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Applied Science
Technologists & Technicians
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ASTT technology professionals™

Technology Skills 2020

An HR Strategy for BC

SEPTEMBER 7, 2007

PREPARED BY:

APPLIED SCIENCE TECHNOLOGISTS & TECHNICIANS OF BRITISH COLUMBIA

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A BRITISH COLUMBIA TECHNOLOGY HUMAN RESOURCES STRATEGY

PREFACE

The Applied Science Technologists and Technicians of British Columbia (ASTTBC) believes our provincial economy is facing a crisis of skill and labour shortages across many industries and regions of the province. This challenge is no longer "looming" as many industries are in the midst of serious and difficult-to-fill vacancies in key skilled positions. While action is being taking on many fronts, many stakeholders are ignoring the shortages of technology workers – particularly technologists, technicians and technical specialists. This "invisible" part of BC's human resources is a key factor in the economic growth of resource, construction and technology industries as well as municipal governments, safety regulation and utilities.

Since 2005, ASTTBC has been raising this issue with employers, regional economic groups, policy-makers, educators and others. The time is now…action is needed now to avert a technology worker shortage that negatively impacts our province and many communities.

ASTTBC has worked with industry groups, employers, government leaders, education and training representatives and other groups to develop a long-term *Technology Human Resources Strategy: Technology Skills 2020*. This is a product of work over the last few years.

We want to use this to communicate a vision and plan of action and to engage partners to work with ASTTBC to implement this strategy in a timely manner. This is an urgent matter. We need your attention and assistance.

Please review this strategy document and join our drive to finalize and implement it as soon as possible.

Sincerely,

John E. Leech, AScT CAE
Executive Director
Applied Science Technologists and Technicians of British Columbia

SUMMARY

INTRODUCTION AND BACKGROUND

While technology careers (see definition on Page 1 in the main body of this report) represent a critical part of BC's occupational stratum, these careers are often invisible in terms of media coverage and attention by business groups, policy-makers, teachers and counselors and the general public. In the last decade, trades career advocates have done an effective job of creating awareness and interest in skilled trades. It is time for technology careers to be seen to play a more prominent role in building BC's economy.

Technology is a major facet of all aspects of a modern economy, and the demand for technologists and technicians in BC will only continue to increase. However, there is a serious disconnect between this rising demand and the public's awareness of these careers and of youth entering these fields of study. Just as employers are demanding more trained professionals, our post-secondary technology programs are closing due to low enrolments and increasing costs. According to a recent newspaper column, while 35,000 new jobs in information and communications technology alone will need to be filled each year in our country, Canadian schools only produce 7,000 graduates in these fields annually. Between 2000 and 2005, the number of computer science graduates in Canada dropped 70%.

There are an estimated 150,000 technology workers in British Columbia; an important component of this workforce is an estimated 50,000 technologists, technicians and technical specialists. Technology workers contribute significantly to the regulation and promotion of public and worker safety, building our provincial infrastructure and constructing all types of buildings, forest/mineral/other resource management, advanced manufacturing, and the design and use of state-of-the-art technology.

It has become abundantly clear to the ASTTBC that BC faces a major challenge in the availability of trained and experienced technology workers. Virtually every day our news media reports on the evidence and impacts of skill and labour shortages in various industries and occupations throughout BC. Our province faces a crisis in its workforce – a crisis brought on by converging economic and demographic trends. In the next few years:

- Almost half of the current technology workers will retire as the oldest baby boomers start to leave the workforce.
- The BC and Canadian economies are forecast to grow steadily, led by the high tech sector and technology-based products and services.
- The 2010 Winter Games, construction and real estate development, mining and resource projects, and the growth of our cities and population, have and will create a surge in demand for trained and qualified workers.
- By 2010, there is projected to be a 70% shortfall in the supply of needed supervisors, managers and contractors in technology roles.

The challenge for industry, educators, professionals and government and other stakeholders is to ensure: people interested in technology careers are informed of the opportunities that exist; post secondary training and professional certification are available; and employers have access to the trained and certified professionals they need to compete in a global marketplace.

Before laying out labour supply challenges and outlining a long-term human resource plan, this document summarizes the context for the Strategy, including an overview of ASTTBC, the scope of technology careers, technology HR demand in the BC labour market, and the impact of technology workers on the BC economy. It also highlights key public policy developments such as Campus 2020, WorkBC, the BC Small Business Roundtable, and relevant federal initiatives.

KEY ISSUES AND CHALLENGES

The Strategy identifies the following issues regarding technology human resources:

1. Skills shortages in technology and technical professions
2. The lack of a strategic direction for technology education in BC
3. The need for clear technology education leadership
4. Little useful technology occupation labour market demand and supply information
5. Lack of integration of and growth in technology education programs
6. Inadequate high school technology career preparation programs and teaching
7. Limited recruitment and retention capacity among small and medium-sized enterprises and few incentives for employers to hire and train technical graduates and workers
8. Minimal, uncoordinated promotion of technology careers and education
9. Lack of a clear mandate for BC polytechnics
10. Low rate of participation and success in technology education and careers among Aboriginal People
11. Low rate of participation and career advancement for women in some technology education and careers
12. Under-utilization ("skills wastage") of internationally trained professionals
13. Lack of access to part-time and other flexible education and training models

A TECHNOLOGY HUMAN RESOURCES STRATEGY – "TECHNOLOGY SKILLS 2020"

BC needs the participation of industry leaders and stakeholder representatives willing to invest the time, money and effort needed to build and implement a comprehensive broad strategic plan and supporting infrastructure required to ensure that BC employers have a sufficient supply of qualified technology professionals well into the future.

