition, the campaign will include stories from "community champions" (immigrants who have built successful work and family lives in Prince George).[74]

68 Canadian Apprenticeship Forum and Skills Canada, "Careers in Trades", www.careersintrades.ca
69 BC Government, Discover Trades. http://www.discovertradesbc.ca/about/
70 Open School BC, Discover Trades BC website. http://www.openschool.bc.ca/info/ita/index.html
71 CME, *Discovery Program.* http://mb.cme-mec.ca/manitoba/education-and-youth-programs/discovery-program.html
72 BC Jobs Plan (Skills). http://www.bcjobsplan.ca/skills/
73 TradeUp Alberta. http://www.tradeupalberta.com/.
74 IEC-BC Employer Innovation Fund List of Funded Projects: Prince George Chamber of Commerce: "Prince George: Dreams. Opportunity. Affordability." http://www.iecbc.ca/our-initiatives/employer-innovation-fund/eif-funded-projects.

Examples of Programs and Initiatives By Type of Objective and Focus	
Stage virtual job fairs	• **The Initiatives Prince George: "Prince George Online Job Fair"** was hosted on June 4, 2013 and featured opportunities for a variety of employers to chat with potential employees (particularly new immigrants) in Metro Vancouver about job openings, accept resumes and conduct interviews through an online web portal. Potential employees could browse a map of Prince George with links to employer profiles, current job openings, apply for jobs, and request five minute interviews with employers, which would take place during the job fair. The job fair eliminated the travel costs associated with traditional career fairs and allows employers to meet candidates without having to leave their offices.[75] • **The Petroleum Human Resources Council of Canada: "Oil and Gas Services Online Career Fair"** similarly piloted an interactive online career fair in October 2012 for the oil and gas services sector to better connect job seekers (unemployed and under-employed) with companies for in-demand occupations. A virtual career fair accesses a wider pool of talent and allows for a more targeted marketing approach. It provides an opportunity for the industry to attract job seekers from across the country who have worked in similar occupations from other industries, new entrants that have transferrable skills, experienced workers and those currently receiving EI benefits.[76]
Stage or participate in job fairs in key target communities or regions	• **The Western Canada Construction Job Expo (Ireland and Northern Ireland)** is a joint initiative led by the BC Construction Association, the Calgary Construction Association, the Edmonton Construction Association and the Saskatchewan Construction Association. The Expo took place in Belfast, Northern Ireland on October 31st, 2013 and in Dublin, Ireland on November 2nd, 2013. It was designed for employers only with job-seekers pre-registering and submitting their resumes in advance so they can be pre-screened to ensure candidates or of high-quality and possess the skills which best meet the needs of the employers in attendance. Employer registration at the Expo ($2000 for association members; $4000 for non-members) includes one booth at each event, admission to the events and other networking events, option to arrange in-person follow-up interview with chosen candidates, opportunity to access the full database of resumes after the Expo, and immigration support to assist employers in bringing chosen candidates to Canada (on a temporary or permanent basis). The rationale for hosting the event in Ireland is that the country has proven to be a very good source for skilled trades people and construction professionals with a strong apprenticeship program in line with Canadian Red Seal qualifications. In addition, the country experienced a serious downturn in its economy several years ago and as a result there are many tradespeople looking for work.[77]
Connect available workers with employment opportunities	• **BC Construction Association (BCCA): JobMatch.** JobMatch is a service which connects unemployed British Columbians with employment opportunities based on specific labour market vacancies in the industrial, commercial and institutional construction sectors. There is no recruitment fee for JobMatch services. Employers are invited to email or telephone a Construction Placement Coordinator that specializes in their region, or contact a Skilled Trades Employment Program (STEP) office in their area. Similarly, skilled trades job seekers are asked to enquire about the program at STEP offices or local BC Employment Service Centres (any unemployed BC resident is eligible to participate in the program – regardless if they are receiving EI). The program provides unemployed people with individualized supports, including skills training, post-employment coaching and

75 Initiatives Prince George: Prince George Online Job Fair. www.pgonlinejobfair.com; http://www.iecbc.ca/about-us/in-the-news/news/prince-george-job-fair-targets-new-canadians-metro-vancouver-online-job-fa.

76 Petroleum Human Resources Council of Canada: "Oil and Gas Services Online Career Fair." http://www.careersinoilandgas.com/servicescareerfair; Alberta Enterprise and Advanced Education. 2013. Alberta Industry Workforce Strategies Progress Update 2012, p. 13. http://eae.alberta.ca/labour-and-immigration/betw.aspx.

77 Western Canada Construction Job Expo. www.wccjobexpo.ca.

Examples of Programs and Initiatives By Type of Objective and Focus	
	other supports that empower participants to access sustainable job opportunities in the construction sector in their regions. JobMatch was first launched in July 2012 by BCCA as a $2.6 million pilot in Northern BC, with funding from the BC government. Since the launch, more than 325 workers, mostly northern residents, have successfully transitioned to jobs in the construction sector. The BC government is investing a further $6.8 million to expand the JobMatch program. According to a recent news release, in 2013-14, JobMatch will place approximately 1,250 people into construction jobs throughout BC. BCCA will be expanding Job Match services over the upcoming months to communities across the province where demand for jobs in construction are highest, in addition to continuing in the original pilot communities of Kitimat, Prince Rupert, Dawson Creek, Fort Nelson and Fort St. John.[78] • **The Skilled Trades Employment Program (STEP)** was launched by BCCA in 2006 and focuses on finding motivated, trained and ready-to-work candidates for construction employers with jobs to fill. The STEP process begins with the job, then candidates are found that best fit the needs of that job. STEP currently has more than 35 Regional Employment Placement Specialists and since its inception, has connected over 6,000 individuals to construction sector jobs. In 2013-14, STEP is targeting more than 2,000 additional placements. STEP also operates several programs to support individuals from a wide range of backgrounds, e.g., STEP 4.0 for individuals who have minimal experience in trades and wanting to enter the trades to find employment, Women in Trades Training, Immigrants in Trades Training, and Aboriginals In Trades Training.[79] • **BC Food Processors Association "Work! Program".** The program is sponsored b the BC Labour Market Agreement and involves working with food processors in the Lower Mainland to meet their demand for workers with basic food industry skills. Participants must be unemployed, non-Employment Insurance individuals, or low-skilled employed individuals.[80]
Objective: Promote Development of Skilled Workers	
Promote best practices in hiring, developing and managing employees	• **Initiatives Prince George Recruitment and Retention Tools for Employers.** Initiatives Prince George publishes extensive tools and regional marketing materials for employers to attract workers to the region.[81] Some highlights include: ▪ Print and electronic promotional materials promoting Prince George as a place to live and work (e.g., business card handouts, notepads, logos, web buttons, job ad banners, PPT template, promotional folders, etc.); ▪ Prince George Ambassador Tours – customized tours of the city for prospective employees, which showcase the city as a great place to work, live and play; ▪ Welcome Wagons – representatives help newly recruited employees feel welcome, assist them with civic information they might need, as well as recommend local community-based businesses who offer gifts and services to the newly relocated hire; ▪ Tools for Hiring New Immigrants – the resource kit contains information for new employers about hiring new immigrants including "KNOW: Orientation, Retention, and Promotion: A Guide for Building Welcoming and Inclusive Workplaces for New Immigrant Workers" document compiled by Surrey's

78 JobMatch Website. http://skillcentral.ca/; Ministry of Jobs, Tourism and Skills Training. 2013. New Release: "Government invests $6.8 million to expand Job Match program" (April 4, 2013). http://www2.news.gov.bc.ca/news_releases_2009-2013/2013PREM0052-000702.htm

79 Skilled Trades Employment Program (STEP). http://www.stepbc.ca/about/.

80 BC Food Processors Association, "Work! Program". http://www.bcfpa.ca/story/2012/07/13/government-bc-supports-food-processing-industry-training

81 Initiatives Prince George: Recruitment and Retention Tools: http://www.initiativespg.com/Living_Working/for_employers/recruitment_and_retention_tools.php.

Examples of Programs and Initiatives By Type of Objective and Focus	
	DIVERSEcity Community Resources Society; and ▪ Welcome to Prince George: An Introduction to Work and Life for New Immigrants – the resource aims to introduce new immigrants to Prince George and the Canadian workplace. • **BC Jobs Website Tools for Employers.** The BC Jobs website features different tools and resource for employers including information on sponsoring or hiring an apprentice, financial support, employee training and skills development, workplace resources (e.g., list of recruitment and retention, rights and regulations, human resources, business growth, and community and employer partnership services), hiring new British Columbians (e.g., skills assessment tools and information on the Foreign Skilled Workers BC program and Welcome BC Skills Connect), and on where to post jobs.[82] • **The Initiatives Prince George and Prince George Chamber of Commerce: "Prince George & Region Forum: Attracting BC's Skilled Immigrants to the North."** IEC-BC in partnership with Initiatives Prince George and the Prince George Chamber of Commerce sponsored a full-day solution-focused Forum in December, 2012 called Attracting BC's Skilled Immigrants to the North. The Forum focused on practical tools, resources and solutions to help Northern employers tap into BC's skilled immigrant talent pool.[83] • **The BC Construction Association New Immigrant "Hire Guide."** The Hire Guide, funded under the IEC-BC Employer Innovation Fund, is an interactive asset for BC construction employers who need to source skilled workers. Taking employers through recruitment, hiring, and retention best practices with simple solution-oriented tools and content from stakeholders in the field, the guide leverages real-life stories (with a focus on the North) to create a resource relevant to every region of the province.[84] • **BC Food Processors Association "Mentorship and Training Program".** In 2013 the BCFPA launched a formal mentorship and training program which partners food and beverage processors with experienced BCFPA members.[85]
Increase access to the hands-on support (e.g. apprenticeship counselors)	• **ITA Apprenticeship Advisors.** Following input received from a province-wide consultation, the ITA has hired advisors based out of Terrace, Prince George, Nanaimo, and Kelowna to build knowledge and awareness of the BC apprenticeship system and provide guidance to apprentices and employer sponsors.[86]
Expand or enhance foundation programs and essential skills training	The ITA currently sponsors three programs targeting youth: • **Accelerated Credit Enrolment in Industry Training (ACE-IT)** allows high school students to take trades training classes for free, and allows them to receive course credits towards their high school graduation. • **Secondary School Apprenticeship (SSA)** allows high school students to begin their apprenticeship while in high school, getting dual credit towards their apprenticeship and high school diploma. Those registered in the SSA may also be eligible for a $1,000 scholarship. • **Youth Exploring Skills to Industry Training (YES 2 IT)** is a joint initiative between the ITA and the BC Ministry of Education that provides funding for projects designed to increase awareness in the trades by targeting younger students, their parents, employers, educators, and communities.

82 BC Jobs: Employer Tools and Resources. http://www.bcjobsplan.ca/skills/employers/.
83 Initiatives Prince George and Prince George Chamber of Commerce: "Prince George & Region Forum: Attracting BC's Skilled Immigrants to the North." http://www.iecbc.ca/our-initiatives/regional-forums/prince-george-region-forum.
84 The BC Construction Association New Immigrant "Hire Guide." http://www.iecbc.ca/our-initiatives/employer-innovation-fund/eif-funded-projects.
85 BC Food Processors Association, "Mentorship and Training Program". http://www.bcfpa.ca/mentorship-program
86 Industry Training Authority, Apprenticeship Advisors. http://www.itabc.ca/our-trades-training-system/apprenticeship-advisors

Examples of Programs and Initiatives By Type of Objective and Focus	
	• **Skills/Compétences Canada National Awareness Campaign to Promote Essential Skills to young Canadian seeking careers in skilled trades and technology sectors.** In conjunction with Employment and Social Development Canada, the Skills/Compétences Canada campaign will focus on young Canadians who are pursuing careers in skilled trades and technology sectors. It will highlight the 9 essential skill profiles which are used in nearly every job and at different levels of complexity, and explain their foundational role in understanding and applying concepts introduced in technical training.[87] • **Essential Skills Ontario and the Food Processing Human Resource Council's "Elevate: Testing New Delivery Models to Better Meet the Needs of Adults" pilot program.** With funding from Employment and Social Development Canada's Adult Learning, Literacy and Essential Skills Program, the Food Processing Human Resource Council is conducting pilots at 10 food processing sites in Ontario to train individuals who receive income support with essential skills and skills relevant to the food processing industry.[88]
Objective: Increase the Effectiveness of Existing Education and Training Programs	
Better link education and training curriculum with required skills/knowledge	• **Natural Science and Engineering Research Council of Canada (NSERC) Engage Grants.** NSERC has a mandate to increase the number of industry-academic partnerships and increase the participation in NSERC's research partnerships and industrial scholarships programs.[89] Engage grants totaling up to $25,000 for up to six months are available for industry-academia partnership projects. For example, NSERC Engage grants totaling nearly $100,000 have been provided to Thompson Rivers University to support research partnerships with New Gold Mine, Kinder Morgan, WTIZIMI, Highland Valley Copper Mine and Absorbent Products.[90] • **The British Columbia Innovation Council.** BCIC provides funding to develop entrepreneurial talent and commercialize technology through startup companies in partnership with industry and academia. BCIC currently operates entrepreneurship programs in partnership with Simon Fraser University and the University of British Columbia.[91] • **The Manufacturing Automation Laboratory (MAL) at the University of British Columbia.** MAL is fully equipped to conduct research in all aspects of machine tool, machining and mechatronics for manufacturing and conducts joint projects with several research centres, and leading machine tool, cutting tool, automotive and aerospace companies in North and South America, Asia and Europe.[92]

87 Newswire, *Skills/Compétences Canada Launches National Awareness Campaign to Promote Essential Skills to Young Career Seekers.* September 26, 2013. http://www.newswire.ca/en/story/1231879/skills-competences-canada-launches-national-awareness-campaign-to-promote-essential-skills-to-young-career-seekers

88 Essential Skills Ontario and the Food Processing Human Resource Council, *Elevate Canada: Raising the Grade for Food Processing.* http://www.essentialskillsontario.ca/content/elevate-canada-raising-grade-food-processing

89 Natural Sciences and Engineering Research Council of Canada, Pacific Office. http://www.nserc-crsng.gc.ca/Regional-Regionaux/Pacific-Pacifique_eng.asp

90 Thompson Rivers University, Research Partnerships and Enterprise Creation. https://www.tru.ca/research/partnerships.html

91 British Columbia Innovation Council, Programs and Initiatives. http://www.bcic.ca/programs/current

92 University of British Columbia, Department of Mechanical Engineering - Manufacturing Automation Laboratory. http://www.mal.mech.ubc.ca/

Examples of Programs and Initiatives By Type of Objective and Focus	
Enhance delivery of existing education and training programs	• **Review of the Industry Training Authority (ITA).** In September 2013, an independent review was launched of the ITA to examine the ITA's mandate, functions and outcomes achieved to date. The review will provide recommendations to improve the service delivery model of the apprenticeship system in BC, increase the number of skilled workers across BC and improve partnerships and engagement with educators, industry, private sector unions and other stakeholders.[93] • **Trades Pilot Programs Implemented at Thompson Rivers University (TRU).** TRU is offering a pilot program for commercial truck and transport mechanic apprentices that will enable students to complete the classroom work and co-op training in the first 61 weeks rather than spread out over four years.[94] • **Northeast Regional Skills Training Plan (December 2012).** Northern Lights College, as the Northeast Regional Workforce Table Secretariat, produced a training plan for the region in response to the occupational outlook projections to 2020 and input from employers and stakeholders in the region. The Plan identifies a series of goals and actions to better address labour shortages in the region, skills training gaps for existing workers and measures to ensure education and training programs meet the skills required by employers.[95] • **Northwest Regional Skills Training Plan 2013-2018.** With funding provided by the Canada-British Columbia Labour Market Development Agreement, the Northwest Regional Workforce Table developed a Plan to address skills mismatch of current workers, and training capacity gaps in key occupations projected to be in high demand from 2010-2010.[96] • **Development of Centres of Excellence for Training.** Provincial funding has been allocated to develop Centres of Excellence for training in BC including the NorKam Trades and Technology Centre of Excellence in Kamloops[97] and the Northern Lights College Centre of Excellence for training in Oil and Gas, Clean Energy Technology and Aerospace.[98]
Objective: Facilitate Mobility and Credential Recognition	
Streamline challenge and accreditation processes	• **Northern Lights College: "Competency-Based Assessment for New Canadian: Oil & Gas, and Mining Industries."** Funded under the IEC-BC Employer Innovation Fund, this project involves using competency-based assessment to hire new Canadians in the oil and gas, and mining industries. Occupational performance standards and competency-based assessment tools will be developed and trialed in two occupations, one in each industry sector. Northern Lights College and its industry partners, Shell Canada, Encana Corporation, Spectra Energy and HD Mining are working together to guide and implement the project. Stakeholders from within companies, relevant industry organizations and immigrant service providers, will be engaged and consulted throughout the project. The project team will develop the occupational performance standards and assessment tools from July to October 2013, trial assessments will be conducted between November and December 2013, and an evaluation of the methodology will be completed by the end of February 2014.[99]

93 Government of British Columbia, "Industry Training Authority to be reviewed". http://www2.news.gov.bc.ca/news_releases_2013-2017/2013JTST0104-001270.htm
94 BC Government Newsroom, "Pilot provides more training for apprentices at front end." November 19, 2013. http://www.newsroom.gov.bc.ca/2013/11/pilot-provides-more-training-for-apprentices-at-front-end.html
95 Northern Lights College, Northeast Regional Skills Training Plan. December 2012. http://www.nlc.bc.ca/Portals/0/documents/News/Northeast_Regional_Workforce_Table-Skills_Training_Plan.pdf
96 Northwest Regional Skills Training Plan 2013-2018. https://www.nwcc.bc.ca/sites/default/files/content-files/miscellaneous/NW%20Regional%20Skills%20Training%20Plan%202013-2018_2.pdf
97 BC Government Newsroom, "$6.3 million for NorKam Trades and Technology Centre". December 19, 2012. http://www.newsroom.gov.bc.ca/2012/12/63-million-for-norkam-trades-and-technology-centre.html
98 Northern Lights College, Centres of Excellence. http://www.nlc.bc.ca/aboutnlc/centresofexcellence.aspx
99 Northern Lights College: "Competency-Based Assessment for New Canadian: Oil & Gas, and Mining Industries."

Examples of Programs and Initiatives By Type of Objective and Focus	
Provide support to facilitate FCR	• **Kitimat Chamber of Commerce: "New Canadians/New Employees: Hiring Immigrants Competently."** Funded under the IEC-BC Employer Innovation Fund, the project involves designing and delivering workshops in a number of locations across three regions in Northern BC to inform employers about ways to use a competency-based approach for hiring new immigrants. The target audience for the workshops will be employers, hiring managers, recruiters and other personnel involved in attracting, hiring and retaining immigrants in the workplace. The project team will design and develop workshops from May to September 2013 and from October 2013 to January 2014 workshops will be delivered in seven locations across Northern BC, including a videotaped session as a resource for later use.[100] • **Electrical Contractors Association of Alberta: Immigrant Skills Recognition.** The Electrical Contractors Association of Alberta, in partnership with the International Brotherhood of Electrical Workers set up an Assessment Booth at the Edmonton Electrical Industry Training Centre to test the practical skills of people that come from countries that do not have a registered apprenticeship system. The assessment is a hands-on evaluation of journeyperson's electrical skills, allowing the candidate up to eight hours to complete a number of required tasks. Upon completion of the assessment, it is determined if the worker has the skills of a journeyperson electrician, "or" if they need to enter the Alberta Apprenticeship system at some point and gain an Alberta electrician's ticket through that route.[101]
Reduce barriers to inter-provincial mobility	The federal and provincial governments have implemented an array of agreements and programs to facilitate regional mobility and reduce inter-provincial barriers. Some key initiatives include: • The **New West Partnership Trade Agreement (NWPTA)** is an accord between the Governments of British Columbia, Alberta and Saskatchewan that creates Canada's largest, barrier-free, interprovincial market by committing to full mutual recognition or reconciliation of their rules affecting trade, investment or labour mobility so as to remove barriers to the free movement of goods, services, investment, and people within and between the three provinces. • The **Red Seal Program** was established in 1959 to create an inter-provincially recognized certification to facilitate greater mobility across Canada for skilled workers. This has removed most regulatory barriers to interprovincial mobility for the skilled trades that are Red Seal trades, but there are still many trades for which there are no Red Seal.
Objective: Enhance Use of Economic Immigrant and Foreign Worker Programs	

http://www.iecbc.ca/our-initiatives/employer-innovation-fund/eif-funded-projects.

100 Kitimat Chamber of Commerce: "New Canadians/New Employees: Hiring Immigrants Competently." http://www.iecbc.ca/our-initiatives/employer-innovation-fund/eif-funded-projects.

101 Alberta Enterprise and Advanced Education. Alberta Industry Workforce Strategies Progress Update 2012 (21/05/13), p. 13. http://eae.alberta.ca/labour-and-immigration/betw.aspx.