If we collectively are bold in our approach and come together to create a comprehensive strategy, we can open a world of opportunities for British Columbians looking for long term career success. It is time for a concrete action plan and a comprehensive approach to promoting and building careers in technology. BC needs the commitment and participation of associations, employers, government, educators, and individual technology workers who will come together to champion the cause and implement the proposed strategies.

The Vision for a Technology HR Strategy is:

> *"A growing, diverse and sustainable British Columbia economy supported by well-trained, qualified and fully-engaged technology workers and a responsive, flexible education and training system."*

This Technology Human Resources Strategy will be implemented in a way that emphasizes and reflects the following principles or values:

- Comprehensiveness in scope and breath of industries, occupations and solutions;
- Focusing on both short and long term strategies;
- Leadership by industry, professionals, governments and educators;
- Partnerships among stakeholders;
- Matching labour market demand and supply;
- Flexible design and delivery of education and training programs;
- Sectorally and regionally sensitive strategies; and,
- Clear roles and responsibilities among stakeholders.

The development and implementation of a Technology Human Resources Strategy will achieve the following long-term goals over the next three to five years:

1. British Columbia leads in technology human resources development in Canada and internationally.
2. Technology careers are 'top of mind' among British Columbian youth and their influencers (i.e. parents, educators, peers).
3. The Technology Education & Careers Council (TECC) provides strategic leadership, guiding and directing BC's technology education system.
4. BC's post-secondary education system provides a balance of programming throughout BC, graduating an optimal supply of technology workers.
5. Unemployed persons and under-utilized labour force groups are full participants in technology careers and education and training.
6. Current technology human resource and labour market information guides strategic decision-making for technology education and careers.
7. Technology professionals in BC are qualified, registered and accountable through professional registration, and enabled and fully recognized by government.
8. Internationally trained professionals are fully integrated into careers and within BC through an effective technology professional foreign credential recognition process.
9. An innovative human resource management initiative assists small and medium-sized businesses in BC to hire, mentor and retain technology workers.

The specific strategy and priority areas in the Strategy are:

1. Technology human resources leadership
   - ◆ Strategic Direction for Technology HR in BC
   - ◆ Technology Education Leadership – A "Technology Education and Careers Council"
   - ◆ Governance of BC Colleges, Institutes and University Colleges
2. Promotion of technology careers
3. Technology education and training programs throughout BC
   - ◆ Implementation of Campus 2020 Recommendations
   - ◆ Expansion and Rationalization of Technology Education Programs
   - ◆ Expansion of High School Technology Career Preparation Programs
   - ◆ Broadening the Polytechnic Concept in British Columbia
   - ◆ Lifelong Technology Learning
4. Technology human resource labour market information
5. Certified technologists and technicians and foreign credential recognition
6. SME recruitment and retention

7. Under-Represented Labour Force Groups
   - ◆ Aboriginal People and Communities in Technology Careers and Education
   - ◆ Women in Technology Careers and Education

The Technology HR Strategy also includes implementation considerations such as roles of key Strategy participants (i.e. employers, industry groups, policy-makers, and educators), partnership/sponsorship resources, and timelines. The intent is to complete and implement this Strategy by late 2007.

NEXT STEPS

This Technology Human Resources Strategy incorporates the findings of the 2005 Building Technology Careers conference, discussions with various stakeholders, and the June 19, 2007 Roundtable on Technology Skills Shortage: Industry Takes Action. The Strategy was released as a discussion paper with key stakeholder groups during the summer, and then finalized and implemented at an October 31, 2007 Roundtable during National Technology Week. The input-gathering steps to finalize the Strategy may also include a survey of technology employers and workers.

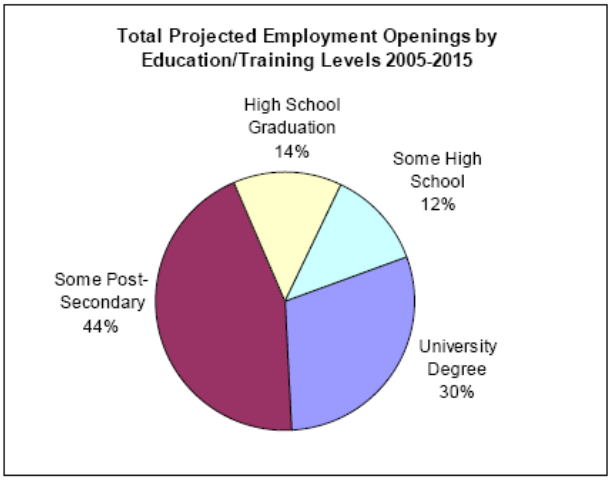
While the strategy is gathering input and being finalized over the coming months, ASTTBC will proceed with the implementation of short-term steps to establish momentum for this plan. These short-term steps are incorporated into the long-term Technology HR Plan:

1. Establish a Technology Education & Careers Council of senior industry and employer representatives and other stakeholders to oversee and champion this Action Plan.
2. Develop and implement a Technology Human Resource Strategy… Technology Talent 2O2O.
3. Sponsor and resource a Technology Skills Roundtable on October 31, 2007, during National Technology Week.
4. Champion for and develop a Technology Skills Advanced Education Strategy that includes targeted spaces and initiatives for technology programs in public post secondary colleges, institutes and university colleges.
5. Initiate programming in K – 12 to enhance awareness of, and participation in, technology education and careers.
6. Partner with governments to initiate a Technology Skills Labour Market Information Project to develop provincial, regional and sectoral labour market demand and supply projections for technology occupations.
7. Partner with governments to initiate a Technology Skills Foreign Credential Assessment, Recognition & Mentoring Demonstration Project.
8. Oversee the development of a package… Practical HR Tools for Small & Medium-Sized Businesses …to recruit, mentor and retain technology professionals.
9. Partner with governments to pilot test a program to support lifelong learning for and retention of mid-career and older technology professionals.
10. Initiate a program to engage under-utilized labour force groups, including women, First Nations and British Columbians with disabilities.

CONTENTS

1. THE "INVISIBLE" OCCUPATION

From aviation to electronics, construction to manufacturing, mining to the environment, and biology to geology, technologists and technicians are contributing to the success of many businesses and most industries in British Columbia, across Canada and around the globe. It is estimated by the Applied Science Technologists and Technicians of BC (ASTTBC) that there are more than 150,000 technology workers[1] in BC. Further, this part of the BC workforce is expanding in number, increasing in value and contributing to the country's economic growth.



While technology careers represent a critical part of BC's wealth-generating sectors, these occupations are often invisible in terms of media coverage and attention by business groups, policy-makers, teachers and counselors, parents and the general public. In the last decade, trades career advocates have done an effective job of creating awareness and interest in skilled trades; it is time for technology careers to be seen to play a prominent role in building BC's economy.

2007 Hot Jobs Worldwide

1. Sales representatives
2. Skilled trades
3. Technicians
4. Engineers
5. Accountants
6. Labourers
7. Production Operators
8. Drivers
9. Management/Executives
10. Machinists/Operators

(Manpower Inc., *Manpower Talent Shortage Survey*, 2007)

Technology is a major facet of all aspects of a modern economy, and the demand for technology workers in BC will only continue to increase. However, there is a serious disconnect between this rising demand and the public's awareness of these careers and of youth entering these fields of study. Just as employers are demanding more trained professionals, our post-secondary technology programs are closing due to low enrolments and increasing costs. According to a recent newspaper column, while 35,000 new jobs in information and communications technology alone will need to be filled each year in our country, Canadian schools only produce 7,000 graduates in these fields annually. Between 2000 and 2005, the number of computer science graduates in Canada dropped 70%.[2]

[1] Technology workers are defined for purposes of this plan as occupations in the following National Occupational Classification categories: Major Group 21, Professional Occupations in Natural and Applied Sciences; Major Group 22, Technical Occupations Related to Natural and Applied Sciences (except 227, Transportation Officers and Controllers); and Major Group 32, (except 322, Technical Occupations in Dental Health Care and 323, Other Technical Occupations in Health Care). See Appendix 1 for a specific list of categories. In a "lay" sense, this definition includes: technology executives and managers; applied science technologies, including agriculture, architectural/building, biomedical engineering, bioscience, engineering, geomatics and geoscience; technology professionals, including technicians, technologists and technical specialists, programmers and analysts, etc.; technology occupations bridging to university and advanced professional registration; and trades occupations that ladder into technical occupations.

[2] *National Post*, April 10, 2007.

One important part of the BC technology workforce is the estimated 50,000 technologists, technicians and technical specialists working in the province, collectively representing $5 billion in direct economic impact through income and taxes. These technology workers also contribute significantly to the regulation and promotion of public and worker safety, building our provincial infrastructure and constructing all types of buildings, forest/mineral/other resource management, advanced manufacturing, and the design and use of state-of-the-art technology. Further, there are another estimated more than 100,000 workers in other technology occupations such as engineering, health care, information technology, digital media, life sciences and telecommunications.

As well, foreign-trained technology professionals are unable to quickly and effectively transfer into Canadian job opportunities where they could be contributing their extensive training and experience gained in other countries.

Technology workers are needed in virtually every BC industry, both by companies that produce and/or sell technology goods and services and by companies that use technology to produce commodities and other non-technology good and services. The demand for technologists and technicians is growing and at the same time the current population of such workers is aging and retiring in increasing numbers. Many of these technical employees will eventually need to move into supervisory and management vacancies which are increasing with the aging of the BC workforce.

The 2010 economy equals…

1,045,085
job openings

That's one for every young person graduating from high school during the same period — plus another 350,000 openings.

It has become abundantly clear that BC faces a major challenge in the availability of trained and experienced technologists, technicians and technical specialists. Virtually every day our news media reports on the evidence and impacts of skill and labour shortages in various industries and occupations throughout BC. Our province faces a crisis in its workforce – a crisis brought on by converging economic and demographic trends. In the next few years:

- Almost half of the current technologists and technicians will retire as the oldest baby boomers start to leave the workforce.
- The BC and Canadian economies are forecast to grow steadily, led by the high tech sector and technology-based products and services.
- By 2010, there is projected to be a 70% shortfall in the supply of needed supervisors, managers and contractors in technology roles.
- The 2010 Winter Games, construction and real estate development, mining and resource projects, and the growth of our cities and population, have and will create a surge in demand for trained and qualified workers. Also VANOC itself and its suppliers will need to hire or contract several hundred technology workers.

The challenge for industry, educators, professionals and government and other stakeholders is to ensure: people interested in technology careers are informed of the opportunities that exist; post secondary training and professional certification are available; and employers have access to the trained and certified professionals they need to compete in a global marketplace.

> "BC has recorded the lowest unemployment rates ever this year. BC has created 370,000 new jobs since 2001; That's a 20% increase and double China's job creation rate. And we have major projects in the province totaling $124 billion, compared to $47 billion in 2001."
>
> (Honourable Colin Hansen, Minister of Economic Development, June 19, 2007 ASTTBC Technology Skill Shortages Roundtable)

Youth, women, foreign-trained professionals, Aboriginal people and adults in career transition make up a vast potential pool of future technology professionals. Educators, professional associations, employers, government, and career and guidance counselors all have an essential role to play in promoting technology careers to these groups and encouraging suitable candidates to enter the field.

BC needs a strategic plan for technology careers and education, and this should be an integral part of government's and employers' strategic planning and human capital development. Therefore, after discussions with various stakeholders over the last year, ASTTBC is launching this Technology Human Resources Strategy, *Technology Talent 2020*. It will is being communicated and implemented in conjunction with industry groups, employers, educators, communities and First Nations, and governments.