Examples of Programs and Initiatives By Type of Objective and Focus	
Work with government to facilitate use of immigration programs and TFWP	• The **Temporary Foreign Workers Program** (TFWP) enables employers in Canada to hire foreign workers on a temporary basis to meet short-term skill and labour needs when Canadians or permanent residents are not available. Citizenship and Immigration Canada (CIC) facilitates the temporary entry of all foreign workers including those who require a Work Permit and a Labour Market Opinion (LMO), those who require a Work Permit but not an LMO, and those who require neither. A Work Permit is an official document issued at the Port of Entry by the Canadian Border Security Agency that allows someone who is not a Canadian citizen or a permanent resident to work in Canada. In most cases, the Work Permit is issued only after Citizenship and Immigration Canada has determined the eligibility of the foreign worker. The usage of the TFWP to bring in foreign workers has grown immensely in BC, with the number of foreign worker entries increasing by more than two-fold from 2003 to 2012. • The **Provincial Nominee Program** (PNP) provides a medium to long term solution, and workers recruited in strategic recruitment streams are offered permanent residence. The PNP is designed to facilitate and accelerate the permanent residency process for skilled and/or experienced workers, experienced businesspersons and their family members who want to settle in a given province permanently. This process is administered by each province, and can be faster than similar federal immigration programs in terms of the time between applications and the commencement of work. • The **Federal Skilled Worker Program** (FSWP) also targets foreign workers in strategic sectors and offers permanent residence to workers. The FSW is based on a human capital model, and in February 2008, CIC introduced Ministerial Instruction identifying a list of targeted occupations as an eligibility requirement for processing. Since these occupations are based on a national level, they may not meet specific occupation needs at the provincial level. In January 2013, CIC announced the beginning of the Federal Skilled Trades Program in order to address labour shortages and to help grow Canada's economy. In its first year (2013/14), across Canada, the program will accept applications from up to 3,000 people in 43 different occupations. The occupation list was designed to reflect current labour market needs and to ensure the program delivers a diverse range of skilled tradespersons to fuels Canada's economy. In recent years, the FSWP made up one-half of economic immigration to Canada and about one-third of overall immigration. FSWP admissions to BC have fluctuated significantly over the past decade from a high of 21,810 in 2005 to a low of 10,028 in 2011. • The **Canadian Experience Class** allows individuals with Canadian work experience or who have graduated from eligible Canadian post-secondary programs and recently worked in Canada to apply for permanent residency from within Canada. The CEC helps to facilitate the retention of temporary residents with skilled work experience in Canada. Launched in 2008, admissions under the CEC have remained relatively low. Nationally, CEC admissions grew from 1,775 in 2009 to 5,943 in 2012. Admissions to BC grew from 385 to 572 between 2009 and 2010.
Assist immigrants better adjust to their new communities	• **CME "Communication in the Workplace Program".** With funding from the BC Labour Market Agreement, CME offered a customized workplace-based certificate training program that embeds communication and literacy skills essential to the workplace and the productivity of ESL workers. Training was provided at the worksite and was based on employer vocabulary and needs.[102] • **Immigrant Employment Council of BC "Employer Innovation Fund".** The IEC-BC has allocated $1.4 million to 11 projects to assist employers, industry and

102 Canadian Manufacturers and Exporters 20/20 Magazine, "CME British Columbia Working to Close the Literacy Gap". March/April 2014. Volume 9, Issue 1. http://www.2020magazine.ca/en/magazine/may-june-2013/cme-british-columbia-working-to-close-the-literacy-gap/

Examples of Programs and Initiatives By Type of Objective and Focus	
	business associations develop initiatives and resources to integrated skilled immigrants into BC workplaces. Funding was specifically allocated to help recruit skilled immigrants to relocate to northern BC.[103] • **Welcome BC's "Settlement and Integration Program".** The Settlement and Integration Program receives provincial funding to assist immigrants and their families settle and integrate into BC communities. Services include information and referrals, orientation, counseling, assisted access to services, life skills and education, case management pathways to support and community connections.[104]
Objective: Address shortages by improving productivity	
Assist manufacturing in improving productivity	• **Productivity Alberta.** Productivity Alberta was founded in 2008 as a service of the Government of Alberta to help the province's small-to-medium-sized enterprises be more productive, more competitive, and more profitable. In October 2011, Productivity Alberta transitioned into a private, not-for-profit corporation, a change that allowed the company to refocus its efforts and enhance its services. Productivity Alberta offers a broad range of products and services that help companies identify and address gaps in productivity, maximize resources and be more efficient. Some examples of programming and tools offered include:[105] ▪ Productivity Assessment Tool; ▪ Productivity 101 Workshop; ▪ Productivity Advisory Service; ▪ Events: Keynote Speakers and Training Room Rental; ▪ Networking: Productivity Improvement Networks; ▪ Operational Excellence; ▪ Lean Six Sigma Training, Coaching, and Certification; ▪ Supply Chain Collaboration Program; ▪ Industrial Energy Efficiency: Toolkit and Assessment Program; ▪ Technology in Productivity: Integration and ICT Toolkit; ▪ Workforce Development: Toolkit and Frontline Leadership Program; and ▪ External Resources: Programs, tool, and services to assist businesses in improving their productivity.
Encourage new capital investment	• **BC tax credits, exemptions and deductions to encourage investment and innovation.[106]** ▪ Incentives for R&F include a 10% non-refundable BC income tax credit for eligible expenditures on qualified R&F, a 20% non-refundable federal income tax credit for eligible expenditures on qualified R&D and a 100% immediate deduction of eligible R&D expenditures to reduce BC and federal payable income tax. ▪ Incentives for machinery and equipment investment include provincial and local property tax exemptions, separate class election for depreciating machinery and equipment (e.g. a 50% straight-line depreciation per year is allowed for manufacturing and processing equipment, tariffs on all manufacturing inputs will be reduced to zero by 2015, imports of advanced machinery and equipment is free from import duties etc.).

103 Immigrant Employment Council of British Columbia, EIF Funded Projects. http://www.iecbc.ca/our-initiatives/employer-innovation-fund/eif-funded-projects

104 Welcome BC, Settlement and Integration Program. http://www.welcomebc.ca/Communities-and-Service-Providers/Service-Providers/funded-services/inclusive-communities/settlement-integration.aspx

105 Productivity Alberta: http://www.productivityalberta.ca/.

106 Trade and Invest British Columbia, Incentives. https://tools.britishcolumbia.ca/Invest/BusinessIncentives/Pages/Incentives.aspx

III. Employer Survey and Key Informant Interviews

This chapter summarizes the findings of the employer survey and subject matter expert interviews regarding the characteristics of the labour market, recent and projected growth in employment, labour and skills shortages, and planned and recommended actions to address shortages.

A. Characteristics of Respondents

1. Manufacturers

A total of 557 manufacturing employers were surveyed. The manufacturers were asked to identify the sub-sector or sub-sectors in which their operations are most involved. As indicated, the sub-sectors that were most commonly identified included fabricated metal products, wood products and food and beverages which are also the three largest sub-sectors as per the database of companies that was developed.

Table 12. Manufacturing Employers by Sub-sector

Question: In what sub-sector or sub-sectors of the manufacturing sector is your organization most involved?

Manufacturing Sub-sector	Respondents		Active in BC	
	Number	%	Number	%
All Sub-sectors	**557**	**100.0%**	**7,175**	**100.0%**
Fabricated Metal Product	126	22.6%	913	12.7%
Wood Products	91	16.3%	838	11.7%
Food and Beverage	90	16.1%	973	13.5%
Machinery	55	9.9%	518	7.2%
Computer and Electronic Products	38	6.8%	220	3.2%
Plastics and Rubber Products	34	6.1%	234	3.3%
Transportation Equipment	32	5.7%	312	4.3%
Electrical Equipment, Appliance & Components	29	5.2%	130	1.8%
Non-Metallic Mineral Product	25	4.5%	357	5.0%
Printing	22	3.9%	522	7.3%
Textile and Clothing	19	3.4%	325	4.5%
Chemical Products	17	3.0%	217	3.0%
Primary Metal	16	2.9%	58	0.8%
Paper	12	2.1%	60	0.8%
Other	96	17.2%	1498	20.9%

The regional representation of the employers closely mirrored the actual representation of manufacturers in the province, with the majority of employers being located in the Mainland/Southwestern development region, followed by concentrations from the Vancouver Island and Coast and the Southern Interior regions, with a small minority from the Northern Interior. The number of respondents from each development region is provided in the following table.

Table 13. Regions in Which the Organizations Operate

Question: In what region or regions of the province are your operations located?

Regions	Respondents	
	Number	%
Employers Reporting Regions	**557**	**100.0%**
Mainland/Southwest	310	55.7%
Southern Interior	123	22.1%
Vancouver Island/Coast	114	20.5%
Northern Interior	34	6.1%

On average, surveyed employers were well established. A large majority (81% or 451) had been in business more than 10 years, and over half (54% or 302) had been operating in BC for more than twenty years.

Table 14. Number of Years in Operation

Question: How long has your organization been operating in BC?

Years in Operation	Respondents	
	Number	%
Less than 5 years	31	5.5%
5 to 9 years	56	10.0%
10 to 14 years	75	13.7%
15 to 20 years	74	13.2%
Over 20 years	302	54.2%
Other	11	2.0%
No response	8	1.4%
Total	**557**	**100.0%**

2. Key Informants

Interviews were conducted with 18 subject matter experts, including twelve representatives from industry associations, sector councils or business groups, three representatives from educational and training institutions, two representatives of regional economic development agencies, and one representative of the federal government. Of the 18 representatives, eight work with multiple sub-sectors within the manufacturing sector while ten focus primarily on a particular sub-sector (such as food and beverage, plastics and rubber, leather and allied product, primary metal, forestry, transportation equipment, and computer and electronic manufacturing). Their involvement in human resources issues ranges from working with universities, colleges or training providers to develop training programs to meet industry needs and supporting human resource, recruitment and skills development programs for members to advocating on labour market and other issues on behalf of manufacturers.

B. Characteristics of Current Employment

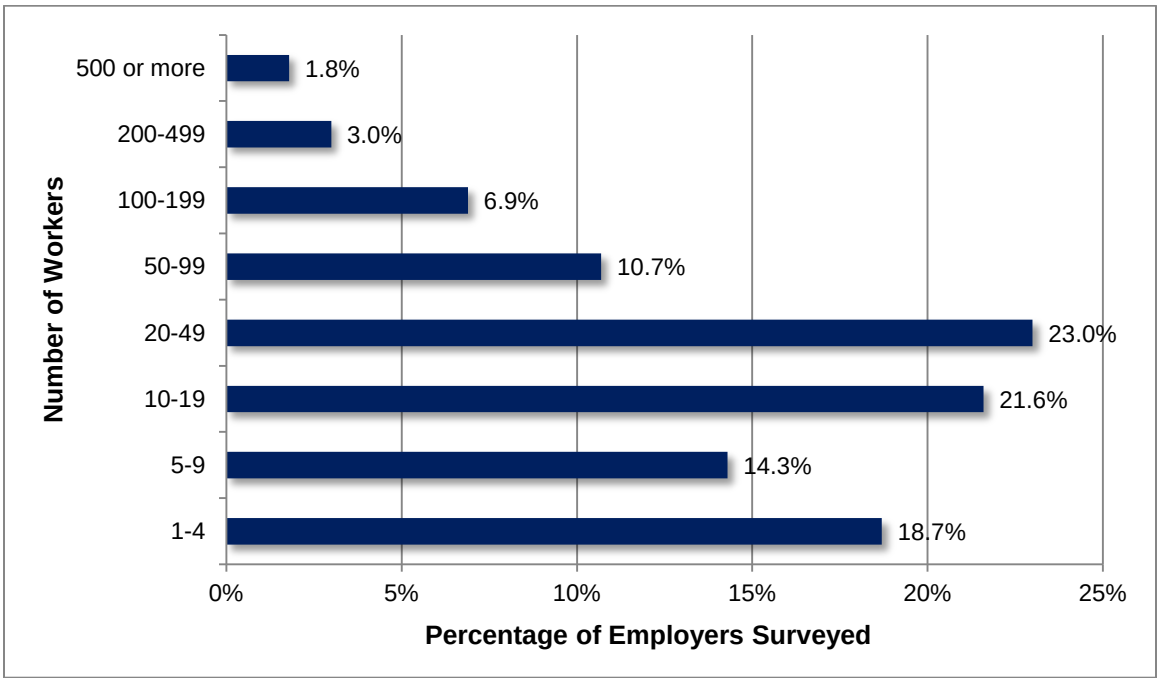
1. Current Size of the Manufacturers

Interest in issues related to labour and skills shortages tends to increase with the size of operation. Of the 557 employers surveyed, 19% employ 4 or few employees, 36%

employ 5 to 19 employees, 23% employ 20 to 49 employees, 18% employ 50 to 199 employees, and 5% employ 200 or more employees, as shown in the following figure. The average number of workers per employer surveyed was 61.

Figure 5. Number of Workers Currently Employed

Question: Approximately, how many workers does your organization employ in BC?



The surveyed manufacturers reported employing 33,531 workers, representing 19% of the 179,200 employees estimated to work in the sector as of 2012.

2. Characteristics of Workers

Manufacturing employers were asked various questions about the characteristics of their workers in order to develop an up-to-date profile of the existing workforce. The number of employers responding varied by question; for example, most employers who completed this section of the questionnaire were able to identify how many workers are employed full-time or how many are women; fewer were able to answer how many of their employees are Aboriginal or had immigrated to Canada in the past five years. The following table identifies how many employers answered each question and, for each characteristic, compares the number of workers reported with the selected characteristic to the aggregate workers employed by the responding companies.

According to the manufacturers surveyed, the vast majority of all workers are employed on a permanent, full-time basis (94%). Almost one-third of workers (33%) are under the age of 32, 43% are between the ages of 36 and 54 years, and 24% are aged 55 years and older. Women account for less than one-fifth of the workforce while 4% of the employees are Aboriginal. While temporary foreign workers make up less 1% of workers, 8% of the workers have immigrated to Canada in the past five years. Production

workers, who make up 62% of the reported number of employees, have an average of 13.1 years of experience.

Table 15. Characteristics of the Workers

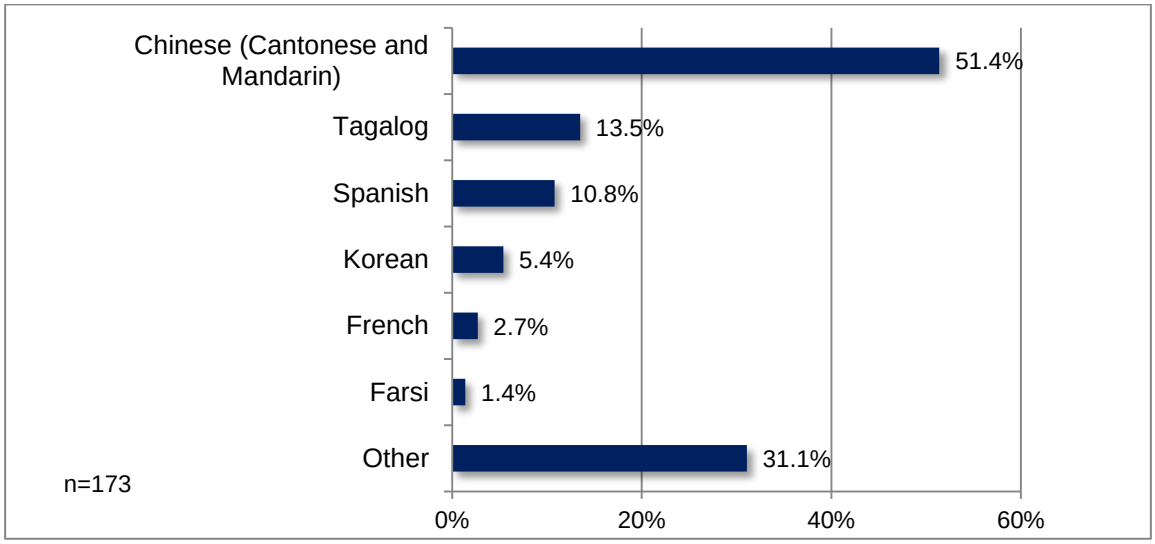
Questions: Of the workers you employ, approximately how many are primarily involved in production (i.e. workers involved in manufacturing or processing your products)? On average, how many years of experience do your production workers have?

Characteristics	Responses			
	N	Segment	All Workers	%
Production Workers As a Percent of Total Number of Employees				
Production Workers	342	10,463	16,814	62.2%
Average years of experience per production worker	342	13.1		
Number of Workers With Selected Characteristics As A Percent of Total Number of Workers				
Employed on a permanent full-time basis?	339	15,284	16,319	93.7%
Under the age of 35?	322	5,372	16,403	32.8%
55 years or older?	328	3,925	16,403	23.9%
Women?	327	3,162	16,484	19.2%
Aboriginal?	282	521	14,249	3.7%
Temporary foreign workers (working in Canada with a temporary work visa)?	172	46	9,973	0.5%
Recent immigrants who moved to Canada in the past 5 years	292	1,106	14,310	7.7%
Employees who commonly work in a language other than English?	289	1,544	14,108	10.9%

One hundred and seventy three employers reported data on the number of their workers who commonly work in a language other than English. These employers reported 1,544 workers (8% of their workers) who work in other languages, with those languages most commonly reported by employers including Mandarin or Cantonese (51%), Tagalog (14%), or Spanish (11%). The most common reasons for working in a language other than English included that the workers are not fully fluent in English (66%), they work with customers or others outside of the organization who do not speak English (18%) or work with managers or co-workers who do not speak English (7%).

Figure 6. Languages Other Than English Most Commonly Spoken by Employees

Question: What language or languages do they most commonly work in? (select all that apply)



Of the total number of workers who comprise their existing workforce, employers identified 1,635 or 16% as possessing credentials or professional designations other than trade certificates which are either required or important for their positions, and 1,369 (13%) were identified as having a university degree.

Table 16. Characteristics of All Workers – Credentials and University Degrees

Characteristics	Responses			
	N	Segment	All Workers	%
Credentials or professional designations other than trade certificates which are either required or at least very important for their positions?	323	2,232	14,934	14.8%
A university degree?	319	2,348	15,858	14.9%

One hundred and ninety-one employers reported that the most common credentials or designations held by their employees included engineering degrees (identified by 74 employers), accounting, bookkeeping or CGA designations (51), a degree in Business Administration or MBA (23) or various other university degrees (30). Eleven were reported as having masters or PhDs in the sciences and 19 were recognized technicians or technologists.

The most commonly held technical certificates included First Aid and Health and Safety (identified by 10 employers), IT or computer science (7), welding (6), human resources (5), training (5), marketing (4), forestry (4), winemaking (3), electrical (3), Forklift operation (3), machining (2), fabrication (2), purchasing (2), heavy duty mechanics, design, water technologies, lighting, baking and carpentry (1 each). Special licenses held by employees included class 1 truck drivers (2) and dairy processors (2).

Workers with credentials and professional designations most commonly work in management (identified by 55 employers), engineering (47), accounting (35), sales and

customer service (21), administration (20), production (16), design (14), machine operation (11), research and development (10), as welders (7) or supervisors (5), and in HR (5), fabrication (4), quality control (4), logistics (4), IT (3) or as an estimator (3). Other occupations in which they were employed included forestry, labour, installation and as a millwright.

Workers with a university education most commonly are employed in management (identified by 89 employers), engineering (49), sales and customer service (36), administration (33), accounting (29), production (9), research and development (7), as technicians (7), supervisors (5), operators (5), in quality assurance and safety (5), design (5), human resources (4), IT (4), software development (2) and as labourers, welders, estimators, and metal fabricators.

When asked whether any of their workers belonged to a union, of the 351 manufacturing employers who responded, the vast majority (297 or 84.6%) said no, 48 (13.7%) reported yes and 6 (1.7%) were unsure.

3. Workers in Apprenticeable Trades

Of the 335 employers who responded to questions about the trades, 171 organizations reported employing tradesworkers (51%). These organizations employed 3,706 tradesworkers, of whom 65% are journeypersons, 18% are apprentices, and 17% are neither journeypersons nor apprentices. Most employers (121 of the 127) with journeypersons employ at least one journeypersons who was already credentialed prior to being hired. Overall, 73% of the journeypersons were already credentialed prior to starting employment with their current employer.

Table 17. Profile of Workers in Apprenticeable Trades

Source of Employees	Number of Employers		Number of Employees	
	Total	%	Total	%
Number of Employers Reporting and Reported Number of Employees Working in Apprenticeable Trades (including journeypersons, apprentices, and others)?	**171**	**100.0%**	**3,706**	**100.0%**
Number of Employers Reporting Employing and Reported Number of Employees Who Are:				
Journeypersons	127	74.3%	2,411	65.1%
Apprentices	80	46.8%	680	18.3%
Working in the trade but not a journeyperson or apprentice	87	50.9%	615	16.6%
Number of employers reporting employing and reported number of journeypersons already credentialed when hired	**121**	**95.3%**	**1,747**	**72.5%**

Of the 127 employers reporting journeypersons, 80 also employ apprentices (63%).

The employers indicated that the most common trade amongst the trades people was welder (identified by 34 employers or 20%), machinist (26 or 15%), industrial mechanic (millwright) (24 or 14%) and metal fabricator (22 or 13%).

Table 18. Common Trades amongst the Workers

Trades	Most Common		Next Most Common	
	Total	%	Total	%

Trades	Most Common		Next Most Common	
	Total	%	Total	%
Number of Employers Reporting Tradesworkers	**170**	**100.0%**	**170**	**100.0%**
What two trades are most common amongst your trades workers?				
Welder	34	20.0%	17	10.0%
Machinist	26	15.3%	16	9.4%
Industrial Mechanic (Millwright)	24	14.1%	12	7.1%
Metal Fabricator (Fitter)	22	12.9%	17	10.0%
Electrician	8	4.7%	14	8.2%
Heavy Duty Equipment Mechanic	5	2.9%	3	1.8%
Sheet Metal Worker	4	2.4%	4	2.4%
Industrial Instrument Mechanic	2	1.2%	1	0.6%
Truck and Transport Mechanic	1	0.6%	3	1.8%
Heavy Equipment Operator	0	0%	1	0.6%
Other	38	22.4%	16	9.4%

4. Staff Turnover

The level of staff turnover (defined as the number of people employed in the past year who no longer work for the organization divided by the maximum number employed at any one time) varies widely across the firms. Of the 368 employers that responded, almost half (177 or 48%) experienced a staff turnover rate of 0% to 5% and 71% of employers reported a turnover rate of 15% of less. The weighted average turnover rate for all employers was 13.8%.

Table 19. Level of Staff Turnover

Question: What was your organization's rate of staff turnover over the past year (i.e. the number of employees who left your employ, were laid off, or terminated in the past year divided by the maximum number of people employed at any one time)?

Rate of Staff Turnover	Respondents	
	Number	%
0% to 5%	177	48.1%
6% to 10%	53	14.4%
11% to 15%	33	9.0%
16% to 20%	24	6.5%
20% to 25%	21	5.7%
25% to 30%	13	3.5%
30% to 50%	17	4.6%
Over 50%	13	3.5%
Other	9	2.4%
Not sure	8	2.2%
Total	**368**	**100.0%**
Weighted Average[107]		**13.8%**

The employers most commonly identified the major factors contributing to staff turnover to be competition for workers from employers in other regions (identified by 26% of employers), the seasonal nature of the work (25%), poor work performance resulting in termination (24%), competition for workers from other employers in the region (21%),

107 *Average turnover rate has been weighted by the current number of people employed by each employer responding to the question*

non-seasonal fluctuations in the volume of the work (14%), and retirement or health issues (14%).

Table 20. Factors Contributing to Staff Turnover

Question: Over the past year, to what extent did the following factors contribute to the level of staff turnover?

Factor	Not a Reason	Some-what	Major Reason	Total	Respondents
Competition for workers from employers in other regions	47.4%	27.0%	25.5%	100.0%	137
The seasonal nature of your work	54.0%	20.7%	25.3%	100.0%	150
Poor work performance resulting in termination	26.1%	49.7%	24.2%	100.0%	157
Competition for workers from other employers in your region	32.7%	46.7%	20.7%	100.0%	150
Other reasons	65.8%	14.5%	19.7%	100.0%	76
Non-seasonal fluctuations in the volume of your work	49.7%	36.4%	14.0%	100.0%	143
Retirement or employee health issues	59.1%	27.0%	13.9%	100.0%	137
Labour disruptions in your company or others	92.2%	4.7%	3.1%	100.0%	129

Other reasons identified by employers included the inability to offer competitive wages (11 employers), restructuring, layoffs or outsourcing of work (9), employees completing apprenticeships or returning to school (5), young workers obtaining experience and moving on (3), and the unappealing nature of the work and general lack of interest in the trades (4).

5. Source of Recent Hires

Employers were asked to identify how many new workers they hired over the past year and what the sources of those workers were. The employers reported hiring an average of 7.3 new workers. Of these new employees, 30% were unemployed at the time they were hired and 12% were just entering or re-entering the workforce. The remainder were working with another employer at the time, including employers in the same region and sector (29%), in another sector (22%) and in another region (8%).

Table 21. Source of New Employees

Questions: Over the past 12 months, approximately how many new employees did you hire to fill new positions or to replace staff members who left? At the time you hired these new employees, how many do you estimate were:

Source of Employees	Number of Employers		Number of Employees	
	Total	%	Total	%
Number of Employers Hiring and Number of Employees Hired	**352**	**100.0%**	**2,568**	**100.0%**
Numbering of Employers Using Each Source and Percent of Employees Hired By Source				
Unemployed at the time you hired them?	198	56.3%	761	29.6%
Working for another employer in your region and sector	184	52.3%	740	28.8%
Working for an employer in another sector?	159	45.2%	563	21.9%
Just entering or re-entering the work force	134	38.1%	306	11.9%
Working for an employer in another region?	119	33.8%	198	7.7%

6. Employer Training

Of the employers surveyed, 35% could not identify how much they spent on training, 8% indicated that they had no employees needing training, 20% spent less than 1% of their revenue on training, and 20% spent from 1% to 3%. Only 17% reported spending more than 3% of revenues on training.

Table 22. Expenditures on Training

Question: Over the past year, what percent of your revenues did your organization spend on employee training in BC?

Training Expenditures	Respondents	
	Number	%
Less than 1%	111	19.9%
1% to 3%	112	20.1%
Over 3% to 5%	42	7.5%
Over 5% to 10%	32	5.7%
Over 10%	17	3.1%
No employees to be trained	46	8.3%
Not noted	197	35.4%
Total	**557**	**100.0%**

Of the 364 employers who described the types of training provided by their organization, a large majority (89%) offered “on-the-job” training, most provided training through staff or individual meetings (64%), and almost half offered some form of a mentoring program for new workers (45%). Other popular training options included group training seminars (29%), external technical training (26%), and certification programs (25%).

Table 23. Types of Training Provided

Question: We'd like to find out more about what your organization does to encourage or support further development of the skills of your workers. Do you commonly provide: (select all that apply)

Types of Training	Respondents	
	Number	%
Number of Organizations Reporting Training	**364**	**100.0%**
"On-the-job" training (e.g. demonstrations, job shadowing, job coaching, or hands-on experience)?	323	88.7%
Training provided through staff or individual meetings?	233	64.0%
A mentoring program for newer workers?	163	44.8%
Support for professional development (e.g. funding for attending conferences or occupational workshops and seminars?	148	40.7%
Group training seminars (e.g. one hour to one day in length) delivered on site?	107	29.4%
Funding for multi-day technical training taken by employees from outside sources?	95	26.1%
Certification programs?	92	25.3%
Training delivered online?	67	18.4%
Co-op and internship programs?	68	18.7%
Training delivered through videos or CDs?	59	16.2%
Group training seminars (e.g. one hour to one day in length) delivered off-site by your organization or a training organization?	53	14.6%

Types of Training	Respondents	
	Number	%
Formal technical training (multi-day) delivered directly through the company?	49	13.5%
Encouragement to employees to take technical training but not pay for it?	49	13.5%
Other?	13	3.6%

The topics most commonly covered in the employee training offered by surveyed employers included health and safety training (45%), orientation for new employees (36%), licensing or certification renewal training (24%), harassment prevention/respectful work environment (21%) and sales and customer service training (20%).

Table 24. Topics of Training Provided

Question: Does your organization regularly fund or deliver the following?

Topics for Training	Respondents	
	Number	%
Number of Organizations Reporting Training	**364**	**100.0%**
Health and safety training	250	44.9%
Orientation for new employees	203	36.4%
Licensing/ certification renewal training	133	23.9%
Harassment prevention/ respectful work environment	118	21.2%
Sales and customer service training	110	19.7%
Team building	104	18.7%
Technical training (multi-day)	103	18.5%
Management training	92	16.5%
Training related to LEAN/ continuous improvement	83	14.9%
Training in communication skills	62	11.1%
Language training	18	3.2%
Stress management	17	3.1%
Training in essential skills (literacy, math, etc.)	13	2.3%
Other types of training	52	9.3%

Of the organizations that reported providing technical training to employees, 47 provided some insight into the kinds of technical training they commonly fund or deliver. Reported topics included technical skills upgrading (14 employers), professional skills development including supervisory skills, time management, analytical skills and finance (11), apprenticeship training (10), health and safety (7), certification and classroom training at a postsecondary institution (6) first aid (2) and software training (2).

The employers which reported training activities were asked to rate the effectiveness of their efforts on a scale of 1 to 5, where 1 is not at all effective and 5 is very effective. The average rating was 3.4, with over 90% believing their training to be from somewhat effective to very effective.

Table 25. Effectiveness of Training

Question: On a scale of 1 to 5, how effective have these efforts been in developing the skills needed by your workers?

Effectiveness Rating	Respondents

	Number	%
1- Not at all effective	13	3.9%
2	19	5.7%
3- Somewhat effective	161	48.3%
4	89	26.7%
5- Very effective	51	15.3%
Employers Providing Training	**333**	**100.0%**
Average Rating	**3.4**	

Those employers who perceived their training as being effective or very effective (140 respondents) suggested that their training programs have been most successful in:

- Improving communications and goal sharing among staff (identified by 29 employers)
- Improving on the job training and mentoring (23)
- Improving basic skills and capability to fulfill job requirements (23)
- Facilitating adoption of safe work procedures including improved compliance, injury avoidance, and greater confidence and safety awareness of the part of employees (20)
- Improving efficiency and quality through employee productivity improvements, greater proficiency, improved lean manufacturing through cross-training and more adept and flexible skill sets of employees, and improved morale (19)
- Increasing employee engagement and loyalty (17)
- Increasing certification among employees (9)
- Improving employee understanding of responsibilities and expectations (8)
- Team building (7)
- Improving understanding of company processes and systems (5)
- Facilitating greater coordination, sharing of responsibilities, and staff flexibility (3)
- Resolving cultural differences (2)
- Improving customer relations (2)

Some of the factors that were identified as limiting the effectiveness of training included:

- Time constraints and scheduling difficulties, particularly with respect to balancing the time needed for training with deadlines for contracts and projects (identified by 20 employers)
- Staff are not very teachable/generally have poor retention of training material (16)
- The benefits are lost because of staff turnover (12)

- Lack of external training available in the region (9)
- Difficulties in accessing training that is specifically relevant to their operation or staff positions (7)
- Training is not recognized externally (4)
- Lack of training focused on lean manufacturing/improving productivity (4)
- Lack of upgrading programs available for existing workers in the sector (3)
- College and apprenticeship training programs are too generic and broad/not tailored to the needs of industry (2)
- The benefits were offset by demands for higher wages following training (2)
- Language barriers (1)

C. Recent and Projected Growth

1. Employment Growth Over the Past Five Years

On average, the employers report that their number of employees has grown by 20% over the past five years (from an average of 51.7 employees to 61.8 employees), with 42% reporting employment has increased, 29% reporting employment has stayed the same, and 28% reporting employment has declined.

Table 26. Growth in Employment over the Past Five Years

Question: Is the number of workers employed by your organization today:

Employment Level is:	Respondents	
	Number	%
Higher than it was five years ago?	219	42.0%
The same as it was five years ago?	149	28.6%
Less than it was five years ago?	146	27.9%
Don't know/ not sure	8	1.5%
Total	**522**	**100.0%**
Current Average	**61.8**	
Average 5 Years Ago	**51.7**	

Among the 219 employers that reported employment growth, increased production in the volume of goods was by far the most commonly identified factor contributing to higher employment demand (78%), followed by vertical integration of operations (12%) and the shifting of work to BC from other operations of the organization (8%). Other reasons indicated as factors in employment growth included increasing numbers of projects or contracts (6), acquisitions or mergers of manufacturing companies (3), and a growing need for more specialized staff (3).

Conversely, of the 146 manufacturers who reported declining employment, the majority (59%) attributed the decline in demand to decreased production of goods. Approximately one-quarter reported decreased demand for employees due to increases in productivity and reduced labour needs (25%) and a minority (16%) reported contracting out some function of production. Other factors identified as contributing to declining employment demand were shifting work from BC to other operations (8%), tightening or poor market conditions (3%), declining sales (2%), changes in leadership or ownership (2%) and competition from other employers (1%).

Table 27. Factors Contributing to an Increase or Decrease in Employment over the Past Five Years

Question: What factors have contributed to this increase or decrease in the number of employees you have?

Contributing Factors	Respondents	
	Number	%
Manufacturers Reporting an Increase	**219**	**100.0%**
The volume of goods we produce has increased	171	78.1%
We have vertically integrated our operations	26	11.9%
Work shifted here from other operations of the organization	18	8.2%
Other	23	10.5%
Manufacturers Reporting a Decrease	**146**	**100.0%**
The volume of goods we produce has decreased	86	58.9%
Productivity has improved (fewer workers are needed to produce the same volume of product)	37	25.3%
We have contracted out some of the functions or production	23	15.8%
Work was shifted from here to other operations of the organization	11	7.5%
Other	36	24.7%

2. Projected Employment Growth

On average, the employers project that their number of employees will grow by 13% over the next three years (from an average of 58.7 employees to 66.3 employees amongst those who provided an estimate), with 59% projecting employment will increase, 22% projecting employment will stay the same, 10% projecting employment will decline and 9% being uncertain.

Table 28. Projected Growth in Employment over the Next Three Years

Employment Level is Expected to Be	Respondents	
	Number	%
Higher in 3 Years	328	59.1%
The Same As Now	122	22.0%
Lower in 3 Years	54	9.7%
Don't know/ no response	51	9.2%
Total	555	**100.0%**
Current Average	**58.7**	
Project Average in 3 Years	**66.3**	

3. Factors Affecting Future Growth

Subject matter experts were asked to comment on the major factors that would drive future employment in the sector. The factors that were most commonly identified are the extent to which the major mining and oil and gas projects proposed in northern BC and in the Alberta oil sands proceed (6), the ability of the sector to provide competitive wages and compete for workers with other sectors (5), government regulations and policies which may either support investment and innovation or encourage more off-shore production (3), the strength of the US economy (2), and the value of the Canadian currency (2).

Subject matter experts generally projected moderate continuing growth in the sector, with increasing demand for durable goods as the US dollar strengthens. Experts were cautious to predict future changes in demand, suggesting that the ability of the BC manufacturing sector to grow will be dependent on its ability to further develop more customized, niche and value-added products and focus on lower-volume, higher-value goods (4), to compete with the demand for workers for the oil and gas and mining sectors (5), and to improve productivity (3). There is an expectation that, given the anticipated shortage of labour and higher wages offered by other sectors, some manufacturers will move more towards the use of automated processes and computer numeric control, leading to improvements in productivity and quality control.

Experts suggested that, while BC suffers from comparatively low productivity levels, BC manufacturers have been, and will continue to, invest in new equipment or technologies that will improve productivity (11). These investments are not anticipated to have a significant impact on employment demand in the sector, as these changes in equipment and technology will largely be used to meet increases in demand rather than replace existing labour. Due to the small size of most manufacturing employers in BC and the relatively low volume of production, it is not expected that manufacturers will invest in fully automated processes, but rather in individual pieces of equipment or programs that will improve existing processes. While these may displace a small portion of the workers, it is anticipated that this investment in new technology will also create new positions for high-skilled workers including technicians, software programmers and electricians.

D. Labour and Skills Shortages

1. General Trends in Employment

When asked to describe some of the major trends over the past five to ten years with respect to the demand for workers in BC manufacturing, the eighteen subject matter experts identified the following (the number of experts who reported each trend is provided in parenthesis):

- **There is a general tightening of the labour market resulting from increased demand for general labourers and skilled tradespersons in northern BC and in Alberta (4).** Increasing demand for workers in Alberta and in the north is resulting in unskilled labourers relocating to take jobs in the oil and gas and mining sectors, consequently restricting the labour pool for these occupations in manufacturing. It was suggested that this has, and will have, a particularly detrimental impact on food

and beverage processors, who continue to utilize large numbers of labourers. Demand for skilled journeypersons and tradespersons is also increasing throughout the province and is expected to result in significant shortages between 2014 and 2019.

- **While most experts do not feel there is a critical shortage at this time, they reported that manufacturing employers are experiencing challenges competing with the wages offered in other sectors and regions of the province (5).** Most experts indicated that there is not currently a significant labour shortage in BC manufacturing, but that employers are facing increasing pressure to compete with the higher wages offered by the oil and gas and mining sectors, and are under strong pressure to keep labour costs low in order to remain competitive with international manufacturers. While jobs may not be going unfulfilled for the most part, employers are having to adapt to working with fewer resources, and are under pressure to recruit workers with higher skill levels and greater flexibility in order to fulfill multiple tasks or roles.

When asked to describe major trends in the particular skills sets required by BC manufacturers over the past five to ten years, experts reported:

- **An increasing need for workers with more advanced soft skills and essential skills (4).** Experts reported a growing need for workers with strong verbal and written communications, the ability to work well in teams as well as independently, good problem-solving and analytical capabilities, and more advanced literacy and numeracy. It was reported that many candidates with strong technical training and abilities often lack the interpersonal skills, independent problem solving capabilities or language and communications abilities to fulfill the evolving job requirements, and that employers are better able to train candidates with these essential skills and capabilities to meet the hard skills requirements of the job, than they are able to train candidates with hard skills who are lacking in these areas.

- **A need for workers who are adaptable and are oriented towards continuous learning (5).** Experts reported that ongoing changes in the workplace and in the nature of production are leading to an increased demand for workers who are adaptable and can learn quickly and continuously. Improvements towards more lean manufacturing processes including the adoption of new equipment and technologies, and variances in production processes due to changes in projects, contracts and market demands necessitate workers who can fulfill multiple roles, multitask and adapt to changing job requirements. Increasingly, these jobs require highly specialized training in niche areas, and/or a blend of traditional areas of expertise and training, requiring workers to learn outside of their particular trade or certification.

- **Greater use of automation and robotics are leading to increased demand for technicians, technologists and programmers (3).** While most BC manufacturers utilize smaller production lines in comparison to the high-speed, high-volume automated production lines found in Ontario and overseas, BC manufacturers are adopting new technologies and processes to streamline production and increase productivity, increasing the demand for high-skilled candidates who design, program and operate these systems.

2. Expected Difficulties Filling Positions

Employers were asked to indicate, for a variety of manufacturing-specific and non-specific occupational categories, whether they are planning to hire workers during the next three to five years and, if so, how difficult they anticipate it will be to find good candidates with the required skills. Occupations which were perceived to be the most difficult to recruit included journeypersons (20%), senior management (15%) and production supervisors (14%). The following table outlines the employer intentions to hire for each occupational category, and the anticipated difficulty in recruiting candidates with the right skills.

Table 29. Expected Difficulties in Filling Positions

Question: If you are expecting to fill any of the following positions over the next three to five years (through hiring or promoting existing employees), how difficult do you anticipate it will be to find good candidates with the required skills?

Positions	No. of Respondents	Not Planning to Hire	Not At All Difficult	Somewhat Difficult	Very Difficult	Total
Journeypersons in the trades	460	37.4%	6.7%	25.7%	19.8%	100.0%
Senior Management	463	60.3%	4.5%	19.7%	15.3%	100.0%
Production supervisors	463	42.3%	8.9%	34.6%	14.0%	100.0%
Technicians	461	53.6%	10.2%	23.4%	12.6%	100.0%
Engineers (e.g. civil, mechanical, electrical or chemical)	457	60.6%	7.0%	20.0%	12.3%	100.0%
Machine operators and assemblers	460	37.4%	18.5%	25.0%	10.2%	100.0%
Sales & customer service	480	31.5%	19.8%	40.6%	7.9%	100.0%
Labourers	466	27.0%	42.5%	25.8%	4.5%	100.0%
Logistics (distribution, tracking and scheduling)	453	55.0%	19.2%	21.9%	3.8%	100.0%
Administration (accounting, human resources, IT, and other administration)	465	40.4%	35.5%	20.6%	3.2%	100.0%
Others	296	75%	16.6%	4.4%	4.1%	100.0%

3. Most Difficult Positions to Fill

Employers were asked to identify for which positions they anticipate it will be most difficult to find candidates with the necessary skills. The full list of occupations identified by surveyed employers is provided in the following table.

Table 30. Most Difficult Positions to Fill

Question: For which specific positions do you anticipate it will be most difficult to find candidates with the necessary skills (please list up to three positions)

Positions	Manufacturing Employers	
	Total	%
Number of Employers Identifying Positions	**412**	**100.0%**
Sales managers and representatives	96	23%
General labour (e.g. production (21), packaging (3), decking).	76	18%
Machine operators (e.g. CNC machines (6), printing press operators (4), industrial sewing machine operators (4), forklift operators (2), winery/distillery equipment (2), diecutters, gluer machines, cameras,	73	18%

Positions	Manufacturing Employers	
	Total	%
fiberglass guns, PLC C controls, bending machines).		
Engineers (e.g. electrical engineers (7), mechanical engineers (5), process/systems (3), RF (3), chemical (2), mechatronic (2), field service (2), project/product (2), combustion, firmware, corporate, technical marketing, marine and instrumentation and control).	62	15%
Manager	54	13%
Technicians (e.g. electronics (2), maintenance (2), truss design, anodizing, process, engineer, automation, dairy, plastic, dust collector, digital printing, metal forming, marine, robotics).	54	13%
Supervisor	51	12%
Machinist (e.g. CNC (7), manual (2), prototype).	41	10%
Welder	40	10%
Skilled trades (e.g. ironworker (2), wood worker (2), carpenter (2), cabinet maker, pipefitter).	35	8%
Senior management	32	8%
Administration or customer service	24	6%
Accountants	22	5%
Millwright	22	5%
Fabricators	19	5%
Marketing	17	4%
Electricians	13	3%
Project managers	11	3%
Mechanic (e.g. 2 refrigeration, 1 marine diesel)	10	2%
Programmer (e.g., 2 machine, 2 PLC, CNC)	10	2%
Designer	10	2%
Quality Control	9	2%
Installer	9	2%
Software engineers	8	2%
Truck drivers	8	2%
Graphic Designer	6	1%
Costing/Estimating	6	1%
Artist or artisan	5	1%
R&D	5	1%
Sawyer	5	1%
Logistics	5	1%
Journeymen/Journeypersons	5	1%
Foremen	4	1%
Technologist	4	1%
IT support	3	1%
Butcher	3	1%
Cook	3	1%
HR	2	0%
Powder Coat Applicator	2	0%
Cheese Maker	2	0%
Baker	2	0%
Heavy duty mechanics	2	0%
Maintenance technicians	2	0%
Glazier	2	0%
Mould maker	2	0%
Lumber graders	2	0%
Tool makers	2	0%

Positions	Manufacturing Employers	
	Total	%
Purchaser	2	0%

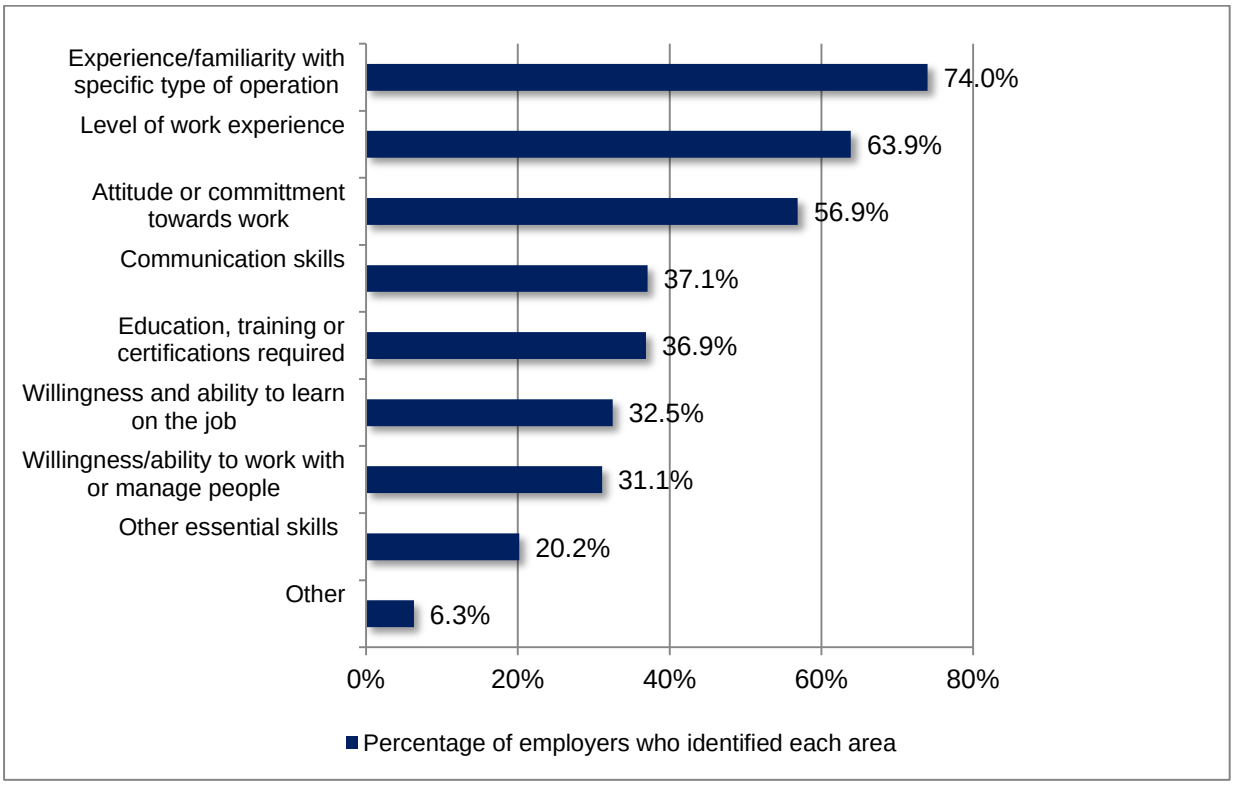
Other occupations mentioned by employers included fermentation specialist, pastry chef managers dual craft specialist, medical PhD, scientists, tea blender, brew master, pattern maker, sausage maker, screen printer, batch person, forester, custom metal spinner, painter, nuclear targetry expert, urethane chemist and health and safety expert.