Before highlighting the strategy, this report provides the context for and key issues regarding technology human resources in BC.

2. BACKGROUND AND CONTEXT

About ASTTBC

Incorporated under the *Applied Science Technologists and Technicians Act* (ASTT Act) in 1985, ASTTBC was established in 1958 by technicians and technologists in the fields of engineering and architecture. ASTTBC has expanded to sixteen disciplines and nine special certifications in the broad field of applied science technology.

ASTTBC's mission is to serve the public by regulating and supporting technology professionals' commitment to a safe, healthy, and sustainable society and environment. See Appendix 1 for ASTTBC's complete strategic direction.

ASTTBC is a self-governing professional association that regulates standards of training and practice, ensuring that BC's technologists and technicians maintain a high standard of performance and professionalism. With more than 9,000 members and technical specialists working throughout the province, ASTTBC is taking a leadership role in developing technology career pathways and promoting technology careers of tomorrow.

The ASTT Act provides for the professional registration of technologists and technicians, provides certification requirements, requires that they adhere to a Code of Ethics, provides a disciplinary mechanism to deal with breaches of the Code, and protects the titles *Applied Science Technologist* and *Certified Technician* and the designations AScT and CTech.

Close ties exist with all other parallel associations both within the province and across the country, representing technicians, technologists and professional engineers and other senior professionals. Most notably, within BC, ASTTBC has a close working relationship with the Association of Professional Engineers and Geoscientists (APEGBC) and the Consulting Engineers of BC (CEBC).

ASTTBC also enjoys good connections with major industry associations such as the BC Technology Industries Associations, Business Council of BC, Canadian Home Builders' Association of BC, etc.

Very close ties are maintained with all community colleges, university colleges and provincial institutes throughout the province which provide education and training for technicians and technologists. Many technology program instructors in all institutions in BC are members of ASTTBC. Close relationships are enjoyed with Deans of Technology, many of whom are members of ASTTBC's Accreditation Board and supported the association in transforming BC accreditations from provincial to national in scope.

Outside the province, ASTTBC is a leading member of the Canadian Council of Technicians and Technologists (CCTT) which embodies the national voice for all registered members of ASTTBC's parallel associations in all provinces and territories.

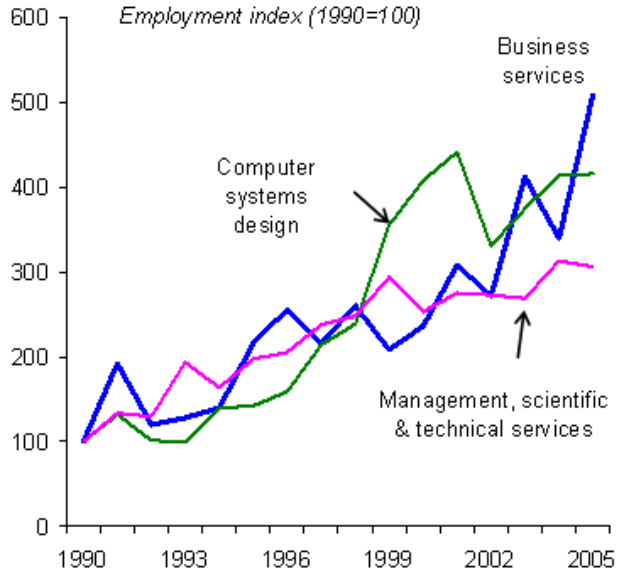
Technology Industry and Occupational Scope

The technology career sector cuts across all key industries in British Columbia. It includes both companies that produce technology goods and provide technology services (i.e. "high technology") and companies which use technology to produce non-technology goods and services. As indicated in the previous section, current employment among technology occupations in BC is over 150,000, and up to half of these jobs are outside of high tech industries.

The technology industry[3] in BC generated revenues of $14 billion, employed almost 65,000, and accounted for 5.3% of Gross Domestic Product in BC in 2004. As the chart in Figure 1 shows, two of the fastest growing industries in BC in terms of employment are technology-related.

Figure 1

Top BC Employment Growth Industries (1990-2005)



Source: A Guide to the BC Economy and Labour Market, BC Stats, http://www.guidetobceconomy.org/welcome.htm.

The high technology industries are an obvious source of technology careers and professionals. Employment in the BC high technology sector reached 64,660 in 2004. High technology industries include aerospace, electronics manufacturing, life sciences/medical, biotechnology, computer products and services, etc.

[3] "Technology industry" as defined by BC Stats, as opposed to technology "occupations." The former leaves out technology employment in non-technology industries, and thus is a lower figure than 150,000 figure of total technology employment.

Technology careers are increasingly prevalent in companies which do not produce high technology goods or services. Technologists, technicians and other technology workers and trades workers are prevalent in forestry, mining, oil and gas, manufacturing, construction, transportation, utilities, communications, engineering, health care, and other service sectors.

Technology Human Resources in the BC Labour Market

As of June 2007, employment in Natural and Applied Science occupations in BC was 137,400 or 6% of total current employment in BC.[4] This occupational category is projected to grow by 2.7% to 2015, a 35% higher rate than overall BC employment. Further, according to the latest Canada-BC occupational forecasts, Natural and Applied Science job openings will increase by just over 76,000 by 2015, or almost 7% of total new openings.[5]

> "In the new economy, competition is global, capital is abundant, ideas are developed quickly and cheaply, and people are willing to change jobs often. In that kind of environment, all that matters is talent. Talent wins." (McKinsey & Co., 2001)

It is important note that "high tech" and "information and communications technology" are not synonymous. Over 40% of the BC technology industry's employment is in biotech/life sciences, energy technologies, new media and sustainability technologies.[6] Also, in addition to employment in technology companies, we know that almost an equal number of technical workers are employed in industries not traditionally considered high tech; they do not produce or provide technology products or services but use technology.