4. Applicant Shortcomings

When asked to identify in what area or areas the applicants for these positions most commonly fall short, the employers most commonly identified experience in, or familiarity with, their specific type of operation (74%), overall level of work experience (265 or 64%), the attitude or commitment to work (57%) and communication skills (37%).

Figure 7. Areas in Which Applicants Are Most Commonly Lacking Skills, Experience and Attributes

Question: When you compare the skills, experience, and attributes of the candidates you attract for these positions to what you are looking for, in what area or areas do the applicants for these positions most commonly fall short?



With regard to the work attitude or commitment, some employers noted that new graduates from trades programs can have a false perception of the trades as providing very high wages to new employees, and may be lured more by the appeal of the pay cheque than by an interest in the trades. Employers also indicated that some workers

have little loyalty to their employer, tending to move from job to job in search of higher wages.

The skill sets of new graduates were also perceived by some employers as not meeting their needs, in areas such as the ability to multitask, innovate, analytical problem solve, work autonomously, learn on the job, and adapt quickly. Many employers require workers with a broad set of skills that can be adapted to their specialized needs and unique manufacturing process.

5. Contributing Factors Identified by Employers

Some of the factors identified by employers as contributing to the difficulties in attracting good candidates with the required skills included the general shortage of workers available (identified as a major reason by 25% of employers), the lack of relevant education or training available in regions close to their operations (24%), the small number of people being educated or trained in BC for the particular position needed (23%) and the fact that existing training or education is not very applicable to their particular type of operation (21%).

Table 31. Factors Contributing to Future Shortages

Question: To what extent will the following factors contribute to your difficulties in attracting good candidates with the required skills?

Factor	Not a Reason	Somewhat of a Reason	Major Reason	Total	Respondents
There is a general shortage of workers available	35.7%	39.7%	24.6%	100.0%	403
There is little or no relevant education or training available in the regions close to our operations	45.8%	30.4%	23.8%	100.0%	395
There are few people being educated or trained in BC for this type of position	30.6%	36.9%	22.8%	100.0%	412
The existing training or education is not very applicable to our type of operation	39.3%	39.3%	21.4%	100.0%	407
While there are people with these skills available, it is difficult to attract them to our operation	35.9%	44.5%	19.7%	100.0%	407
Many of the skilled workers in these positions are nearing retirement	50.4%	30.4%	19.2%	100.0%	411
The skills and experience of the available candidates do not transfer well to our type of operation	39.3%	46.4%	14.3%	100.0%	399
The cost of the available training is high	58.3%	27.9%	13.8%	100.0%	398
The quality of training or education is not very high	63.1%	27.9%	9.0%	100.0%	390
Workers from outside of BC have the necessary skills but have difficulty getting those skills recognized	71.7%	21.2%	7.1%	100.0%	396
Other	72.1%	11.7%	16.2%	100.0%	111

Seven percent of employers identified the issue that workers from outside of BC have the necessary skills but have difficulty getting those skills recognized as a major reason. When asked if there are particular groups of workers from outside of BC who experience more difficulty having their skills recognized, a few employers suggested engineers (4), those who do not speak English (4), international medical professionals (2), and those in occupations not identified as a priority by Citizenship and Immigration Canada (2).

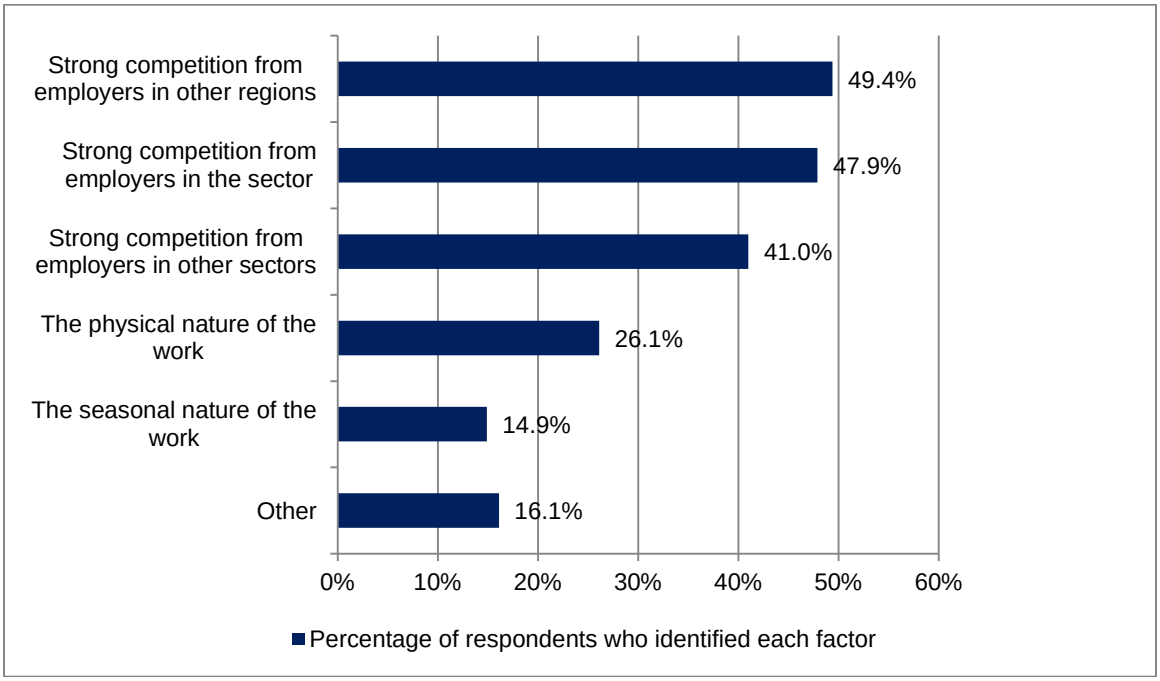
Recommendations to better facilitate skills recognition for workers outside of BC included streamlining the recognition process (5) through the development of standardized testing (3), more fast-track skills assessments and training opportunities (1), establishing federal qualification levels for applicants rather than provincial qualifications (1), recognizing on-the-job experience in lieu of training (1) and possibly establishing an association that validates external credentials against BC or Canadian credentials (1).

Employers were also asked to describe in what respects the skills and experience of the available candidates do not transfer well to their type of operation. Of the 141 who responded, the majority (61%) reported running a very specialized operation that requires a highly unique skill set, the use of very specific equipment or machinery, or a process that necessitates workers have training in multiple specialized areas which is very uncommon among candidates. Other reasons provided included candidates not having the right fit or understanding of the company's culture or expectations (13%), candidates not being adequately prepared for the job requirements by existing education and training programs, either because the programs are too broad and theory based and additional hands-on experience is needed (12%) or because there are no applicable programs in these specialized areas (6%), candidates having limited English language abilities (4%) or finding the work unappealing due to the physical or seasonal nature of the work (3%).

When asked what factors make it difficult to attract workers to their operation, competition for labour was overwhelmingly identified as the primary issue. Of the 261 employers who responded, almost half of employers reported strong competition from employers in other regions (49%), strong competition from other employers in the sector (48%), and over 40% indicated strong competition from employers in other sectors (41%).

Figure 8. Factors Contributing to Difficulties Attracting Workers

Question: Why is it difficult to attract those people to your operations?



Other factors identified as deterring applicants included the physical or seasonal nature of the work, a general negative perception of the trades or manufacturing as a source of employment, and issues associated with the location of manufacturing operations and the high cost of living in these regions.

6. Contributing Factors Identified by Subject Matter Experts

Subject matter experts were asked to what extent skills shortages and other factors are constraining the further development of the BC manufacturing sector or sub-sectors. While 11 experts (61%) suggested the sector faced labour and skills shortages in highly specialized areas such as programmers and technicians, and among qualified tradespersons as a result of increased economic activity in the mining, oil and gas and construction sectors, 7 experts (39%) were unsure or felt there was no current skills shortage.

For the majority of experts, further development of the BC manufacturing sector is constrained less by a labour shortage of candidates with hard skills than by a mismatch between the available candidate skills, experience, work ethic and expectations and the needs of employers in the sector. This mismatch between labour availability and employer needs reflects, in part, challenges resulting from the lack of HR capacity among small manufacturers, their difficulties in recruiting and training candidates, and particular challenges in attracting skilled and experienced candidates to work in northern and more remote regions of the province, in certain types of operations, and in more physically demanding positions.

Experts reported that the sector's growth was being impeded by the inadequate promotion of manufacturing opportunities among new graduates and skilled workers, and by a negative perception of employment in the trades. It was suggested that many employers have not developed partnerships with technical schools and that co-op and internship programs are underutilized by the manufacturing sector. Experts also suggested there were significant issues with new graduates having a poor understanding of the job requirements and unrealistic wage expectations for their level of skill and experience, partly inflated by the perception of very high paying trades positions for new graduates in the oil and gas and mining sectors.

Most experts felt that the most pressing skills shortages facing the sector today revolved around skilled trades including shortages for operations management, journeypersons, tradespersons, millwrights, red seal designated tradespersons, and electricians, and in highly specialized technical areas such as machinists, electrical control personnel, robotics and automation programmers, manufacturing engineers, technologists and technicians. Non-manufacturing specific occupations where skills shortages were identified included technical sales and marketing, management and strategic planning, accounting and finance, and human resources and training. Experts generally anticipate that current or projected skills shortages will worsen over the next five to ten years depending on the approval and implementation of major projects in northern BC, and on the ability of the industry and educational institutions and trainers to adapt to employers' needs and recruit candidates with the desired aptitudes.

According to the experts, the three major issues that the BC manufacturing sector faces with respect to hiring, developing and retaining workers in these occupations include:

- **A disconnect between the structure of the current educational system and training programs and the needs of industry (5).** Employers are described as needing faster, more modular-based training programs which are better designed around specific areas of expertise which support diverse and specialized industry needs. In addition, experts suggested that recruitment campaigns of educational institutions need to be revised in order to target students with higher essential skills levels, adaptability, flexibility and technical aptitude in order to reduce the high dropout rate in programs and to develop available candidates with the right fit.

- **The need for more promotion and awareness-building of the careers and opportunities within the manufacturing sector (5).** A lack of understanding and awareness on the part of educators, parents and students discourages those with the right aptitudes and essential skills levels from pursuing a career in the sector. Additional sector-wide efforts are needed to help change the image of the manufacturing sector as being a dirty or dangerous source of employment dominated by unskilled labour, in addition to more targeted promotional campaigns and recruitment strategies at the secondary school level. Employers also need to recognize younger generations' emphasis and value on continuous learning and to develop workplaces that are challenging and motivating with more clearly outlined career paths.

- **Challenges competing with employers in the oil and gas and mining sectors for workers, including the challenge of offering competitive wages (5).**

E. Actions to Address Shortages

1. Actions Planned by Employers

When asked which strategies or actions their organization was most likely to undertake in response to the current or projected skills shortages, employers most commonly cited expanding the amount of internal or informal training or mentoring provided to employees (50%), increasing their investment in equipment or new technology in order to reduce their labour requirements (44%), outsourcing certain functions of their work (40%), and increasing their investment in formal or external training (29%). Employer responses to the full list of strategies and actions are provided in the following table.

Table 32. Likely Actions in Response to Skills Shortages

Questions: Which, if any, of the following strategies or actions is your organization most likely to undertake in response to these skills shortages?

Positions	Registered Charities	
	Total	%
Number of Employers Identifying Shortages	**415**	**100.0%**
Expand the amount of internal or informal training or mentoring provided to employees	208	50.1%
Increase your investment in equipment or technology to reduce labour requirements	183	44.1%
Outsource certain functions or work	167	40.2%
Increase the wages or benefits you pay to make your positions more attractive to candidates	143	34.5%
Increase your investment in formal or external training	120	28.9%
More aggressively promote your job openings	111	26.7%
Increase the amount of overtime worked by your employees	100	24.1%
Hire new or recent immigrants with the required skills	98	23.6%
Slow your rate of business growth	71	17.1%
Hire temporary foreign workers with the required skills	51	12.3%
Move certain functions or work to other regions within your organization	37	8.9%
Introduce or expand job sharing programs	31	7.5%
Other	25	6.0%

2. Industry Initiatives

Subject matter experts identified numerous strategies that are being undertaken to respond to current and project skilled shortages including:

- Programs targeting foreign workers and immigrants such as the Temporary Foreign Worker Program, skills development programs for immigrants, and development of a foreign credential recognition database. It was noted that these programs are more effective for some sectors than others.

- Collaborative programs between industry groups and educational institutions to ease the transition of new graduates into the workplace and to create a career path in the industry.

- Efforts to support further development of management, negotiation and human resource skills amongst manufacturers through the development of tools and materials as well as the provision of hands-on support.

- Other strategies including efforts to recruit underrepresented groups (e.g. Aboriginal populations and women) to the trades, federal initiatives such as the Career Focus Program which facilitates internships for young people and new graduates, investments in capital technology to increase productivity, and promotional efforts to reduce negative stereotypes about the industry and its occupations.

3. Recommendations from Employers

A majority of employers (58%) believe there are opportunities for industry, educators, government, and others to work together to address these issues. Only 8% of employers did not perceive there to be opportunities for collaboration on these issues while 34% were unsure.

Employers recommended a wide variety of possible strategies or actions to address skill shortages, recognizing that a multi-pronged approach is required. The recommendations most commonly made by the employers included increasing training tax credits/incentives or other support available to employers (provided by 66% of the 368 employers who identified labour and skill shortages), developing a website and materials to promote employment opportunities in the BC manufacturing sector (60%), promoting careers in manufacturing, particularly in the occupations where skills shortages exist, to youth, Aboriginal people and other target groups (54%), revising the education and training curriculum to better reflect actual skills and knowledge employees require on the job (49%) and enhancing delivery of existing education and training programs (e.g. by ensuring the equipment is up-to-date and relevant to industry, encouraging further professional development of instructors, designating Centres of Excellence for training; and introducing a system-wide quality assurance program and accreditation process for training programs) (48%).

Table 33. Recommended Actions to Address Skill Shortages

Questions: A variety of actions have been proposed to address skill shortages, some of which are listed below. Which, if any, of these actions would you recommend that industry, educators, or government take to help address the skills shortages?

Positions	Employers	
	Total	%
Number of Employers Providing Responses	**368**	**100.0%**
Increase Access to Education and Training Programs		
Increase training tax credits/incentives or other support available to employers	241	65.5%
Support innovative and scalable technical training alternatives (e.g. after-hours scheduling, training delivery at job sites, modular training, online delivery, etc.).	173	47.0%
Increase access to training and education throughout BC	168	45.7%

Positions	Employers	
	Total	%
Improve Awareness of Employment Opportunities		
Develop a website and materials to promote employment opportunities in the BC manufacturing sector	222	60.3%
Stage virtual job fairs that enable potential employees to learn about current job openings, apply for jobs, submit resumes, and be interviewed by employers through a web portal	153	41.6%
Stage or participate in job fairs in key target communities or regions inside and outside of Canada	81	22.0%
Promote Development of Skilled Workers		
Promote careers in manufacturing, particularly in the occupations where skills shortages exist, to youth, Aboriginal people and other target groups	199	54.1%
Make tools, strategies and resources available to employers and supervisors to promote best practices in hiring, developing and managing employees such as apprentices	164	44.6%
Increase access to the hands-on support available to employers and employees through resources such as apprenticeship counselors	154	41.8%
Expand or enhance foundation programs and essential skills training	150	40.8%
Increase the Effectiveness of Existing Education and Training Programs		
Revise the education and training curriculum to better reflect actual skills and knowledge employees require on the job	185	49.2%
Enhance delivery of existing education and training programs (e.g. by ensuring the equipment is up-to-date and relevant to industry, encouraging further professional development of instructors, designating Centres of Excellence for training; and introducing a system-wide quality assurance program and accreditation process for training programs)	177	48.1%
Mobility and Credential Recognition		
Streamline the challenge and accreditation processes to enable experienced workers who have the required skills to successfully challenge and obtain accreditation.	162	44.0%
Provide support (e.g. information, referrals, access to effective assessment tools, bridge training and other support) to facilitate formal recognition of the worker's experience and credentials	130	37.5%
Reduce barriers that constrain inter-provincial mobility	126	34.2%
Enhance Use of Economic Immigrant and Foreign Worker Programs		
Work with the federal and provincial governments to facilitate better use of existing economic immigrant programs and the Temporary Foreign Worker Program to ease skills shortages	124	33.7%
Make tools and resources available to assist immigrants better adjust to their new communities	112	30.4%
Develop on-going relationships with agencies and others who promote employment opportunities to workers outside of Canada	96	26.1%
Facilitate development of applications under economic immigrant programs and the Temporary Foreign Worker Program	67	18.2%

Other actions suggested by manufacturers included:

- Improve the educational system in BC by strengthening education in the essential skills, better integrating the trades during secondary school, greater promotion of trades and technical studies, and providing guidance to students regarding skills requirements, possible career paths, and realistic wage and work expectations (27).
- Working to increase recognition of the BC manufacturing sector as an important and valuable industry and an appealing employer with many high-skilled, high-paying, and interesting job opportunities (10).
- Providing tax subsidies, incentives or wage subsidies for manufacturing employers to hire apprentices and employees (10).

- Supporting in-house training programs to address the unique needs of employers. Examples of in-house training included free English-second language (ESL) courses for new immigrants, apprenticeship programs for skilled tradespersons, and independent training opportunities to address skills shortages in non-apprenticed workers (8). Two employers suggested that an Industry Training Board be established for the sector to oversee and administer trades training in BC and ensure it remains at arm's-length from government.

- Working to strengthen the work ethic among young people (8).

- Increasing recognition on the part of government that the manufacturing sector is a vital source of employment and a significant source of GDP (5). Employers suggested that the government has burdened the manufacturing sector with red tape and bureaucracy and perceive the government as focusing exclusively on the needs of the oil and gas and mining sector to the detriment of the manufacturing sector.

- Facilitating more streamlined, faster processing of applications under the Temporary Foreign Worker Program and Provincial Nominee Program (4).

- Providing incentives for employers to invest in R&D, innovation and increased productivity (4). Employers suggested that government provide incentives for investment in automation to offset high labour costs, and support for training existing workers to use of robotic and automatic (CNC) machinery. Increased productivity and reduced need for general labour were seen as the only way BC can remain competitive in the international marketplace.

- Facilitate development of affordable housing and community infrastructure in order to encourage labour mobility and better enable manufacturers to recruit workers particularly in smaller communities (3).

Manufacturing employers were also asked to describe their concerns with respect to the available training and education programs and provide suggestions for how these programs could be improved. Of the 180 employers who provided comments, 16 (9%) reported existing programs as being adequate in meeting employers' needs. The remaining 165 employers identified the following issues:

- A need to revise programs to be more responsive to employer and student needs by developing learning programs which can be tailored to specific skills sets and requirements, integrating more hands-on training and experience, and developing programs where the educational component is completed in advance rather than in sequential work and study terms (31%). Some employers suggested that existing training was not relevant or adequately tailored to meet the needs of the manufacturing sector (20%) and suggested that more hands-on training and mentorship is needed in order for graduates to have the relevant experience and skills to meet the job requirements (9%). It was suggested that government facilitate additional hands-on learning by providing funding for apprenticeship, co-op and internship programs in the sector (4%). The sequential learning and work terms of current trades programs were described as being hard on both employers and students, and were perceived to contribute to higher dropout rates (2%). Overall, the structure of the trades programs were described as being too broad, inflexible and

lengthy - it was suggested that programs should be module-based to better adapt to the varied and specialized needs of employers and workers, and to train and graduate skilled workers more quickly in response to changing market demands (3%).

- A lack of educational and training programs in specialized areas (23%). For many employers, training or educational programs simply do not exist in their particular field or area of expertise or are not offered in BC. While some employers indicated that they must rely on in-house training due to the unique nature of their operations, others provided the following examples of specialized areas of expertise where training programs are needed: robotics technician; electrical technicians; hydraulics technician; fabricators; plastics fabricators; avionics; powder coating; accelerator technology; and radiochemistry.

- The need for training programs which are more accessible to workers and employers (18%). Employers highlighted the fact that training programs are being shut down at secondary and post-secondary educational institutions, particularly in remote areas and that accessibility in these areas is generally an issue (8%). The long wait times (e.g. 18 months or more) for apprenticeship programs and limited seats (4%), and the high cost of training (4%) were also identified as barriers by employers.

- The need to reconsider entrance requirements, recruitment strategies and efforts to promote careers in the sector (9%). Recruitment in the sector was commonly repeated as a concern. Some employers think the trades should be better incorporated into secondary school education and that greater efforts are needed to educate the public to improve the perception of the sector, and to promote opportunities and careers among students with the desired skill sets and aptitudes (8%). A couple of employers suggested that entrance requirements must be reviewed to ensure that the trend towards increasing GPA requirements are not preventing local students from entering programs or eliminating opportunities for mature workers without their high school diploma who are considering a career change and have the applicable technical aptitudes and characteristics.

- Greater emphasis is needed on essential skills (5%). A small number of employers suggested that general education and training on verbal and written communication, problem solving, teamwork and work ethic was lacking among graduates of training and education programs and should be incorporated into these programs to help ensure new graduates are a better fit for industry.

Similarly, subject matter experts reported a disconnect between employer needs and the programs currently offered by training providers and post-secondary institutions. The full multiple-year apprenticeship and credential programs were reported by some to be too long and broad in terms of curriculum. Experts suggested that employers would prefer shorter, module-based training programs that could be better tailored to the specific skills needs of each manufacturer and employee and could allow for faster training and integration of skilled workers.

4. Recommendations from Subject Matter Experts

Experts indicated that there is no single solution to the labour demands of employers and that employers and government will need to look to multiple approaches including the use of skilled immigration programs, the Temporary Foreign Worker Program, investments in technology, and investments in training and development of existing workers. It was recommended that one or two sub-sector studies be undertaken to better understand the roadmap to new technology and the need for training and upskilling.

The 18 subject matter experts suggested that there are numerous opportunities for government, industry and educators to work together to address some of the skills and labour issues identified in this study. The following recommendations were made:

- **Government should do more to encourage investments in innovation and productivity in the BC manufacturing industry (11).** Experts suggested that there is a need for broad-based incentives for capital investment in all manufacturing sub-sectors rather than support or incentives which focus exclusively on one major industry such as liquid natural gas. It was recommended that government provide financial support in the form of tax credits or rebates for training expenditures to facilitate employer investment in labour productivity and innovation, and that government remove barriers to private sector investment.

- **Government, industry and educators should undertake joint efforts to encourage a better understanding and awareness of the importance of the manufacturing sector in BC and better promote the various career opportunities available, particularly to students with higher essential skills levels and aptitudes (11).** Experts believe that the manufacturing sector suffers from a lack of awareness and understanding on the part of government and the public as to the importance of the sector and its contribution to GDP and employment. The sector is often viewed as being dominated by unskilled labour and dangerous occupations and is not encouraged as a possible source of employment for students with high technical, mathematic and scientific aptitudes and high essential skill levels. Parents, teachers and career counselors are often unfamiliar with the variety of occupations within the sector and are directing desirable candidates into university programs and away from the trades. It was recommended that industry associations, educators and government make a combined effort to better promote the sector and its opportunities and more effectively target the message of the importance of math, science and physics in the secondary school education system.

- **Educators and industry should work together to revise existing training and education programs to be more responsive to the needs of students and employers (10).** Experts described current programs as being too long in duration and broad and general with regard to curriculum and skills in order to meet the highly diverse needs of manufacturers. Employers were reported as increasingly requiring workers whose expertise and skill sets cross traditional trades, and as often requiring workers with specific levels of skills and experience rather than full credentials. It was advised that educators and industry work together to identify the skill sets in demand, develop a more clearly defined career path with stages of skills development for candidates, and develop modular-based trades and certification programs which

would allow for faster training and integration for candidates who do not require full credential programs, and would better enable employers and students to obtain the specific skill sets required for the diverse occupations in the sector.

- **Educators, industry and government can work together to improve the quality of candidates and better facilitate the transition from school to the workforce (5).** Experts reported that the type of candidates currently enrolling in the trades programs do not meet the needs and requirements of manufacturing employers, and that the disconnect between the available candidates' skills, aptitudes and work ethic and employers' needs and expectations are contributing to skills shortages more than a shortage of labour. It was recommended that government support the recruitment of more qualified candidates with higher essential skills levels by providing financial assistance for apprenticeship, internship and education programs, and support to facilitate training and integration of new employees who do not meet employers' full needs. It was also suggested that industry and educators work together to ensure students have a more realistic understanding of the sector and appropriate expectations for occupations and salary upon entering the workforce.

- **Government should strive to further streamline and improve labour mobility and sourcing of international skilled labour (6).** The federal and provincial governments should continue working to improve the LMO process to hire temporary foreign workers when available labour in the province will not suffice, to encourage labour mobility within the province's development regions and to continue to facilitate immigration as a source of recruiting skilled workers. It was recommended that industry and government work together to establish qualifications frameworks to identify transferable and common skills as well as the unique skills obtained through each subsector, and to develop faster skills assessment practices for screening internationally-trained and educated applicants.

Experts also believed there were opportunities for the various manufacturing subsectors to work together to address skills issues (17). Possible areas for collaboration included:

- **Better communication across sub-sector industry associations to identify skills and training needs, facilitate cross-sector training programs and work towards making the educational system more responsive to the sector's needs (10).** The CME, Canadian Manufacturers Coalition and the Industrial Research Assistance Program was identified as organizations which could play an important role in bringing various manufacturing sub-sectors together.

- **Increased collaboration in lobbying government for more streamlined immigration and temporary foreign worker applications for the industry and for incentives programs which support small and medium employers across all sectors and not just for projects involving mining and oil and gas (2).**

- **Collaborative work strategies at the managerial and executive level which would support sharing and leveraging of resources for strategic planning, HR, training, export development, LMI applications and other common issues shared by leaders in the industry (10).**

F. Results by Sector, Region and Size of Employer

A further summary of the survey results cross-tabulated by sub-sector, region, and size of employers is provided in a series of tables in Appendix IV. Where particularly relevant, the major findings have been highlighted elsewhere in this report.

IV. Summary of Major Findings by Research Question

What are the major characteristics of the manufacturing sector in BC?

British Columbia's manufacturing sector has historically been dominated by forest products. While wood and pulp and paper products continue to represent a significant share of the sector, BC manufacturers have grown and diversified to produce a wide variety of products ranging from computers, aircraft parts, and scientific instruments to food and beverage products, nutraceuticals, pharmaceuticals, clothing and textiles, and transportation equipment.[108] In recent years, shipments of wood and pulp and paper products have declined, while other subsectors such as food and machinery have enjoyed significant growth, suggesting a transition away from traditional natural resource-related processing towards new specialty products and machinery components in support of the renewed development in northern BC.

Manufacturing is a major contributor to the economy in BC. In 2012, the sector accounted for 29% of GDP in goods-producing industries and was the fourth largest contributor to provincial GDP (7%) ranking only behind real estate, rental and leasing (17%), wholesale and retail trade (10%), and construction (8%). The sector's GDP has expanded by 43% since 1997, considerably faster than other provinces, including Ontario, with annual shipment values increasing by an estimated $761 million per year between 2002 and 2007. While the industry experienced a significant setback with the economic downturn in 2008, particularly in the demand for durable goods, it has made a strong recovery, experiencing average annual growth in shipments of 6.2% since 2009.

Manufacturing is the province's primary source of exports, accounting for over 60% of the $39.3 billion of manufactured goods shipped from BC in 2012. Dependence on export markets varies widely by sub-sector, with sub-sectors related to BC`s primary industries such as forestry and mining being most heavily reliant on foreign demand.

The sector consists primarily of small and medium-sized employers who produce smaller volumes of customized or value-added niche products. Of the 7,175 manufacturing employers in BC, 40% have 4 or few employees and 96% have 99 or fewer employees. Manufacturing employers with over 100 employees account for only 4% of employers, but 51% of people employed in the sector. Conversely, the 40% of manufacturers with one to four employees account for only 4% of employment. The majority of employers are located in the Mainland/Southwestern region (64%), followed by Vancouver Island and Coast (14%) and the Thompson Okanagan (13%).

Manufacturing is the province's third largest source of employment, directly providing 179,200 jobs and indirectly supporting hundreds of thousands of others in related sectors as of 2012. Employment in the sector has grown at a compound annual rate of 3.7% since 2009, with 18,400 jobs created. The majority of BC's manufacturing jobs

108 Canadian Manufacturers & Exporters BC. *Manufacturing BC – Outlook 2020*. Page 3.

(67% or 120,200 jobs) are in the Lower Mainland, followed by the Vancouver Island and Coast region (11% or 18,800 jobs), the Thompson Okanagan region (10% or 17,300 jobs) and the Cariboo (6% or 11,300 jobs). Manufacturing employment in the North Coast, Nechako and Northeast development regions is comparatively small (1%-3%) but is expected to be impacted by major projects in northern BC.

What are the characteristics of the major sub-sectors?

BC's major manufacturing sub-sectors vary widely in terms of shipment values, numbers of workers employed, average size of employer, and labour intensity and productivity of the manufacturing process.

- The province's two largest sub-sectors, food manufacturing and wood product manufacturing, each account for approximately $7 billion in shipments, or 17%-18% of all BC manufacturing shipments. The sub-sectors employ nearly 27,000 workers each, with an average of 30 and 34 workers per employer. Wood product manufacturers are significantly more reliant on export markets, with exports representing 85% of all shipments as compared to 23% of food product shipments. In addition to being the largest, the food and wood product sub-sectors are two of the least labour intensive sub-sectors, averaging $262,450 in shipments per food manufacturing employee, and $197,482 per wood product employee.

- The third largest sub-sector, pulp and paper manufacturing, is similarly reliant on export markets, exporting 81% of its total $4.5 billion in shipments (11% of all BC manufacturing shipments). Employing a total of 12,000 workers, the average paper manufacturer employs approximately 200 workers, making them the second largest employers after petroleum and coal manufacturers. Paper manufacturers enjoy the lowest labour intensity of all sub-sectors, generating an average of $565,090 in shipments per employee.

- While the primary metal, machinery and transportation equipment manufacturing sub-sectors all produce between $2 and $2.5 billion in annual shipments (3-5% of total shipments), they vary significantly in terms of employment size and labour intensity. Primary metal is heavily export-reliant (74% of all shipments) and employs a total of 6,200 workers with an average of 107 employees per manufacturer, producing $359,621 in shipments per worker. Machinery manufacturing is also export-oriented (65% of shipments), employs 10,600 workers with an average of 20 employees per employer, and has an average intensity of $224,218 in shipments per employee. Transportation equipment is slightly less reliant on export markets (43% of shipments), and employs a total of 11,900 workers with an average of 38 employees per manufacturer. The transportation equipment manufacturing process, however, is more labour intensive, with an average intensity of only $151,156 per employee.

- The non-metallic mineral products, plastics and rubber products and computer and electronic components manufacturing sub-sectors each produce between $1 and $1.8 billion in shipments annually. Non-metallic mineral and plastic and rubber product manufacturers rely predominantly on domestic markets, employing 6,200 and 4,500 workers respectively, with an average of 17 workers per mineral

manufacturer and 19 workers per plastic and rubber manufacturer. Computer and electronic components manufacturers are heavily export-reliant (83% of shipments) and employ 7,600 workers with an average of 35 workers per employer. Plastic and rubber product manufacturers rely on domestic markets for three-quarters of all shipments and enjoy a much lower level of labour intensity with $285,590 in shipments generated per employee, as compared to $174,750 in shipments per non-metallic mineral employee and $170,750 per computer and electronic product employee.

- Of the ten major manufacturing sub-sectors, furniture and related product manufacturing is the most labour-intensive. The sub-sector relies predominantly on domestic markets (exports represent for 13.3% of all shipments), and employs 8,800 workers with an average of 16 employees per manufacturer. With a total shipment value of $831 million, Furniture manufacturers generate approximately $113,963 in shipments per employee.

Based on the survey findings, there are also notable differences in the characteristics of the workforce by sub-sector. For example,

- Sub-sectors which are least likely to have a unionized workforce include computer and electronic product manufacturers (0% of employees), electrical equipment, appliance and component manufacturers (3.6%) and food and beverage producers (3.6%) in comparison to manufacturers in fabricated metal (26%), machinery (27%), primary metal and non-metallic mineral products (23%) and transportation equipment (21%).

- Staff turnover is far more common in food and beverage manufacturing (26%), a large part due to the seasonal nature of the work, and in wood product manufacturing (17%). Other sub-sectors which experience comparatively high levels of turnover include transportation equipment manufacturing (17%), metal and non-metallic mineral products (11%), fabricated metal (10%) and computer and electronic component manufacturing (10%).

- The food and beverage (50%) and plastics and rubber (27%) sub-sectors have the greatest proportion of women in their workforce, as compared to machinery, where women comprise only 10% of all employees. The wood product and food and beverage product sub-sectors employ the highest proportion of Aboriginal workers at 8% and 4% respectively. Transportation equipment manufacturers have the highest representation of recent immigrants in their workforce at 18%, followed by food and beverage manufacturers at 15%. Similarly, employers in transportation equipment (26%) and food and beverage (21%) manufacturing are more likely to have employees who work in a language other than English.

- The computer and electronic product sub-sector has the most highly-educated workforce (44% of employees are university educated and 35% are professionally-credentialed), followed by transportation equipment (27% university educated, 23% professionally credentialed), electrical equipment, appliance and component manufacturers (22% university-educated, 20% professionally-credentialed) and manufacturers in the primary metal and non-metallic mineral product sub-sectors (20% university educated, 15% professionally-credentialed).

What are the characteristics of the workforce?

Approximately 40% of BC manufacturing employees are employed in occupations relatively unique to the manufacturing sector (i.e. NOC codes 091 and 921-961), and 60% are employed in manufacturing, but in occupations which are not unique to the sector, such as management, administration and accounting. The majority of workers in manufacturing-specific occupations are machine operators (accounting for 23% of employment in the sector overall), manufacturing labourers (11%) and manufacturing managers and supervisors (8%). Among workers employed in other non-sector specific occupations, most are in trades and other production-related positions (16%), administrative support services (9%), transportation and material handing (8%), management (6%), sales and service (4%), mechanics (4%), other equipment operating (4%), engineering and related occupations (3%) and in science and other technical positions (2%).

According to the results of the survey, the key characteristics of the workers are as follows:

- The vast majority of workers are employed on a permanent, full-time basis (94%). Almost one-third (33%) are under the age of 35, 43% are between the ages of 36 and 54 years, and 24% are aged 55 years and older. Women account for less than one-fifth of the workforce and 4% of manufacturing employees are Aboriginal. While temporary foreign workers make up less than 1% of the work force, 8% of the workers have immigrated to Canada in the past five years. Production workers, who make up 62% of the reported number of employees, have an average of 13.1 years of experience, which is considerably higher than the BC average of 8.1 years.

- Approximately 8% of manufacturing employees commonly work in a language other than English, usually in Mandarin or Cantonese (51%), Tagalog (14%) or Spanish (11%). Employers report that this is most commonly due to the workers being not fully fluent in English (66%), working with customers or others outside of the organization who do not speak English (18%) or working with managers or co-workers who do not speak English (7%).

- About 16% of workers possess credentials or professional designations other than trade certificates which are either required or important for their positions. The most commonly-held technical certificates include First Aid and Health and Safety, IT or computer science, welding, human resources, training, marketing, forestry, winemaking, electrical, Forklift operation, machining, fabrication, purchasing, and heavy duty mechanics. Special licenses held by employees include class 1 truck driving and dairy processing. Workers with credentials and professional designations most commonly work in management, engineering, accounting, sales and customer service, administration, production, design, machine operation, and research and development.

- Approximately 13% of workers have a university degree. These workers are most commonly employed in management, engineering, sales and customer service, administration, accounting, production, research and development, as technicians, supervisors, operators, in quality assurance and safety, design, human resources,

IT, software development and as labourers, welders, estimators, and metal fabricators.

- A little more than half of manufacturers employ tradesworkers, most of whom (65%) are journeypersons, followed by apprentices (18%). About 17% of tradesworkers are neither. Overall, 73% of journeypersons were credentialed prior to being hired by their current employer. The most common trades include welder, machinist, industrial mechanic (millwright) and metal fabricator.

What are the major drivers of employment growth in the manufacturing sectors?

Among the employers surveyed, employment has grown by 19% over the past 5 years, from an average of 52 employees to 62 per employer. Employers reported employment growth resulting from an increase in the volume of goods produced (78% of employers), vertical integration of operations (12%) and shifting work here from other operations of the organization (8%). Similarly, for manufacturers reporting a decrease in employment, the most common contributing factor was a decrease in the volume of goods produced (60%), followed by increased productivity leading to the demand for fewer workers (25%) and outsourcing or contracting out some functions or production (16%).

According to the literature review and interviews with subject matter experts, key drivers which have, and will continue to determine the future economic growth and employment levels of the manufacturing sector include:

- **Economic conditions, including the demand for Canadian-made goods in the United States, within Canada's domestic market, and in other key markets including Asia.** With a strengthening US economy, rebounding housing market and low interest rate policies, U.S. demand for Canadian goods is anticipated to expand at a steady, but moderate rate. Domestic demand, which accounts for approximately half of manufacturing sales in Canada, is also expected to continue to rise at a steady and moderate rate of approximately 2% per year. Other key markets which will influence demand include China, Brazil, Mexico, India and Japan.

- **The value of the currency.** The depreciating Canadian dollar is expected to create a pricing advantage for Canadian manufacturers. Employers who cut costs and implemented other measures to increase competitiveness when the dollar was at parity will stand to benefit more with the effective price reduction on their products sold in the US, however, manufacturers who rely on imports of semi-processed goods or machinery will face higher costs.

- **The extent to which major projects proceed in resource and construction sectors.** The approval and implementation of major projects is expected to lead to spin-off demand for manufacturing and to impact the demand for, availability and wages of skilled tradesworkers, labourers, logistics workers, engineers and technicians and technologists, particularly in northern BC, Alberta and Saskatchewan. Changes in demand for specific occupations and skills sets will impact the manufacturing sector's ability to compete for a limited supply of skilled and experienced workers.

- **International competition.** Networks of competing global and regional value chains are increasingly complex. Emerging markets are becoming more technologically advanced in manufacturing and are investing in higher levels of education and training, providing more direct competition for Canadian manufacturers.

- **Influence of government regulations, policies and agreements.** Safety, quality and sustainability regulations, intellectual property protection regulation, changing and competing tax structures and government support for domestic manufacturing will all impact Canadian manufacturers' competitiveness.

- **Changes in the level of productivity.** Canadian productivity levels have generally been considered low in comparison to competitors and the recent economic downturn may have led to greater losses in competitiveness. A recent TD study reported that in 2013, labour costs in Canada's manufacturing sector were estimated to be 14% higher than in 2009, whereas they have decreased by 4% in the US.

- **Other input costs** such as raw materials, transportation, power and border-related costs which pose a financial burden on Canadian manufacturers exporting goods to large US markets.

What is the current status of the labour market? In what terms? Are there skills shortages? In what areas are skills shortages most severe?

Most subject matter experts indicated that there is not a significant labour shortage in BC manufacturing, but that numerous trends are impacting the demand for workers and the ability of employers to recruit, develop and retain workers with the skills and experience they require. Identified trends include:

- A general tightening of the labour market resulting from the increased demand for skilled workers in northern BC and Alberta, creating challenges for BC manufacturers to compete with higher wage rates offered in other sectors;

- Changes in manufacturing processes and a general trend towards more advanced educational requirements for workers leading to an increased need for workers with more advanced soft skills and strong essential skills who are adaptable and oriented towards continuous learning and are capable of responding to changing needs of manufacturing employers; and

- Greater use of automation and robotics, leading to increased demand for technicians, technologists and programmers.

According to the experts, the three major challenges the BC manufacturing sector faces with respect to hiring, developing and retaining workers are the disconnect between the structure of the current educational system and training programs and the needs of industry, the need for more promotion and awareness-building of the careers and opportunities within the manufacturing sector, and challenges competing with employers

in the oil and gas and mining sectors for workers, including the challenge of offering competitive wages.

Based on the survey findings, staff turnover and hiring in the sector have not reached a critical state; however, employers are anticipating hiring shortages in key occupations over the next three to five years. Staff turnover has averaged 14% per year, with half of employers reporting staff turnover of 5% or less. The majority of employees hired during the past year were unemployed (30%) or working for another employer in the same region and sector at the time (29%), suggesting that there is still an available pool of workers, but that competition for workers among manufacturers is a reality. To develop their workers, employers most commonly spend 1%-3% of revenues on training, typically relying on "on-the-job training", meetings and mentoring. Most employers perceive this training to be somewhat effective at meeting their needs.

The occupations which are expected to be most difficult to fill in BC manufacturing over the next three to five years are journeypersons (anticipated to be very difficult to hire by 20% of employers), managers and supervisors (15% and 14%, respectively), technicians (13%), engineers (12%) and machine operators and assemblers (10%). A large number of factors were reported to be contributing to the difficulty in filling positions including a general shortage of workers available (identified by 25% of employers), issues of accessibility for relevant training (24%), the small number of people trained in BC for these skilled areas (23%), a lack of applicability of existing training programs (21%), and difficulties attracting workers to the sector (20%). Difficulties attracting and retaining workers were attributed to strong competition from employers in other regions (49%), competition from other employers in the sector (48%), from employers in other sectors (41%) and difficulties attracting people due to the physical nature (26%) or seasonal nature of the work (15%).

There appears to be marked differences in the labour market challenges facing smaller businesses and those facing larger manufacturing operations. Larger manufacturing employers (those with more than 50 employees, and especially those with greater than 100 employees) are more likely to identify skilled worker shortages, particularly associated with engineers, technicians, journeypersons and machine operators. Larger employers are also more concerned that their existing skilled workers are nearing retirement. Larger employers are less likely to report that applicants fall short in terms of essential skills, willingness and ability to learn on the job and attitude or commitment to work, and are less likely to express concerns about costs or access to training. Instead, larger operations are more likely to report concerns about the sheer number of trained workers available, rather than the quality of training or ability to attract available workers to their operation.

What is the future outlook for the labour market in the short and medium term?