Most recently, a survey sponsored by the BC Technology Industries Association is projecting significant growth in technology employment. For example, BCTIA shows a 15% or 9,000 increase in employment in the BC technology industry in 2007. Extrapolating from the survey results, the BCTIA study projects that this level of growth will double technology employment over the next 5 years, from 65,000 to 130,000.[7] The BCTIA study identified the following occupations with the highest new job openings over the next year:

- Over 1,400 marketing and sales professionals;
- 500 technical managers;
- 800 technical support personnel;
- Over 500 entry level positions in software, hardware/software testing, and general engineering.

In a recent national study by Deloitte Consulting in conjunction with the Information Technology Association of Canada, it concluded, "A talent crisis is threatening to jeopardize the success of Canada's technology and

[4] *Summary Tables of Labour Force Survey Statistics: June 2007*. BC Stats, July 2007.
[5] Ministry of Advanced Education, *Employment Outlook for BC, COPS BC Unique Scenario 2005-2015*, February 2007.
[6] High-Tech Industry Advisory Committee. *Submission to the BC Competition Council*, March 2006., p.6.
[7] BCTIA. *TechTalentBC Final Report: Labour Trends in the BC Technology Sector*. February 2007.

telecommunications companies that are faced with unprecedented growth opportunities."[8] The study found that 95 percent of Canada's technology and telecommunications companies say finding skilled help to fill jobs is the most critical issue they face today – yet only 10 percent of these companies have talent strategies in place.

An indication of the level of demand and importance of technology jobs in BC is that they are well-represented on the federal government's "Regional Occupations under Pressure List" for BC, which it refers to in the case of the federal Temporary Foreign Worker Program (see www.hrsdc.gc.ca/en/gateway/nav/top_nav/program/fw.shtml).

Another "proxy" for how tight the technology labour market is, is the relative unemployment rates in the technology industries and among technology occupations. In BC in June 2007, overall unemployment was at 4.1%, while a technology-intensive industry such as Professional, Scientific and Technical Services had an unemployment rate of 2.2%. At the occupational level, Natural and Applied Science occupations had an unemployment rate of 1.6% in BC in June 2007.[9]

The Impact of Technologists and Technicians on the BC Economy

> "Human capital has and will become the ultimate scarce resource. Technologists and technicians are a precious commodity because they know not only what needs to be done, but also know how to do it with the right tools and equipment."
>
> (Dr. Roslyn Kunin, Economist, ASTTBC *Building Technology Careers*, 2005)

As mentioned earlier, there are an estimated 50,000 technologists, technicians and technical specialists working in BC, representing billions of dollars of spending power. Technologists and technicians also contribute significantly to the regulation, safety, construction, forestry, mining and other resource management, as well as advanced manufacturing and computer-related services.

Specific examples and anecdotes that reflect the contribution of technologists, technicians and technical specialists to the BC economy include the following:

- A growing area of technical expertise is the field of environmental sciences, where technologists and technicians support the work of engineers and scientists with field inspections, research, and project development.
- The professional day-to-day activities of technologists and technicians delivering their services to commercial, industrial and residential clients are a key function that sustains a public safety system that protects the public.
- BCIT the leading educator of Forest Technologists and Technicians announced it is closing down its Forestry programs. There are currently only 5 post secondary education institutions training forest technologists

[8] Gillian Shaw, Vancouver Sun, June 13, 2007, p. D3.
[9] *Summary Tables of Labour Force Survey Statistics: June 2007*. BC Stats, July 2007; Statistics Canada. Table 282-0007, CANSIM, http://cansim2.statcan.ca/cgi-win/CNSMCGI.EXE.

and technicians in BC. The closing of BCIT will reduce BC's training capacity by over 20%. If the number of technologists and technicians continues to decrease the ability for the forest industry to operate will be significantly reduced to the point where harvesting operations will be reduced. This will in turn have the effect of reducing provincial revenues through stumpage and other spin-off sources of revenue.

The Vancouver Island Advanced Technology Centre reports that the high-tech industry in Victoria has surpassed $1.67 billion in total revenue taking it well past tourism as Victoria's number 1 non-government industry.

(*Victoria Times-Colonist*, May 24, 2007)

- Technologists are empowered to make discretionary decisions that directly effect oil and gas production in the province, an industry that contributes over $2 billion dollars in direct government revenue. These technologists also initiate and contribute to policy decisions that effect continued and future investment. Understaffing of technical positions would result in a direct loss of oil and gas royalty revenue to the province.
- Technologist and technicians are the primary structure inspectors for the Ministry of Transportation which is responsible for the inspection of over 4600 structures throughout BC for the traveling public's safety and appropriate maintenance, replacement and new construction activities. Most of the Bridge Area Managers are graduates of a Civil and Structural Technology Program and have a significant amount of experience and related training to undertake these roles.
- The economic impact to BC of not having a technologist in the engineering design fields would be:
    - Design professionals would hire unskilled employees, requiring more resources to complete design calculations.
    - Inability of employees to implement design software, hence, productivity decreases.
    - Significant pressure and workload transferred to the professionals to prepare and publish their design documentation.
    - Designs will be bottlenecked at the professional level economically affecting developers/investors, contractors, sub-contractors, suppliers, manufacturers, municipal and provincial infrastructure, institutional buildings, etc.
- Millions of dollars are spent annually on replacement, rehabilitation and construction of provincial and municipal infrastructure. Technologists, technicians and technical specialists from numerous fields including Civil engineering, Survey, Geomatics, Public Works Inspection insure this knowledge base is maintained. Project and contract management, quality assurance, commissioning and acceptance rely on the technical knowledge of these professionals to deliver value, safety and longevity to infrastructure investments.