Manufacturing GDP and employment are projected to grow at a moderate rate over the short and medium term in response to increasing foreign demand as well as strengthening domestic demand. The Canadian Occupational Projection System's *Industrial Outlook 2011-2020* projected a rise in world demand for resources and

investment-related products, driving growth in manufacturing real GDP in Canada over the next decade. Growth was projected in foreign demand, particularly from the US, as well as in domestic demand, particularly business investment in non-residential structures and in machinery and equipment. It was anticipated that growth in employment would be slower than growth in GDP as manufacturers work to improve productivity in the face of the high Canadian dollar and increased international competition in foreign and domestic markets.

A shortage of skilled trades workers, engineers, technologists and technicians and a mismatch between the skills and experience of the unemployed and those required by employers are expected to impede the labour market over the short to medium term. In the medium term, population size is expected to be a key challenge, with aging contributing to larger skills and labour shortages and potentially exacerbating the economic impact of skills mismatches. Skilled immigrants will continue to be an important part of the labour supply. In addition, more responsive training and investments in innovation and productivity will help to realign labour demand and supply.

Surveyed employers reported employment growth of 19% over the past 5 years, and projected employment growth of 13% over the next three to five years, with nearly 60% of surveyed employers expecting higher employment three years from today and 22% expecting employment demand to stay at current levels. Increased employment demand is believed to be driven primarily by increases in the volume of goods produced. In comparison, the Canadian Occupational Projection System projected that employment in positions associated with the manufacturing sector would grow at the rate of about 1.3% per year.

At a growth rate of 1.3% to 3.0% per year in employment, the manufacturing sector in BC will need to attract from a low of 58,000 new workers (of whom 70% would be replacement workers) to a high of 88,000 new workers over the next eight years (of whom nearly one-half would be replacement workers). Under the lower estimate, the leading types of positions in terms of the projected number of new workers that will be required over the next eight years include machine operators (13,372), trades and other production positions (8,055), labourers in manufacturing and processing (5,968), managers and supervisors in manufacturing and utilities (5,787), administrative support (5,555), mechanics (2,482), sales and service (1,985), and engineering and related (1,951).

What actions are currently being taken or currently planned to address skills shortages in the short and medium term? What additional actions could be taken?

To date, the federal and provincial governments and industry have implemented a wide variety of initiatives, programs and strategies designed to address labour and skills shortages including:

- Programs intended to increase access to education and training programs, either by providing tax credits, incentives or other support to employers or by increasing access to training and education throughout BC;

- Campaigns and resources designed to promote the BC manufacturing sector and increase awareness of employment opportunities to potential employees, virtual job fairs and job fairs in key target regions, and services and programs that connect available workers with employment opportunities;

- Programs and tools to promote the development of skilled workers including a variety of online resources, guides and programs to promote best practices in hiring, developing and managing employees, strategies to increase access to hands-on support (e.g. apprenticeship counselors), and programs to expand or enhance foundation programs and essential skills training for students as well as existing workers;

- Initiatives to increase the effectiveness of existing education and training programs including grants and partnerships to support better linkages between educational institutions and industry, and enhance the delivery of existing programs;

- Strategies to facilitate mobility and credential recognition including streamlining the challenge and accreditation process, providing support to facilitate foreign credential recognition and efforts to reduce barriers to inter-provincial mobility;

- Strategies to enhance the use of economic immigrant and foreign worker programs including efforts to work with government to facilitate the use of the Provincial Nominee Program, Temporary Foreign Worker Program and Federal Skilled Worker Program, and programs to assist immigrants better adjust to their new communities; and

- Programs to encourage new capital investment.

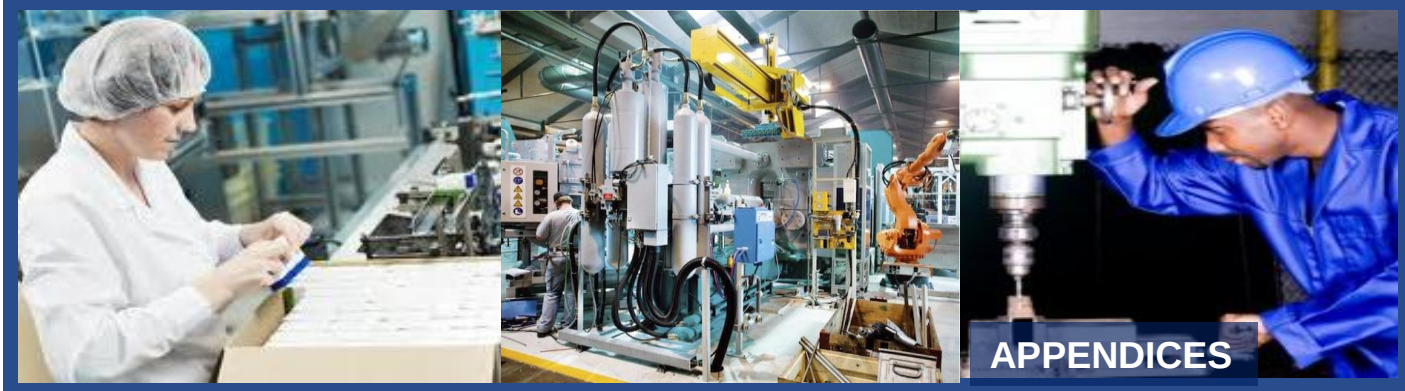
In response to shortages, employers have suggested they may expand training provided internally (50%), invest in new equipment or technology to increase productivity and reduce the demand for labour (44%), outsource some functions or processes (40%), increase wages or benefits to compete with other employers in the manufacturing sector or in other sectors (35%), invest in external training (29%), more aggressively promote job openings (27%), increase overtime of existing workers (24%), hire new or recent immigrants (24%), slow the rate of business growth (17%) or hire temporary foreign workers (9%).

With regard to possible actions that should be taken, the majority of employers (58%) recommended industry, educators and government work together to address these issues and suggested there are opportunities for various manufacturing sub-sectors to work together to identify skills and training needs, facilitate cross-sector training programs, make the educational system more responsive to sector needs, lobby government regarding immigration/temporary foreign worker programs and incentive programs for manufacturers, collaborate on work strategies at the managerial and executive level and share and leverage resources for common issues including strategic planning, HR planning, training, export development, and LMI applications. In particular, employers would like parties to increase access to quality training programs, promote employment opportunities in the sector, and facilitate mobility and credential recognition.

Other common recommendations included tailoring existing training programs to meet the specific skill sets and requirements of employers in the sector, including integrating more hands-on training and experience, revising recruitment strategies and paths and increasing the level of collaboration and coordination between industry and educators; targeting under-represented groups; making improvements to the K-12 education system in BC; increasing recognition within government of the importance of manufacturing; providing incentives for investments in innovation and productivity and facilitating affordable housing and community infrastructure improvements.

Subject matter experts indicated there is no single solution to the human resources challenges facing the sector and suggested employers and government will need to implement multiple approaches including the use of skilled immigration programs, the Temporary Foreign Worker Program, investments in technology, and investments in training and development of existing workers. It was recommended that one or two sub-sector studies be undertaken to better understand the roadmap to new technology and the need for training and upskilling. Specifically, experts suggested:

- Government should do more to encourage investments in innovation and productivity in the BC manufacturing industry.
- Government, industry and educators should undertake joint efforts to encourage a better understanding and awareness of the importance of the manufacturing sector in BC and better promote the various career opportunities available, particularly to students with higher essential skills levels and aptitudes.
- Educators and industry should work together to revise existing training and education programs to be more responsive to the needs of students and employers.
- Educators, industry and government can work together to improve the quality of candidates and better facilitate the transition from school to the workforce.
- Government should strive to further streamline and improve labour mobility and sourcing of international skilled labour.



Appendices

Appendix I: List of Documents Reviewed

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Appendix II: Occupations Unique to Manufacturing in BC, by NOC Code Category

Table II.1. Level of Employment and Required Education and Experience

NOC Category	Occupations[109]	Associated Subsectors*	Employed in BC as of 2012 (thousands)[110]	Education/ Experience Required
091 Managers In Manufacturing And Utilities	911 Manufacturing Managers	All Manufacturing sub-sectors.	6,684.4	Post-Secondary, related industry experience
092 Processing, Manufacturing and Utilities Supervisors and Central Control Operators	921 Supervisors, Processing Occupations	Non-Metallic Mineral Product, Primary Metal; Food, Beverage and Tobacco Product; Wood Product; Paper; Plastics and Rubber Products; Textile Mills; Textile Product Mills; Clothing; Leather and Allied Product.	3,560.4	Post-Secondary, related industry experience. Some sub-sectors require license, on-the-job-training, company training, special certificate.
	922 Supervisors, Assembly and Fabrication	Transportation Equipment; Computer and Electronic Product; Furniture and Related Product; Textile Mills and Textile Product Mills; Clothing; Leather and Allied Product; Primary Metal; Machinery; Electrical Equipment, Appliance and Component; Miscellaneous.	1,192.3	Post-Secondary, related industry experience. Most require on-the-job-training, license, special certificate.
	923 Central Control and Process Operators in Manufacturing and Processing	Non-Metallic Mineral Product, Primary Metal; Petroleum and Coal Products; Chemical; Paper.	1,647.4	Post-Secondary, related industry experience, formal company training. Some sub-sectors require license or special certificate.
094/095 Processing and Manufacturing Machine Operators and Assemblers	941 Machine Operators and Related Workers in Metal and Mineral Products Processing	Non-Metallic Mineral Product, Primary Metal.	2,042.5	Secondary, related industry experience. Some sub-sectors require on-the-job training.
	942 Machine Operators and Related Workers in Chemical, Plastic and Rubber Processing	Chemical; Plastic and Rubber Product.	1,630.5	Secondary, on-the-job training. For specific subsectors: post-secondary specialized courses, related industry experience, special certificate.
	943 Machine Operators and Related Workers in Pulp and Paper	Wood Product; Paper.	8,466.6	Secondary, related industry experience. Most sub-sectors require post-secondary courses, on-the job-

109 HRSDC, Detailed Occupational Structure: *9 Occupations in manufacturing and utilities.* Accessed December 2013. http://www5.hrsdc.gc.ca/noc/english/noc/2011/Occupations.aspx?val=9

110 Government of British Columbia, BC Labour Market Outlook 2010. *Occupation by Industry Employment for Manufacturing, BC and Regions.* Accessed December 2013.

NOC Category	Occupations[109]	Associated Subsectors*	Employed in BC as of 2012 (thousands)[110]	Education/ Experience Required
	Production and Wood Processing			training, formal/informal training in the company, or special certificate. Lumber graders require a license.
	944 Machine Operators and Related Workers in Textile Processing	Textile Mills, Textile Product Mills; Clothing and Allied Products and Leather.	469.0	On-the-job training. Some sub-sectors require some or all post-secondary, related industry experience.
	945 Machine Operators and Related Workers in Fabric, Fur and Leather Products Manufacturing	Textile Mills, Textile Product Mills; Clothing and Allied Products and Leather.	3,527.2	Varies. Some sub-sectors require some secondary, related industry experience and on-the-job training.
	946 Machine Operators and Related Workers in Food, Beverage and Tobacco Processing	Food, Beverage and Tobacco Manufacturing.	4,968.8	Some secondary, post secondary required for meat cutters. Most sub-sectors require on-the-job training and related industry experience.
	947 Printing Machine Operators and Related Occupations	Printing and Related Support Activities.	1,691.7	Secondary, post-secondary in a related field or extensive on-the-job training and experience.
	948 Mechanical, Electrical and Electronics Assemblers	Transportation Equipment; Computer and Electrical Product; Electrical Equipment, Appliance and Component.	3,555.6	Secondary, on-the-job training. Some subsectors require post-secondary courses, most require relevant industry experience.
	949 Other Assembly and Related Occupations	Transportation Equipment; Furniture and Related Product Manufacturing; Wood Product; Plastic and Rubber Product; Primary Metal.	8,296.8	Some secondary, on-the-job training. Some sub-sectors require post-secondary or courses, most require relevant industry experience.
	951 Machining, Metalworking, Woodworking and Related Machine Operators	Machinery Manufacturing; Primary Metal Manufacturing; Wood Product Manufacturing.	3,642.9	Some secondary, on-the-job training, relevant industry experience. Some machining tool operates require post-secondary.
096 Labourers in Processing, Manufacturing and Utilities	961 Labourers in Processing, Manufacturing and Utilities	Non-Metallic Mineral Product Manufacturing; Primary Metal Manufacturing; Chemical Manufacturing; Wood Product Manufacturing; Paper Manufacturing; Plastic and Rubber Product Manufacturing; Food, Beverage and Tobacco Manufacturing.	17,875.9	Some secondary or completion of secondary.

Table II.2. Average Hourly Wages of BC Manufacturing Sector-Specific Occupations, 2002 to 2012 ($, hourly rate, employees ages 15 and older)

NOC Occupational Category	Sex	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total employees, all occupations	**Both**	**$17.63**	**$17.98**	**$18.60**	**$19.04**	**$19.00**	**$19.37**	**$19.92**	**$20.48**	**$21.41**	**$22.17**	**$22.78**
	Male	**19.41**	**19.65**	**20.27**	**20.68**	**20.54**	**21.1**	**21.83**	**22.26**	**23.4**	**24.32**	**24.97**
	Female	**15.76**	**16.26**	**16.9**	**17.37**	**17.45**	**17.62**	**18.00**	**18.65**	**19.39**	**20.1**	**20.65**
Occupations unique to processing, manufacturing and utilities	**Both**	**17.00**	**17.35**	**17.03**	**17.72**	**17.44**	**17.46**	**17.83**	**18.55**	**19.44**	**20.28**	**20.77**
	Male	**18.64**	**19.01**	**18.43**	**19.26**	**19.1**	**19.1**	**19.32**	**20.4**	**21.15**	**21.73**	**22.7**
	Female	**1.66**	**11.75**	**12.04**	**12.59**	**13.09**	**12.36**	**13.30**	**13.23**	**14.52**	**15.67**	**15.63**
Machine operators and assemblers in manufacturing, including supervisors	Both	17.36	17.67	17.32	18.14	18.15	18.06	18.1	19.05	19.96	21.08	21.61
	Male	19.04	19.26	18.81	19.66	19.71	19.59	19.84	21.06	21.53	22.11	23.34
	Female	11.72	11.80	11.93	12.39	13.47	12.31	13.01	13.31	14.69	16.56	16.38
Labourers in processing, manufacturing and utilities	Both	15.71	16.16	15.71	16.17	15.04	15.79	17.08	17.19	17.80	17.70	18.04
	Male	17.14	17.98	16.65	17.54	16.66	17.48	17.89	18.61	19.71	20.01	20.3
	Female	11.48	11.59	12.54	13.1	12.19	12.46	14.23	13.02	14.18	14.37	13.92

Source: Table 282-0070 Labour force survey estimates (LFS), wages of employees by type of work, National Occupational Classification for Statistics (NOC-S), sex and age group, annual (current dollars)(5,6)

Table II.3. Labour Forecast for Occupations Unique to Processing and Manufacturing in BC, by NOC Code Category, Year 2020

NOC Category	Demand	Supply	Total Job Openings	Attributed to Expansion	Attributed to Replacement
091 Managers In Manufacturing And Utilities	11,514	11,407	470	47	423
921 Supervisors, processing occupations	5,368	5,331	223	20	203
922 Supervisors, assembly and fabrication	1,712	1,695	67	6	61
923 Central control and process operators in manufacturing and processing	3,054	3,042	118	22	96
941 Machine operators and related workers in metal and mineral products processing	3,148	3,122	98	15	83
942 Machine operators and related workers in chemical, plastic and rubber processing	3,418	3,387	106	17	89
943 Machine operators and related workers in pulp and paper production and wood	10,870	10,808	349	36	313
944 Machine operators and related workers in textile processing	919	910	26	3	23
945 Machine Operators/Related Workers in Fabric, Fur/Leather Products Manufacturing	5,492	5,431	191	19	172
946 Machine operators and related workers in food, beverage and tobacco processing	7,197	7,133	222	27	195
947 Printing machine operators and related occupations	5,023	4,974	147	26	121
948 Mechanical, electrical and electronics assemblers	5,686	5,628	157	22	135
949 Other assembly and related occupations	13,323	13,202	329	40	289
951 Machining, metalworking, woodworking and related machine operators	5,438	5,388	150	17	133
961 Labourers in processing, manufacturing and utilities	31,727	31,461	873	112	761

Source: WorkBC, BC Regional Occupation Forecast June 2011

Appendix III: Occupations Not Unique to Manufacturing in BC, by NOC Code Category

Table III.1. Other Occupations Employed in the BC Manufacturing Sector, by NOC Code Category

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
001 Legislators and Senior Management	0011 Legislators 0016 Senior Managers - Goods Production, Utilities, Transportation and Construction	1,920	Post secondary, relevant industry experience, specialization in a particular field. Some positions require a professional designation
011 Administrative Services Managers	0111 Financial Managers 0112 Human Resources Managers 0113 Purchasing Managers 0114 Other Administrative Services Managers	1,445	Post secondary, relevant industry experience, specialization in a particular field. Some positions require a professional designation.
021 Managers in Engineering, Architecture, Science and Information Systems	0211 Engineering Managers 0213 Computer and Information Systems Managers	759.113	Post secondary, relevant industry experience. Registration as a Professional Engineer/Architect. Some positions require a Masters or Doctoral degree.
061 Sales, Marketing and Advertising Managers	0611 Sales, Marketing and Advertising Managers	2.599	Post secondary, relevant industry experience.
072 Facility Operation and Maintenance Managers	0721 Facility Operation and Maintenance Managers	486.6	Post secondary, relevant industry experience.
111 Auditors, Accountants and Investment Professionals	1111 Financial Auditors and Accountants 1112 Financial and Investment Analysts	1282.5114	Post secondary, relevant industry experience. Some positions require license, special certificate.
112 Human Resources and Business Service Professionals	1121 Specialists in Human Resources 1122 Professional Occupations in Business Services to Management	432.1	Post secondary, some positions require professional certificate.

111 HRSDC, Detailed Occupational Structure: *9 Occupations in manufacturing and utilities.* Accessed December 2013. http://www5.hrsdc.gc.ca/noc/english/noc/2011/Occupations.aspx?val=9

112 Government of British Columbia, BC Labour Market Outlook 2010. *Occupation by Industry Employment for Manufacturing, BC and Regions.* Accessed December 2013.

113 *This total also includes 0212 Architecture and Science Managers.*

114 *This total also includes 1113 Securities Agents, Investment Dealers and Brokers and 1114 Other Financial Officers*

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
121 Clerical Supervisors	1211 Supervisors, General Office and Administrative Support Clerks 1215 Supervisors, Recording, Distributing and Scheduling Occupations	618.1115	Post secondary (college courses), relevant industry experience.
122 Administrative and Regulatory Occupations	1221 Administrative Officers 1223 Personnel and Recruitment Officers 1225 Purchasing Agents and Officers	2,296.9116	Post secondary (college courses), relevant industry experience. Some positions require special certificate, specialized training program.
123 Finance and Insurance Administrative Occupations	1231 Bookkeepers 1233 Insurance Adjusters and Claims Examiners 1236 Customs, Ship and Other Brokers	1,015.7117	Post secondary (college or other courses), some accounting clerks must be bondable, some positions require on-the-job training.
124 Secretaries, Recorders and Transcriptionists	1241 Secretaries (Except Legal and Medical)	1,040.4118	Secondary, post secondary college courses or program.
141 Clerical Occupations, General Office Skills	1411 General Office Clerks 1413 Records Management and Filing Clerks 1414 Receptionists and Switchboard Operators	2,297.4	Post secondary college or commercial courses. Some positions require on-the-job training.
142 Office Equipment Operators	1422 Data Entry Clerks 1423 Desktop Publishing Operators and Related Occupations 1424 Telephone Operators	335.1	Post secondary college courses or completion of relevant program.
143 Finance and Insurance Clerks	1431 Accounting and Related Clerks 1432 Payroll Clerks	1,765.5119	Post secondary college courses or completion of relevant program. Some accounting clerks must be bondable.
144 Administrative Support Clerks	1441 Administrative Clerks 1442 Personnel Clerks	483.8120	Post secondary college courses or completion of relevant program.
145 Library, Correspondence and Related Information Clerks	1452 Correspondence, Publication and Related Clerks 1453 Customer Service, Information and Related Clerks 1454 Survey Interviewers and Statistical Clerks	1,268.6121	Secondary, some positions require post secondary courses or programs, relevant industry experience.

115 *This total also includes 1212 Supervisors, Finance and Insurance Clerks, 1213 Supervisors, Library, Correspondence and Related Information Clerks and 1214 Supervisors, Mail and Message Distribution Occupations*
116 *This number also includes 1222 Executive Assistants, 1224 Property Administrators, 1226 Conference and Event Planners, 1227 Court Officers and Justices of the Peace and 1228 Immigration, Employment Insurance and Revenue Officers*
117 *This number also includes 1232 Loan Officers, 1234 Insurance Underwriters and 1235 Assessors, Valuators and Appraisers*
118 *This number also includes 1242 Legal Secretaries, 1243 Medical Secretaries and 1244 Court Recorders and Medical Transcriptionists*
119 *This number also includes 1433 Customer Service Representatives - Financial Services, 1434 Banking, Insurance and Other Financial Clerks and 1435 Collectors*
120*This number also includes 1443 Court Clerks*
121 *This number also includes 1451 Library Clerks*

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
147 Recording, Scheduling and Distributing Occupations	1471 Shippers and Receivers 1473 Production Clerks 1474 Purchasing and Inventory Clerks	4,768.8122	Secondary, some post secondary courses.
211 Physical Science Professionals	2111 Physicists and Astronomers 2112 Chemists 2113 Geologists, Geochemists and Geophysicists 2114 Meteorologists 2115 Other Professional Occupations in Physical Sciences	310.4	Post secondary graduate degree. Some positions require license, professional certification.
212 Life Science Professionals	2121 Biologists and Related Scientists 2122 Forestry Professionals 2123 Agricultural Representatives, Consultants and Specialists	410.0	Post secondary graduate degree. Some positions require license, professional certification or membership.
213 Civil, Mechanical, Electrical and Chemical Engineers	2131 Civil Engineers 2132 Mechanical Engineers 2133 Electrical and Electronics Engineers 2134 Chemical Engineers	1,922.5	Post secondary graduate degree. Some positions require license, professional certification or membership.
214 Other Engineers	2141 Industrial and Manufacturing Engineers 2142 Metallurgical and Materials Engineers 2143 Mining Engineers 2144 Geological Engineers 2145 Petroleum Engineers 2146 Aerospace Engineers 2147 Computer Engineers (Except Software Engineers and Designers) 2148 Other Professional Engineers, n.e.c.	1,051.5	Post secondary graduate degree. Some positions require license, professional certification or membership.
217 Computer and Information Systems Professionals	2171 Information Systems Analysts and Consultants 2172 Database Analysts and Data Administrators 2173 Software Engineers and Designers 2174 Computer Programmers and Interactive Media Developers 2175 Web Designers and Developers	1,770.8	Post secondary, relevant industry experience, some positions require special certificate.
222 Technical Occupations in Life Sciences	2221 Biological Technologists and Technicians 2222 Agricultural and Fish Products Inspectors 2223 Forestry Technologists and Technicians 2225 Landscape and Horticulture Technicians and Specialists	362.8123	Post secondary, relevant industry experience. Some positions require certification, on-the-job training.

122 *This number also includes 1472 Storekeepers and Parts Clerks, 1475 Dispatchers and Radio Operators and 1476 Transportation Route and Crew Schedulers*
123 This total also includes 2224 Conservation and Fishery Officers

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
223 Technical Occupations in Civil, Mechanical and Industrial Engineering	2231 Civil Engineering Technologists and Technicians 2232 Mechanical Engineering Technologists and Technicians 2233 Industrial Engineering and Manufacturing Technologists and Technicians 2234 Construction Estimators	998.6	Post secondary, supervised work experience, certification.
224 Technical Occupations in Electronics and Electrical Engineering	2241 Electrical and Electronics Engineering Technologists and Technicians 2242 Electronic Service Technicians (Household and Business Equipment) 2243 Industrial Instrument Technicians and Mechanics 2244 Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors	1,354.9	Post secondary, supervised work experience, certification.
225 Technical Occupations in Architecture, Drafting, Surveying and Mapping	2251 Architectural Technologists and Technicians 2252 Industrial Designers 2253 Drafting Technologists and Technicians 2254 Land Survey Technologists and Technicians 2255 Mapping and Related Technologists and Technicians	983.6	Post secondary, supervised work experience apprenticeship or internship, certification.
228 Technical Occupations in Computer and Information Systems	2281 Computer Network Technicians 2282 User Support Technicians 2283 Systems Testing Technicians	632.8	Post secondary. Some positions require certification.
524 Creative Designers and Craftspersons	5241 Graphic designers and illustrators 5242 Interior designers and interior decorators 5243 Theatre, fashion, exhibit and other creative designers 5244 Artisans and craftspersons 5245 Patternmakers - textile, leather and fur products	2,797.7	Post secondary, or apprenticeship, creative ability. Some positions may require specialized training is a specific field, certification.
621 Sales and Service Supervisors	6211 Retail sales supervisors	173.0	Secondary, related industry experience.
622 Technical Sales Specialists, Wholesale Trade	6221 Technical sales specialists - wholesale trade 6222 Retail and wholesale buyers	773.0	Post secondary, experience in a related industry.
624 Chefs and Cooks	6321 Chefs 6322 Cooks	257.0	Secondary, certification, related industry experience.
625 Butchers and Bakers	6331 Butchers, meat cutters and fishmongers - retail and wholesale 6332 Bakers	1,740.8	May require secondary, on-the-job training, completion of a meat and fish cutting training program.

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
641 Sales Representatives, Wholesale Trade	6411 Sales and account representatives - wholesale trade (non-technical)	2,279.1	Post secondary, related industry experience.
666 Cleaners	6731 Light duty cleaners 6732 Specialized cleaners 6733 Janitors, caretakers and building superintendents	1,938.5	May require some secondary, on-the-job training.
721 Contractors and Supervisors, Trades and Related Workers	7201 Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations 7202 Contractors and supervisors, electrical trades and telecommunications occupations 7203 Contractors and supervisors, pipefitting trades 7204 Contractors and supervisors, carpentry trades 7205 Contractors and supervisors, other construction trades, installers, repairers and servicers	1,628.5	Secondary. related industry experience, certification.
723 Machinists and Related Occupations	7231 Machinists and machining and tooling inspectors 7232 Tool and die makers 7233 Sheet metal workers 7234 Boilermakers 7235 Structural metal and platework fabricators and fitters 7236 Ironworkers 7237 Welders and related machine operators	2,759.6	Secondary, apprenticeship, certification, related industry experience.
724 Electrical Trades and Telecommunication Occupations	7241 Electricians (except industrial and power system) 7242 Industrial electricians 7243 Power system electricians 7244 Electrical power line and cable workers	1,781.2124	Secondary, apprenticeship, certification, related industry experience
725 Plumbers, Pipefitters and Gas Fitters	7251 Plumbers 7252 Steamfitters, pipefitters and sprinkler system installers 7253 Gas fitters	781.9	Secondary, apprenticeship, certification, related industry experience
726 Metal Forming, Shaping and Electrical Trades		7,162.0	Secondary, apprenticeship, certification, related industry experience
727 Carpenters and Cabinetmakers	7271 Carpenters 7272 Cabinetmakers	3,392.8	Secondary, apprenticeship, certification, related industry experience

124 *Total also includes 7245 Telecommunications line and cable worker, 7246 Telecommunications installation and repair workers and 7247 Cable television service and maintenance technicians*

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
731 Machinery and Transportation Equipment Mechanics (except motor vehicle)	7311 Construction millwrights and industrial mechanics 7312 Heavy-duty equipment mechanics 7313 Refrigeration and air conditioning mechanics 7314 Railway carmen/women 7315 Aircraft mechanics and aircraft inspectors 7316 Machine fitters 7318 Elevator constructors and mechanics	6,362.0	Secondary, apprenticeship, certification, related industry experience
733 Other Mechanics	7331 Oil and solid fuel heating mechanics 7332 Appliance servicers and repairers 7333 Electrical mechanics 7334 Motorcycle, all-terrain vehicle and other related mechanics 7335 Other small engine and small equipment repairers	297.3	Secondary, apprenticeship, certification, related industry experience
734 Upholsterers, Tailors, Shoe Repairers, Jewellers and Related Occupations	6342 Tailors, dressmakers, furriers and milliners 6343 Shoe repairers and shoemakers 6344 Jewellers, jewellery and watch repairers and related occupations 6345 Upholsterers	1,449.9	Secondary, related experience, demonstrated ability. Some positions may require courses or specialized training.
735 Stationary Engineers and Power Station and System Operators		945.0	
738 Printing Press Operators, Commercial Drivers, and other Trades and Related Occupations	7381 Printing press operators 7384 Other trades and related occupations, n.e.c.	1,691.7	Secondary, post secondary or on-the-job training..
742 Heavy Equipment Operators	7521 Heavy equipment operators (except crane) 7522 Public works maintenance equipment operators and related workers	738.2	Some secondary, apprenticeship. Some positions may require certificate.
821 Supervisors, Logging and Forestry	8211 Supervisors, logging and forestry	56.0	Secondary, post-secondary training, formal company training, on-the-job training, some positions may require license.
822 Supervisors, Mining, Oil and Gas	8221 Supervisors, mining and quarrying 8222 Contractors and supervisors, oil and gas drilling and services	18.5	Secondary, post-secondary training, related industry experience some positions may require certification.
823 Underground Miners, Oil and Gas Drillers and Related Workers	8231 Underground production and development miners 8232 Oil and gas well drillers, servicers, testers and related workers	23.2	Secondary, post-secondary training, formal company training, on-the-job training, some positions may require license or certificate.

NOC Category	Occupations[111]	Employed in BC as of 2012 (thousands)[112]	Education/ Experience
825 Contractors, Operators and Supervisors in Agriculture, Horticulture and Aquaculture	8252 Agricultural service contractors, farm supervisors and specialized livestock workers 8255 Contractors and supervisors, landscaping, grounds maintenance and horticulture services	148.6	Post secondary. Some positions require additional certification.
841 Mine Service Workers and Operators in Oil and Gas Drilling	8411 Underground mine service and support workers 8412 Oil and gas well drilling and related workers and services operators	29.1	Secondary, formal training, on-the-job training, relevant industry experience. Some positions require certificate, license.
843 Agriculture and Horticulture Workers	8431 General farm workers 8432 Nursery and greenhouse workers	266.4	Some secondary, some positions require post secondary, certificate or relevant industry experience.

Table III.2. Average Hourly Wages of Other Occupations Employed in the BC Manufacturing Sector, 2002 to 2012 ($, hourly rate, employees ages 15 and older)

Occupational Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total employees, all occupations	18.6	19.04	19	19.37	19.92	20.48	21.41	22.17	22.78	23.17	23.58
Management Occupations (A)	27.28	28.56	28.15	28.34	30.31	29.26	32.4	33.29	34.47	34.16	35.89
Senior management occupations [A0]	32.94	36.96	37.51	37.89	36.6	33.46	42.04	43.23	40.31	40.03	42.64
Other management occupations [A1-A3]	26.86	27.76	27.23	27.51	29.79	28.86	31.58	32.44	34.03	33.7	35.51
Professional occupations in business and finance [B0]	25.09	25.38	26.29	27.18	27.65	28.4	29.24	29.56	30.54	31.86	32.25
Financial, secretarial and administrative occupations [B1-B3]	18.34	18.61	19.07	18.88	18.89	19.83	20.86	21.87	22.25	22.35	22.77
Clerical occupations, including supervisors [B4-B5]	16.4	16.14	16.37	16.83	17.27	17.36	17.96	18.63	19.35	19.1	19.62
Natural and applied sciences and related occupations [C]	25.76	25.9	24.94	26.18	27.51	28.02	29.12	30.93	31.23	32.79	32.13
Technical, assisting and related occupations in health [D2-D3]	20.39	21.36	21.36	20.9	21.82	22.23	22.57	23.7	23.03	24.19	24.17
Occupations in social science, government service and religion [E0 E2]	21.05	21.83	22.14	22.79	21.49	23.1	23.59	24.65	25.35	25.51	24.68
Sales and service occupations [G] (8)	13.22	13.38	13.31	13.55	13.68	14.32	14.65	15.32	15.7	15.78	16.39
Wholesale, technical, insurance, real estate sales specialists, and retail, wholesale and grain buyers [G1]	18.98	18.86	19.45	19.37	20.75	21.54	20.85	22.61	23.93	24.09	23.96
Retail salespersons, sales clerks, cashiers, including retail trade supervisors [G011 G2-G3]	11.59	12.08	11.95	12.08	12.1	12.71	13.12	13.43	13.73	13.77	14.54
Chefs and cooks, and occupations in food and beverage service, including supervisors [G012 G4-G5]	11.88	11.6	11.75	12.26	11.99	12.45	13.02	13.06	13.17	13.43	14.46
Sales and service occupations not elsewhere classified, including occupations in travel and accommodation, attendants in recreation and sport as well as supervisors [G013-G016 G7 G9]	12.17	12.25	11.99	12.28	12.13	12.9	13.45	13.73	13.8	14.04	14.6
Trades, transport and equipment operators and related occupations [H]	19.8	19.96	19.88	20.18	20.43	21.58	22.55	23.19	24.1	24.42	24.46
Contractors and supervisors in trades and transportation [H0]	24.92	24.44	25.37	24.17	25.57	25.96	28.96	29.29	29.45	30.39	29.72
Construction trades [H1]	18.89	18.81	19.41	18.96	19.66	21.12	21.64	22.25	23	23.3	23.18
Other trades occupations [H2-H5]	21.56	22.16	21.54	22.66	22.54	23.7	24.2	25.61	26.23	26.75	26.38
Transport and equipment operators [H6-H7]	18.31	18.81	18.69	18.94	19.67	20.46	21.94	22.02	22.91	23.3	23.39
Trades helpers, construction, and transportation labourers and related occupations [H8]	16.26	16.31	16.37	16.51	16.85	17.59	18.4	17.94	18.99	19.76	20.77
Occupations unique to primary industry [I]	15.57	16.15	15.83	16.29	16.18	18.51	17.96	19.54	20.5	20.28	20.61
Occupations unique to processing, manufacturing and utilities [J]	17.03	17.72	17.44	17.46	17.83	18.55	19.44	20.28	20.77	20.5	21.21
Machine operators and assemblers in manufacturing, including supervisors [J0-J2]	17.32	18.14	18.15	18.06	18.1	19.05	19.96	21.08	21.61	21.18	21.9
Labourers in processing, manufacturing and utilities [J3]	15.71	16.17	15.04	15.79	17.08	17.19	17.8	17.7	18.04	18.65	19.28

Source: Table 282-0070 Labour force survey estimates (LFS), wages of employees by type of work, National Occupational Classification for Statistics (NOC-S), sex and age group, annual (current dollars)(5,6)

Table III.3. Labour Forecast for Other Occupations Employed in the BC Manufacturing Sector, by NOC Code Category, Year 2020

NOC Category	Demand	Supply	Attributed to Expansion	Attributed to Replacement
001 Legislators and Senior Management	29,587	29,305	159	1,074
011 Administrative Services Managers	22,563	22,346	159	792
021 Managers in Engineering, Architecture, Science and Information Systems	8,998	8,902	77	298
041 Managers in Public Administration	2,148	2,131	15	77
061 Sales, Marketing and Advertising Managers	26,666	26,396	137	883
072 Facility Operation and Maintenance Managers	7,104	7,042	40	248
111 Auditors, Accountants and Investment Professionals	49,247	48,771	228	1,444
112 Human Resources and Business Service Professionals	15,430	15,275	133	432
121 Clerical Supervisors	12,351	12,234	76	436
122 Administrative and Regulatory Occupations	61,489	60,925	438	1,818
123 Finance and Insurance Administrative Occupations	40,565	40,233	169	1,093
124 Secretaries, Recorders and Transcriptionists	40,323	39,965	372	1,185
141 Clerical Occupations, General Office Skills	82,805	82,020	979	2,039
142 Office Equipment Operators	7,930	7,852	62	196
147 Recording, Scheduling and Distributing Occupations	34,588	34,264	41	853
211 Physical Science Professionals	4,591	4,546	71	122
212 Life Science Professionals	7,205	7,159	124	193
213 Civil, Mechanical, Electrical and Chemical Engineers	16,563	16,390	58	447
214 Other Engineers	7,468	7,390	60	201
216 Mathematicians, Statisticians and Actuaries	557	551	381	13
217 Computer and Information Systems Professionals	41,458	41,011	35	948
221 Technical Occupations in Physical Sciences	4,566	4,525	70	100
222 Technical Occupations in Life Sciences	9,068	9,012	20	229
223 Technical Occupations in Civil, Mechanical and Industrial Engineering	6,259	6,203	106	159
224 Technical Occupations in Electronics and Electrical Engineering	15,346	15,212	95	391
225 Technical Occupations in Architecture, Drafting, Surveying and Mapping	9,138	9,051	72	213
228 Technical Occupations in Computer and Information Systems	15,219	15,061	135	331

NOC Category	Demand	Supply	Attributed to Expansion	Attributed to Replacement
512 Writing, Translation and Public Relations Professionals	16,483	16,323	131	408
522 Photographers, Graphic Arts Technicians and Technical an Co-ordinating Occupations	10,402		95	258
523 Announcers and Other Performers	1,833	10,289	12	41
524 Creative Designers and Craftspersons	20,736	1,816	135	476
621 Sales and Service Supervisors	8,371	20,549	123	527
622 Technical Sales Specialists, Wholesale Trade	22,921	22,528	41	198
624 Chefs and Cooks	10,815	22,721	267	854
625 Butchers and Bakers	14,655	45,708	45	237
641 Sales Representatives, Wholesale Trade	126,834	20,113	113	628
666 Cleaners	76,938	76,294	643	340
721 Contractors and Supervisors, Trades and Related Workers	20,657	20,501	-16	228
723 Machinists and Related Occupations	5,037	4,991	19	49
724 Electrical Trades and Telecommunication Occupations	25,803	25,607	18	128
725 Plumbers, Pipefitters and Gas Fitters	14,890	14,779	-40	733
726 Metal Forming, Shaping and Electrical Trades	20,742	20,579	37	362
727 Carpenters and Cabinetmakers	42,946	42,661	-200	483
728 Masonry and Plastering Trades	15,277	15,167	-82	1,007
729 Other Construction Trades	28,282	28,077	-164	341
731 Machinery and Transportation Equipment Mechanics (except motor vehicle)	25,303	25,130	88	622
733 Other Mechanics	4,760	4,724	15	758
734 Upholsterers, Tailors, Shoe Repairers, Jewellers and Related Occupations	5,623	5,572	19	133
735 Stationary Engineers and Power Station and System Operators	2,426	2,407	16	170
738 Printing Press Operators, Commercial Drivers, and other Trades and Related Occupations	4,667	4,630	23	66
741 Motor Vehicle and Transit Drivers	77,159	76,537	438	136
742 Heavy Equipment Operators	16,596	16,507	43	2,053
821 Supervisors, Logging and Forestry	1,719	1,713	18	112
822 Supervisors, Mining, Oil and Gas	1,442	1,436	15	52
823 Underground Miners, Oil and Gas Drillers and Related Workers	1,785	1,779	15	45
825 Contractors, Operators and Supervisors in Agriculture, Horticulture and	21,535	21,419	-65	114

NOC Category	Demand	Supply	Attributed to Expansion	Attributed to Replacement
Aquaculture				
841 Mine Service Workers and Operators in Oil and Gas Drilling	1,220	1,216	18	61
842 Logging and Forestry Workers	4,050	4,035	29	17

Appendix IV: Survey Results Data Tables

Table IV.1. Summary of Survey Results by Region of Operations

Characteristic	Region				Total
	Lower Mainland	Vancouver Island	Southern Interior	Northern Interior	
Level of Employment					
Number of Employers Surveyed	310	114	123	34	557
Median Years in Operation	Over 20	Over 20	Over 20	Over 20	Over 20
Percent of Employers Unionized	18.9%	14.3%	6.1%	23.1%	13.7%
Average Number of Employees	79.9	48.6	43.5	70.2	61.0
Level of staff turnover	14.1%	9.6%	13.9%	18.7%	13.8%
Growth in Employment Over the Past 5 Years	22.2%	-19.0%	6.8%	67.4%	19.4%
Projected Growth – Next 3 Years	10.6%	10.3%	20.2%	12.8%	12.9%
Primary Sources of New Employees					
Working for another employer in same region and sector	33.0%	32.3%	24.0%	25.8%	28.8%
Working for an employer in another sector	22.6%	24.0%	21.4%	14.5%	21.9%
Working for an employer in another region	6.3%	12.2%	10.4%	3.2%	7.7%
Unemployed at the time they were hired	25.5%	22.7%	32.6%	36.7%	29.6%
Just entering or re-entering the work force	12.7%	8.8%	11.7%	19.8%	11.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Skill Shortages (% very difficult to fill)					
Senior management	14.5%	19.8%	12.3%	17.2%	15.3%
Sales & customer service	6.8%	7.8%	10.4%	3.4%	7.9%
Logistics (distribution, tracking and scheduling)	2.0%	3.3%	7.8%	3.4%	3.8%
Administration	1.9%	1.1%	8.6%	0%	3.2%
Production supervisors	13.0%	14.1%	16.7%	10.3%	14.3%
Engineers	13.5%	13.3%	9.5%	27.6%	12.5%
Technicians	11.8%	10.6%	14.3%	24.1%	12.6%
Journeypersons	18.0%	12.2%	25.7%	43.3%	20%
Machine operators and assemblers	8.7%	5.5%	14%	17.2%	10.2%
Labourers	2.4%	5.4%	9.3%	6.9%	4.5%
Areas Where Applicants Commonly Fall Short					
Education, training or certifications required	35.5%	31%	41.2%	48%	27.5%
Level of work experience	63.2%	63.1%	66%	68%	47.6%
Experience in/familiarity with your specific type of operation	76.2%	78.6%	67%	64%	55.1%
Willingness and ability to work with or manage people	33.3%	31%	30.9%	20%	23.2%
Communication skills	41.1%	35.7%	38.1%	20%	27.6%
Other essential skills (reading, writing, numeracy, etc.)	19.9%	21.4%	23.7%	12%	15.1%

Characteristic	Region				Total
Willingness and ability to learn on the job	31.2%	34.5%	35.1%	28%	24.2%
Attitude or commitment towards work	54.1%	59.5%	60.8%	64%	42.4%
Factors Contributing To Shortages (% identified as a major reason)					
Many of the skilled workers in these positions are nearing retirement	20.2%	15.1%	19.4%	40.9%	19.2%
There are few people being educated or trained in BC for this type of position	33.9%	26.9%	31.6%	47.8%	32.5%
There is little or no relevant education or training available in the regions close to our operations	22.6%	20.2%	28.3%	28.6%	23.8%
The cost of the available training is high	11.5%	10.2%	17.8%	23.8%	13.8%
The existing training or education is not very applicable to our type of operation	20.5%	22.8%	20.4%	31.8%	21.4%
The quality of training or education is not very high	9.8%	11.8%	6.7%	0%	9%
The skills and experience of the available candidates do not transfer well to our type of operation	13.4%	16.9%	11.7%	21.1%	14.3%
Workers from outside of BC have the necessary skills but have difficulty getting those skills recognized	6.0%	11.4%	4.3%	10%	7.1%
There is a general shortage of workers available	22.1%	17.2%	34.4%	36.4%	24.6%
While there are people with these skills available, it is difficult to attract them to our operation	16.5%	13.3%	29.2%	23.8%	19.7%
Training					
Expenditures on training (median)	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%
Effectiveness of training (average rating)	3.5	3.3	3.5	3.8	3.4
Use of Tradespersons					
% Reporting Tradespeople	55.8%	40.4%	51.9%	63.6%	51.0%
Average Number of Journeyperson Per Employers Having Trades	29.0	27.1	8.8	18.4	19.0
% of Journeypersons Credentialed When Hired	78.0%	67.1%	62.1%	53.4%	74.7%
% of Employers With Journeyperson Reporting Apprentices	70.8%	65.5%	50.0%	58.3%	63.0%
Production Workers					
As a % of total number of workers	58.5%	54.8%	73.4%	57.0%	62.2%
Average years of experience	13.4	19.1	9.2	15.2	13.1
Characteristics of Workers					
Employed on a permanent full-time basis?	93.9%	97.2%	91.8%	89.9%	93.7%
Under the age of 35?	30.2%	26.4%	41.4%	38.1%	32.8%
55 years or older?	27.0%	27.4%	17.8%	18.2%	23.9%
Women?	19.4%	16.2%	17.5%	24.8%	19.2%
Aboriginal?	3.0%	1.8%	4.4%	9.8%	3.7%
Recent immigrants who moved to Canada in the past 5 years	9.3%	5.7%	1.6%	1.3%	7.7%
Employees who commonly work in a language other than English?	14.8%	6.6%	1.1%	0.0%	10.9%
University Educated	17.9%	12.0%	7.0%	10.7%	14.9%
Professionally Credentialed	16.1%	12.3%	8.8%	16.5%	14.8%