A May 15, 2007 *Business Edge* article reported, "The Information Technology Association of Canada calculates that Canada currently supports ore than 566,000 high-tech jobs, contributing $130 billion to Canadian business revenues."

(*Business Edge*, BC Edition, "Companies facing tech talent crunch. "May15, 2007)

As research and development progress at an ever-faster pace, the gap between fundamental research and practical implementation continues to grow, especially in the field of technology. Within this context, engineering technology

has emerged as a new discipline to effectively bridge the practical orientation of tradespeople and the increasingly conceptual focus of professional engineers. It comprises a unique skill set and has evolved into a distinct occupational category with two certification levels, the Certified Technician (CTech) and the Applied Science Technologist (AScT). Despite the apparent need for this occupational category, engineering technology has remained largely unnoticed by the general public and policy-makers. As a result, the rising shortage of technicians, technologists and other technology workers is having a detrimental effect on the viability, flexibility and diversity of the technology economy as the link between practitioner and researcher is beginning to fail.

Public Policy Context

During the conception and development of this HR strategy, some significant developments have occurred in provincial public policy regarding post-secondary education and skills development. While public policy is always evolving, an important context for this Technology HR Strategy is the Campus 2020 Report by Geoff Plant, Q.C., and the WorkBC Action Plan. These are briefly highlighted below.

Campus 2020 Report

Campus 2020 or the "BC Access and Excellence Strategy" is the province's first comprehensive post-secondary education plan in several years, and the BC Government should be congratulated for initiating this work. Some of the positive recommendations put forth by Special Advisor Geoff Plant include:

- Strengthened system data collection and accountability measures;
- More cohesive coordination across the system through new bodies and regional learning councils;
- A more strategic role for BC Campus and greater emphasis on online learning and flexible delivery;
- Further work on strengthening our credit transfer system;
- Work on portfolio and credential recognition, including immigrant credentials and foreign student status.

It is important that the implementation of Campus 2020 recommendations includes provision for 1) ASTTBC and other technology organizations being involved in the new Higher Education Board and Regional Learning Councils and in the implementation of the Campus 2020 recommendations; and, 2) technology programs and careers need to be clearly targeted in various parts of the strategy including the 25,000 additional student spaces by 2010, new graduate spaces, etc.

WorkBC Action Plan

WorkBC is the BC Government's labour market strategy to meet increasing skills shortages. It was launched in April 2007 and has five Strategic Action areas:

- Attract and recruit new workers;
- Increase the labour market participation and success of Aboriginal people in BC;
- Keep the workforce we have;
- Develop the skills of our existing workforce; and,
- Address regional skills shortages.

WorkBC includes over 60 specific action initiatives across these five areas. We applaud the BC Government for recognizing the labour supply challenges and developing several new initiatives. Launching a jobs marketing campaign, expanding apprenticeship spaces, introducing a Training Tax Credit Program, increasing supports for Aboriginal workers, increasing support for recruiting immigrants and temporary workers, and better labour market and career information are all added value tools for employers, workers and job-seekers.

WorkBC provides a solid platform on which to build this Technology HR Strategy. Part of ASTTBC's response to the WorkBC launch is to use it to build on and tailor the strategy by ensuring some of the WorkBC initiatives include a technology career focus and ASTTBC and other technology organization involvement in their implementation. This should include, for example, the following:

- Investigating the feasibility of a Technology Industry Organization and new ITA training programs;
- Including technology program spaces in the Aboriginal Post-Secondary Education Strategy;
- Initiatives to promote technology careers in the K-12 system, including high school work experience, co-op and mentorship programs;
- Including targeted technology spaces in high demand technology careers; and,
- An immigrant technologist/technician strategy;
- Specific labour market and career information on technology employment.

These and other actions will be discussed later in the next section of this strategy.

Other Public Policy Initiatives

The elimination of mandatory retirement, introduction of a training tax credit, a $65 million Aboriginal Post-Secondary Education Strategy, and the BC Small Business Roundtable Report are other recent BC Government skills-related initiatives that are relevant to a Technology HR Strategy. Most recently, the BC Government announced a $1 million program to help small businesses with training and recruitment challenges; and WelcomeBC, a two-year $43 million initiative to expand services to immigrants.

Also, the federal government labour market policy context is important to consider. These initiatives will be referred to in the context of strategies in the next section.

3. KEY ISSUES AND CHALLENGES

In the context of growing skills shortages, aging of our workforce and resulting labour supply gap, and the increasing global and North American "war for talent", BC technology career stakeholders need to identify barriers and solutions to ensuring the provincial labour market is supported with a larger pool of technology workers and professionals in all regions and sectors of the economy. ASTTBC has identified the following issues regarding technology human resources.

1. Skills shortages in technology professions

BC employers, both large and small, are suffering from labour shortages and a lack of available trained and experienced technology workers. If this remains the case, individual companies (as well as the overall BC economy) will be limited in their growth, or worse, unable to compete in the local, national and global marketplace. The issues of recruitment and retention of employees are key to corporate success, and must be addressed more broadly and with a view to the long term. Survey after survey has confirmed that skills shortages are no longer "looming" but are facing 30-50% of many industries and regions.

Impacts of skill shortages

- Having to hire under-qualified workers (65%);
- Having to improve salary/benefits (45%);
- Having to pass responsibilities to other employees (41%);
- Having to function with fewer employees (40%);
- Having to hire temporary help (35%); and,
- Having to use overtime/longer shifts (35%).