Table IV.2. Summary of Survey Results by Size of Employer

Characteristic	Number of Employees						Total
	0-4	5-9	10-19	20-49	50-99	100 & more	
Level of Employment							
Number of Employers Surveyed	104	80	120	128	60	65	557
Median Years in Operation	15 to 20 years	15 to 20 years	15 to 20 years	Over 20 years	Over 20 years	Over 20 years	Over 20 years
Percent Unionized	0%	2.2%	7.7%	10.7%	21.4%	59%	13.7%
Average Number of Employees	2.2	6.7	13.5	31.0	66.4	363.7	61.0
Level of staff turnover	11.5%	12.1%	10.7%	12.6%	11.6%	15.3%	13.8%
Growth in Employment Over the Past 5 Years	-36.4%	-1.6%	7.8%	3.2%	13.0%	26.5%	19.4%
Projected Growth – Next 3 Years	63.4%	35.3%	24.9%	18.7%	20.8%	8.5%	12.9%
Distribution By Region							
Vancouver Island	26.9%	12.5%	21.7%	22.7%	18.3%	15.4%	20.5%
Lower Mainland	41.3%	58.8%	50.8%	56.2%	61.7%	76.9%	55.7%
Southern Interior	26%	25%	23.3%	21.2%	20%	13.8%	22.1%
Northern Interior	7.7%	6.2%	5%	5.5%	5%	7.7%	6.1%
Primary Sources of New Employees							
Working for another employer in same region and sector	22.2%	23.2%	30.1%	21.7%	26.5%	34.0%	28.8%
Working for an employer in another sector	16.7%	28.0%	11.5%	26.8%	18.5%	23.7%	21.9%
Working for an employer in another region	5.6%	8.5%	7.8%	9.3%	5.4%	8.2%	7.7%
Unemployed at the time they were hired	38.9%	29.3%	34.9%	25.9%	38.2%	25.1%	29.6%
Just entering or re-entering the work force	16.7%	11.0%	15.6%	16.3%	11.4%	9.0%	11.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Skill Shortages (% very difficult to fill)							
Senior management	7.1%	10%	10.6%	19.1%	30.9%	18.3%	15.3%
Sales & customer service	5.5%	6.7%	4%	11.4%	16.4%	5%	7.9%
Logistics (distribution, tracking and scheduling)	2.2%	1.8%	3.2%	6.9%	3.8%	3.3%	3.8%
Administration	4.7%	0%	3.1%	4.6%	3.7%	1.6%	3.2%
Production supervisors	6.9%	15.3%	17.2%	12.8%	18.5%	18%	14.3%
Engineers	5.7%	1.7%	8.8%	14%	23.1%	26.2%	12.5%
Technicians	5.7%	8.3%	14%	15.9%	11.1%	20%	12.6%
Journeypersons	6.7%	13.1%	16.5%	20%	34.5%	39%	20%
Machine operators and assemblers	5.7%	8.8%	12.4%	11.5%	5.6%	16.7%	10.2%
Labourers	2.4%	7.1%	9.1%	3.6%	1.8%	1.7%	4.5%
Areas Where Applicants Commonly Fall Short							
Education, training or certifications required	51.1%	34.5%	35.6%	33.3%	30.4%	43.1%	27.5%
Level of work experience	66.7%	65.5%	58.9%	62.2%	69.6%	65.5%	47.6%
Experience in/familiarity with your specific type of operation	100%	70.9%	71.1%	64.9%	75%	77.6%	55.1%
Willingness and ability to work with or manage people	40%	34.5%	42.2%	21.6%	21.4%	31%	23.2%

Characteristic	Number of Employees						Total
	0-4	5-9	10-19	20-49	50-99	100 & more	
Communication skills	46.7%	36.4%	33.3%	40.5%	25%	41.4%	27.6%
Other essential skills (reading, writing, numeracy, etc.)	26.7%	25.5%	25.6%	16.2%	14.3%	15.5%	15.1%
Willingness and ability to learn on the job	51.1%	49.1%	41.1%	25.2%	10.7%	24.1%	24.2%
Attitude or commitment towards work	86.7%	60%	64.4%	45%	50%	48.3%	42.4%
Factors Contributing To Shortages (% identified as a major reason)							
Many of the skilled workers in these positions are nearing retirement	12.1%	18.4%	14.4%	18.6%	20.4	36.4%	19.2%
There are few people being educated or trained in BC for this type of position	31.3%	32%	36.8%	23.8%	49%	29.6%	32.5%
There is little or no relevant education or training available in the regions close to our operations	24.2%	28.3%	27.1%	25.5%	23.4%	11.3%	23.8%
The cost of the available training is high	11.9%	22.4%	13.8%	14.7%	14.3%	5.8%	13.8%
The existing training or education is not very applicable to our type of operation	25.4%	22.4%	20%	21.6%	27.5%	11.3%	21.4%
The quality of training or education is not very high	11.7%	13%	11.9%	8.1%	8.2%		9%
The skills and experience of the available candidates do not transfer well to our type of operation	15.9%	6.4%	19.5%	14%	10.2%	15.1%	14.3%
Workers from outside of BC have the necessary skills but have difficulty getting those skills recognized	4.9%	10.9%	11.6%	6.1%		7.4%	7.1%
There is a general shortage of workers available	15.6%	28.6%	23.8%	19.8%	28%	38.2%	24.6%
While there are people with these skills available, it is difficult to attract them to our operation	21%	19.6%	20.2%	17.5%	18.8%	22.2%	19.7%
Training							
Expenditures on training (median)	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%
Effectiveness of training (average rating)	3.4	3.4	3.5	3.4	3.5	3.4	3.4
Use of Tradespersons							
% Reporting Tradespeople	22.8%	29.3%	47.3%	59.3%	72.1%	82.1%	51.0%
Average Number of Journeyperson Per Employer Having Trades	1.1	2.6	4.4	6.7	9.3	66.7	19.0
% of Journeypersons Credentialed When Hired	71.4%	71.4%	56.2%	60.3%	70.0%	78.5%	74.7%
% of Employers With Journeyperson Reporting Apprentices	57.1%	25.0%	70.8%	51.4%	65.4%	81.5%	63.0%
Production Workers							
As a % of total	72.1%	60.4%	66.7%	61.3%	59.4%	62.7%	62.2%
Average years of experience	13.1	10.8	9.9	10.0	9.8	15.1	13.1
Characteristics of Workers							
Employed on a permanent full-time basis?	76.4%	76.7%	89.8%	92.1%	94.4%	95.0%	93.7%
Under the age of 35?	29.4%	31.8%	36.6%	37.0%	44.8%	28.2%	32.8%
55 years or older?	50.0%	23.3%	20.4%	18.6%	18.4%	26.8%	23.9%
Women?	39.7%	31.2%	21.3%	20.3%	18.1%	18.4%	19.2%
Aboriginal?	3.4%	3.2%	3.0%	1.9%	3.2%	4.4%	3.7%
Recent immigrants who moved to Canada in the past 5 years	3.2%	8.4%	3.4%	6.0%	8.0%	8.7%	7.7%
Employees who commonly work in a language other than English?	9.3%	8.3%	4.0%	7.5%	8.2%	13.5%	10.9%

Characteristic	Number of Employees						Total
	0-4	5-9	10-19	20-49	50-99	100 & more	
University Educated	25.4%	18.2%	12.8%	15.6%	18.7%	13.6%	14.9%
Professionally Credentialed	34.6%	14.5%	14.0%	13.9%	16.4%	14.4%	14.8%

Table IV.3. Summary of Survey Results by Sector (Table 1 of 2)

Characteristic	Sector (Table 1 of 2)					All
	Food & Beverage	Wood Products	Plastics & Rubber	Metal & Non-metallic Prod.	Fabricated Metal	
Level of Employment						
Number of Employers Surveyed	75	63	21	31	101	557
Median Years in Operation	15 to 20 years	Over 20 years	Over 20 years	Over 20 years	Over 20 years	Over 20
Percent Unionized	3.6%	14%	14.3%	23.3%	25.5%	13.7%
Average Number of Employees	43.1	75.0	24.7	61.0	53.7	61.0
Level of staff turnover	25.9%	16.7%	8.8%	11.3%	10.1%	13.8%
Growth in Employment Over the Past 5 Years	27.0%	7.7%	4.8%	1.8%	25.4%	19.4%
Projected Growth – Next 3 Years	17.6%	8.0%	8.0%	19.4%	20.3%	12.9%
Distribution By Region						
Vancouver Island	24.4%	20.9%	23.5%	17.1%	17.5%	20.5%
Lower Mainland	42.2%	41.8%	64.7%	51.2%	59.5%	55.7%
Southern Interior	34.4%	28.6%	8.8%	24.4%	22.2%	22.1%
Northern Interior	3.3%	13.2%	2.9%	12.2%	4.8%	6.1%
Primary Sources of New Employees						
Working for another employer in same region and sector	19.7%	21.0%	17.7%	24.3%	33.6%	28.8%
Working for an employer in another sector	17.3%	26.3%	38.0%	33.6%	19.8%	21.9%
Working for an employer in another region	4.0%	7.9%	2.5%	5.0%	9.5%	7.7%
Unemployed at the time they were hired	37.5%	37.3%	32.9%	30.7%	26.6%	29.6%
Just entering or re-entering the work force	21.5%	7.5%	8.9%	6.4%	10.5%	11.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Skill Shortages (% very difficult to fill)						
Senior management	17.1%	16.7%	14.3%	5.7%	16.5%	15.3%
Sales & customer service	7.9%	6.3%	11.1%	2.8%	7%	7.9%
Logistics (distribution, tracking and scheduling)	7.8%	2.6%	3.7%	5.7%	3.8%	3.8%
Administration	9.2%	5.2%	0%	5.4%	2.8%	3.2%
Production supervisors	20.3%	12.7%	32.1%	2.9%	16%	14.3%
Engineers	8.1%	6.5%	11.5%	17.1%	17.9%	12.5%
Technicians	11.7%	13%	18.5%	5.7%	13.3%	12.6%
Journeypersons	15.6%	25.3%	7.4%	8.3%	30.3%	20%
Machine operators and assemblers	7.7%	9.8%	8%	8.6%	13.5%	10.2%

Characteristic	Sector (Table 1 of 2)					All
	Food & Beverage	Wood Products	Plastics & Rubber	Metal & Non-metallic Prod.	Fabricated Metal	
Labourers	8.6%	9.9%	3.4%	3%	1.8%	4.5%
Areas Where Applicants Commonly Fall Short						
Education, training or certifications required	32%	42.9%	28.6%	25.8%	45.5%	27.5%
Level of work experience	54.7%	76.2%	81%	64.5%	76.2%	47.6%
Experience in/familiarity with your specific type of operation	64%	66.7%	95.2%	103.2%	73.3%	55.1%
Willingness and ability to work with or manage people	33.3%	28.6%	33.3%	41.9%	42.6%	23.2%
Communication skills	30.7%	33.3%	42.9%	51.6%	45.5%	27.6%
Other essential skills (reading, writing, numeracy, etc.)	17.3%	17.5%	33.3%	29%	26.7%	15.1%
Willingness and ability to learn on the job	37.3%	38.1%	47.6%	41.9%	36.6%	24.2%
Attitude or commitment towards work	57.3%	66.7%	71.4%	80.6%	66.3%	42.4%
Factors Contributing To Shortages (% identified as a major reason)						
Many of the skilled workers in these positions are nearing retirement	16.4%	17.6%	20%	6.1%	19.4%	19.2%
There are few people being educated or trained in BC for this type of position	32.8%	32.4%	46.2%	25.8%	37.3%	32.5%
There is little or no relevant education or training available in the regions close to our operations	18.8%	22.2%	56%	34.4%	21.1%	23.8%
The cost of the available training is high	8.1%	20.6%	8.7%	17.6%	14.8%	13.8%
The existing training or education is not very applicable to our type of operation	24.2%	10.9%	34.6%	24.2%	20.95	21.4%
The quality of training or education is not very high	4.9%	8.1%	24%	12.1%	13.9%	9%
The skills and experience of the available candidates do not transfer well to our type of operation	22.2%	13.8%	12%	21.9%	12.1%	14.3%
Workers from outside of BC have the necessary skills but have difficulty getting those skills recognized	11.3%	9.2%	4.3%	3%	4.7%	7.1%
There is a general shortage of workers available	23.1%	36.8%	12.55	26.5%	30.8%	24.6%
While there are people with these skills available, it is difficult to attract them to our operation	19.7%	24.2%	23.1%	27.8%	15.6%	19.7%
Training						
Expenditures on training (median)	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%
Effectiveness of training (average rating)	3.5	3.4	3.2	3.4	3.5	3.4
Use of Tradespersons						
% Reporting Tradespeople	28.8%	54.7%	50.0%	50.0%	74.7%	51.0%
Average Number of Journeypersons Per Employer Having Trades	2.0	6.5	3.9	15.4	17.4	19.0
% of Journeypersons Credentialed When Hired	87.5%	58.5%	61.8%	92.2%	68.6%	74.7%
% of Employers With Journeypersons Reporting Apprentices	50.0%	73.7%	44.4%	40.0%	66.0%	63.0%
Production Workers						
As a % of total	67.3	74.0	66.4	65.7	66.2	62.2%
Average years of experience	9.0	16.1	7.7	10.1	11.7	13.1
Characteristics of Workers						
Employed on a permanent full-time basis?	73.4%	96.7%	95.6%	94.8%	95.4%	93.7%
Under the age of 35?	36.2%	32.8%	35.2%	33.9%	37.1%	32.8%

Characteristic	Sector (Table 1 of 2)					All
	Food & Beverage	Wood Products	Plastics & Rubber	Metal & Non-metallic Prod.	Fabricated Metal	
55 years or older?	20.3%	21.2%	24.5%	22.4%	21.5%	23.9%
Women?	49.9%	13.9%	27.0%	9.4%	13.7%	19.2%
Aboriginal?	4.2%	7.7%	3.1%	2.2%	2.8%	3.7%
Recent immigrants who moved to Canada in the past 5 years	15.1%	3.7%	7.2%	5.7%	6.6%	7.7%
Employees who commonly work in a language other than English?	21.1%	5.2%	16.1%	18.6%	8.3%	10.9%
University Educated	13.8%	10.1%	9.5%	19.6%	12.4%	14.9%
Professionally Credentialed	7.8%	8.6%	7.5%	14.5%	14.1%	14.8%

Table IV.3. Summary of Survey Results by Sector (Table 2 of 2)

Characteristic	Sector (Table 1 of 2)					All
	Machinery	Computer & Electronic	Electrical Equipment	Transportation Equipment	Other (NES)	
Level of Employment						
Number of Employers Surveyed	45	31	27	27	57	557
Median Years in Operation	Over 20 years	15 to 20 years	15 to 20 years	Over 20 years	Over 20 years	Over 20 years
Percent Unionized	26.7%	0%	3.6%	21.4%	7%	13.7%
Average Number of Employees	47.8	22.8	52.7	181.7	78.6	61.0
Level of staff turnover	7.2%	10.4%	9.0%	17.3%	14.7%	13.8%
Growth in Employment Over the Past 5 Years	40.5%	30.7%	52.6%	202.7%	-13.4%	19.4%
Projected Growth – Next 3 Years	25.2%	43.9%	22.3%	9.6%	1.3%	12.9%
Distribution By Region						
Vancouver Island	19%	18.4%	27.6%	12.1%	23.7%	20.5%
Lower Mainland	63.8%	76.3%	62.1%	63.6%	65.65	55.7%
Southern Interior	17.2%	10.5%	13.8%	21.2%	9.7%	22.1%
Northern Interior	10.3%	0%	3.4%	12.1%	4.3%	6.1%
Primary Sources of New Employees						
Working for another employer in same region and sector	24.9%	20.8%	35.3%	41.5%	39.3%	28.8%
Working for an employer in another sector	28.4%	30.2%	19.9%	22.0%	19.1%	21.9%
Working for an employer in another region	4.9%	8.3%	10.8%	6.3%	8.8%	7.7%
Unemployed at the time they were hired	28.9%	27.1%	22.0%	20.1%	24.6%	29.6%
Just entering or re-entering the work force	12.9%	13.5%	12.0%	10.2%	8.2%	11.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Skill Shortages (% very difficult to fill)						
Senior management	16.3%	29%	16.7%	10%	12.3%	15.3%
Sales & customer service	13.7%	12.5%	25%	6.7%	10%	7.9%
Logistics (distribution, tracking and scheduling)	2%	3.6%	5.3%	3.3%	4.1%	3.8%
Administration	2%	3.2%	13.6%	3.3%	1.4%	3.2%

Characteristic	Sector (Table 1 of 2)					All
	Machinery	Computer & Electronic	Electrical Equipment	Transportation Equipment	Other (NES)	
Production supervisors	9.8%	13.8%	15%	3.4%	12.3%	14.3%
Engineers	22.4%	21.95	29.65	20%	5.6%	12.5%
Technicians	17%	6.1%	30.8%	20%	8.1%	12.6%
Journeypersons	36.7%	6.9%	25%	22.6%	11.8%	20%
Machine operators and assemblers	16.7%	0%	8.7%	17.2%	11%	10.2%
Labourers	0%	0%	69%	0%	5.3%	4.5%
Areas Where Applicants Commonly Fall Short						
Education, training or certifications required	40%	32.3%	48.1%	44.4%	40.4%	27.5%
Level of work experience	88.9%	58.1%	59.3%	74.1%	49.1%	47.6%
Experience in/familiarity with your specific type of operation	75.65	77.4%	59.3%	63%	71.9%	55.1%
Willingness and ability to work with or manage people	26.7%	19.4%	22.2%	40.7%	29.8%	23.2%
Communication skills	37.8%	38.7%	37%	44.4%	42.1%	27.6%
Other essential skills (reading, writing, numeracy, etc.)	20%	32.3%	14.8%	14.8%	17.5%	15.1%
Willingness and ability to learn on the job	26.7%	22.6%	25.9%	33.3%	35.1%	24.2%
Attitude or commitment towards work	51.1%	38.7%	29.6%	63%	49.1%	42.4%
Factors Contributing To Shortages (% identified as a major reason)						
Many of the skilled workers in these positions are nearing retirement	29.2%	16%	14.85	24.1%	22.2%	19.2%
There are few people being educated or trained in BC for this type of position	34.7%	44%	33.3%	27.6%	24.5%	32.5%
There is little or no relevant education or training available in the regions close to our operations	26.1%	20.8%	26.9%	20.7%	16%	23.8%
The cost of the available training is high	12.8%	11.1%	11.1%	21.4%	9.8%	13.8%
The existing training or education is not very applicable to our type of operation	16.7%	23.1%	33.3%	3.3%	23.1%	21.4%
The quality of training or education is not very high	6.7%	4.2%	7.4%	13.8%	8.2%	9%
The skills and experience of the available candidates do not transfer well to our type of operation	4%	15.4%	18.5%	6.9%	13.7%	14.3%
Workers from outside of BC have the necessary skills but have difficulty getting those skills recognized	6.4%	8%	0%	0%	9.8%	7.1%
There is a general shortage of workers available	29.2%	12.5%	16%	27.6%	18%	24.6%
While there are people with these skills available, it is difficult to attract them to our operation	18.8%	7.7%	14.8%	17.2%	21.2%	19.7%
Training						
Expenditures on training (median)	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%	1% to 3%
Effectiveness of training (average rating)	3.8	3.4	3.4	3.3	3.4	3.4
Use of Tradespersons						
% Reporting Tradespeople	69.0%	25.0%	46.4%	52.0%	40.5%	51.0%
Average Number of Journeypersons Per Employer Having Trades	37.9	5.8	26.6	27.5	33.9	19.0
% of Journeypersons Credentialed When Hired	80.2%	51.9%	51.0%	66.7%	76.4%	74.7%
% of Employers With Journeypersons Reporting Apprentices	82.6%	80.0%	66.7%	61.5%	73.3%	63.0%

Characteristic	Sector (Table 1 of 2)					All
	Machinery	Computer & Electronic	Electrical Equipment	Transportation Equipment	Other (NES)	
Production Workers						
As a % of total	53.5%	36.9%	40.5%	46.8%	63.2%	62.2%
Average years of experience	11.9	7.7	7.3	14.1	12.2	13.1
Characteristics of Workers						
Employed on a permanent full-time basis?	98.0%	96.9%	97.2%	91.5%	97.3%	93.7%
Under the age of 35?	33.4%	45.7%	36.1%	32.0%	22.1%	32.8%
55 years or older?	23.5%	19.3%	18.4%	21.9%	35.3%	23.9%
Women?	10.5%	17.9%	17.1%	17.2%	20.9%	19.2%
Aboriginal?	3.5%	0.5%	0.6%	2.0%	2.5%	3.7%
Recent immigrants who moved to Canada in the past 5 years	4.6%	10.3%	6.7%	17.5%	5.6%	7.7%
Employees who commonly work in a language other than English?	3.6%	4.2%	5.6%	25.9%	10.5%	10.9%
University Educated	13.0%	43.7%	22.0%	27.0%	14.7%	14.9%
Professionally Credentialed	24.5%	34.8%	20.2%	23.2%	7.9%	14.8%

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