(Canadian Federation of Independent Business, 2006)

2. The lack of a strategic direction for technology education in BC

In this broader context, there is a higher learning policy vacuum. There is currently little apparent cohesive strategic direction for technology education in BC. While there is some linkage between some institutions, it is far from the ideal needed to ensure maximum potential for our post-secondary education system. Despite good work by the Premier's Technology Council and technology industry associations on marketing our province and stimulating technology investment and research, technology education and human resources do not appear to be on the federal and provincial policy agenda.

3. The need for clear technology education leadership

While there are several industry and professional associations involved in technology development, and leadership groups such as the Premier's Technology Council and BCTIA, no high-level panel of leaders is bringing these groups together around an long-term comprehensive technology education and skills strategy.

4. Little useful technology occupation labour market demand and supply information

There is currently only general and dated labour market information on the supply, demand and supply/gaps of technology occupations in BC and Canada. While there has been increased interest and activity in labour market research for trades and tourism occupations, for example, despite the size and implications of technology jobs, there is a shortage of such labour market information.

5. Lack of integration of and growth in technology education programs

There has been a general decline in interest in electronics, automation and other technology programs with applicants selecting other career options. Jobs are going unfilled and enrolment in post secondary technology programs has declined to the point that programs are now being cancelled. People interested in technology careers must be made aware of the career opportunities that exist, the prerequisites required and the post secondary training that is available. Although many of the key components and training programs are currently available, they need to be more clearly interlinked to allow for the transfer of credits, the recognition of prior learning, and bridging between the trades, technology and university-based careers.

> Almost 80 percent of technology and telecommunications companies in Canada say employers and educational institutions need to work together to ensure a supply of new graduates.
>
> (Deloitte Consulting, *Coming of Age: 2007 TechTalent Pulse Survey Report*, June 2007).

Despite increasing labour market demand now and expected in the future in BC, enrolments in technology programs are down, including cancellation of some key programs. Technology programs need to be introduced and/or expanded in various regions and occupational categories throughout the province. Based on the latest Ministry of Advanced Education data on diploma credentials issued in nationally accredited applied science and engineering technology programs in BC, all but 2 (BCIT and Okanagan College) of 10 institutions show a decline in credentials awarded since 2001/02 and 2002/03. Overall, credentials awarded in 2004/05 were 743 compared to 761 in 2002/03.[10]

For example, at BCIT, 20 or 38% of 52 certificate, diploma and baccalaureate technology programs had reduced first-year student capacity reductions in the last 1, 2 or 3 years.[11]

Also, some ITA industry training programs (i.e. trades) are related to the skills, knowledge and qualifications of technician and technologist standards. To date, only sporadic and piece-meal efforts have been undertaken to create linkages in training, certification and accreditation between trades and technology occupations. Bridging and laddering among trades and technology jobs through a partnership of ASTTBC and the Ministry of Advanced Education could increase the value of training, certification and the full utilization of talent in BC.

6. Inadequate high school technology career preparation programs and teaching

ASTTBC and partners delivered successful technology career prep programs in the last 10 years through programs such as *TechWorks!*. Despite the success of such programs and the demand for technology awareness and technology workers, federal and provincial departments and the school system have not been able to allocate funds to sustain these valuable programs.

[10] *National Accredited Applied Science and Engineering Technology Programs – Diploma Credentials Issued by Academic Year (2001/02 – 2004/05)*. Information and Data Management Branch, Ministry of Advanced Education, August 9, 2006.
[11] Program Performance Summary 2005: Application/Enrolment/Capacity Analysis. BCIT, 2005.

Also, at the high school level, technology employers and technology administers have lamented the weak quality if math, science and technology teaching and facilities in our schools.

7. Lack of small business HR innovation capacity and few incentives for employers to hire and train technical graduates and workers

Many recent studies have demonstrated significant skills gaps in small and medium sized businesses in BC and weak capacity and/or cultures among such employers to invest in employee training and innovative human resource practices. Small businesses that employ technology workers need supports including information, practical tools and financial incentives to help build this capacity for attracting and recruiting, developing and retaining such workers. Despite federal and provincial governments recently announcing training tax credit programs for apprenticeship occupations (i.e. $90 million in BC over the next three years), there are no similar incentives for technical occupations and professions. This playing field should be leveled.

8. Minimal coordination promotion of technology careers and education

Despite efforts of ASTTBC and other private and public agencies, technology careers are 'invisible' in BC and most of Canada.

There is a general lack of public understanding of the key role technologists and technicians play in industry today, the significance of their contribution to the BC economy, and of the diverse and exciting career opportunities and income potential these careers provide. Awareness of science and engineering technology jobs has been lost between the perceived higher status of university degrees and the increasing profile of the trades.

Youth are not enrolling in college technology programs and are not taking the required science, math and physics prerequisites in high school. In a recent survey, 75% of youth agreed with the statement "university degrees lead to better job opportunities than college diplomas" and most high school students claim that they plan on attending university. This view is encouraged by key influencers of youth including parents and school counselors, who often encourage youth to pursue a degree versus technology training or trade apprenticeship.

9. Lack of a clear mandate for BC polytechnics

The Ministry of Advanced Education should expand the concept of polytechnics (beyond simply BCIT) by reviewing the mandates of Okanagan College and university colleges and considering converting some/all to polytechnics. ASTTBC would be able assist and BC should look at the experiences of other jurisdictions in this regard.

10. Low rate of participation and success in technology education and careers among Aboriginal People

Approximately 10 million in Canada workforce are Aboriginal people, immigrants and/or visible minorities, persons with a disability, and women. Leaving these labour force participants out eliminates 60% of your available labour. Aboriginal communities and people and First Nations have lower rates of technology adoption and lower rates of

participation in technology education and employment. Yet Aboriginal youth represent a fast-growing pool of available skilled labour. While encouraging Aboriginal youth to go into trades careers and business opportunities, technology careers should be promoted to Aboriginal students, teachers and parents.

11. Low rate of participation and career advancement for women in some technology education and careers

Women who enter technology education and employment have higher success rates than men. Young women in school and unemployed and under-employed women are an important talent pool to tap for technology jobs and careers.

> "So it will be increasingly important that our economy uses the labour that is available in the most efficient way. To being with, it means that we must remove any unnecessary barriers, either to labour-force participation or to labour mobility, he said, adding that this includes barriers that prevent older workers from remaining in the job market."
>
> (David Dodge, Bank of Canada Governor in Working.com, Eric Beauchesne, July 2, 2007)

Women are extremely under-represented in technology occupations. The Vice-President of Human Resources of Microsoft Canada recently stated that women are a serious untapped resource, representing only 30% of the IT workforce in Canada.[12] Women as a percentage of total employment were 10% or lower in the following occupations in 2001[13]:

- Civil engineering technologists and technicians;
- Mechanical engineering technologists and technicians;
- Technical occupations in electronics and electrical engineering;
- Electronic service technicians;
- Industrial instrument technicians and mechanics;
- Aircraft instrument, electrical and avionics;
- Construction inspectors.

12. Under-utilization ("skills wastage") of internationally trained professionals

Immigration is a huge source of labour and skills. New immigrants will account for 70% of Canada's total net new labour force and this number will rise. New immigrants, however, are often not integrated into the workforce quickly or efficiently, resulting in extended unemployment or under-employment. We must work towards a common method and system for assessing both formal credentials and competencies from past work experience, and linking skilled professionals with employers sooner.

Earlier this decade, the Conference Board of Canada estimates that 540,000 Canadians would earn an additional $4.1 billion to $5.9 billion annually if their learning, experience and credentials could be rewarded and recognized in the

[12] Emily Mathieu. Financial Post, Wednesday, June 13, 2007.
[13] Technical Occupations Related to Natural and Applied Sciences by Gender and Percent Female, Canada (1991-2001). Statistics Canada Catalogue No. 97F0012XCB2001022.

workplace[14]. It maintains that the single largest reason for "unrecognized learning" is unrecognized foreign credentials. Extrapolating from the Conference Board's data, 46,000 adult Canadians with Cantonese and Mandarin as their mother tongue are affected by this. BC's significant Chinese population means this issue affects thousands of new Canadians and reflects significant skills wastage and opportunities for prior learning assessment and recognition and industry mentorships.

Another indication of better recognizing and utilizing immigrants with technical credentials is the increasing proportion of immigrants to Canada who have technology skills.

Table 1 shows, for example, immigrants with the intention of working in information technology as a proportion of total "skilled worker" immigrants to Canada increased from 3.6% to 27.7% during the period 1992-2004.

Table 1
Intended Occupation of Canadian Immigrants – Skilled Worker Category
1992-2004

Occupation	Intended Occupation of Skilled Worker Immigrants to Canada				
	1992	1997	2000	2003	2004
Information technology	3.6%	16.0%	26.8%	26.2%	27.7%
Engineers	2.5%	10.2%	15.1%	16.1%	17.2%
Other professionals	23.5%	43.8%	35.1%	37.6%	35%
Management	10.6%	5.4%	5.0%	5.8%	5.7%
Sales and services	22.2%	13.4%	9.2%	8.9%	8.8%
Other occupations	37.6%	11.2%	8.9%	5.4%	5.7%

Source: Citizenship and Immigration Canada.

13. Lack of access to part-time and other flexible education and training models

We have seen an almost total demise of the part-time path to a Diploma of Technology. It was ended at BCIT about 10 years ago, and the result is that ASTTBC now finds it all but impossible to prescribe a series of available courses which would allow a certified technician to upgrade to become an Applied Science Technologist, or an applicant with an otherwise excellent international education and who just needs a few top-tier technology courses to become certified and registered. You can no longer get there from here through the part-time route.

[14] Conference Board of Canada, *Brain Gain: The Economic Benefits of Recognizing Learning and Learning Credentials in Canada*, Ottawa: Conference Board of Canada, September, 2001.

4. A TECHNOLOGY HUMAN RESOURCES STRATEGY

BC needs the participation of industry leaders and stakeholder representatives willing to invest the time, money and effort needed to build and implement a comprehensive broad strategic plan and supporting infrastructure required to ensure that BC employers have a sufficient supply of qualified technology professionals well into the future.

If we collectively are bold in our approach and come together to create a comprehensive strategy, we can open a world of opportunities for British Columbians looking for long term career success. It is time for a concrete action plan and a comprehensive approach to promoting and building careers in technology. BC needs the commitment and participation of associations, employers, government, educators, and individual technologists and technicians who will come together to champion the cause and implement the proposed strategies.

Vision

> **"A growing, diverse and sustainable British Columbia economy supported by well-trained, qualified and fully-engaged technology workers and a responsive, flexible education and training system."**

Principles and Values

This Technology Human Resources Strategy will be implemented in a way that emphasizes and reflects the following principles or values:

- Comprehensiveness in scope and breath of industries, occupations and solutions;
- Focusing on both short and long term strategies;
- Leadership by industry, professionals, governments and educators;
- Partnerships among stakeholders;
- Matching labour market demand and supply;
- Flexible design and delivery of education and training programs;
- Sectorally and regionally sensitive strategies; and,
- Clear roles and responsibilities among stakeholders.

Long-Term Goals

The Technology Human Resources Strategy will achieve the following long-term goals over the next three to five years:

1. British Columbia leads in technology human resources development in Canada and internationally.

2. Technology careers are 'top of mind' among British Columbian youth and their influencers (i.e. parents, educators, peers).
3. The Technology Education & Careers Council (TECC) provides strategic leadership, guiding and directing BC's technology education system.
4. BC's post-secondary education system provides a balance of programming throughout BC, graduating an optimal supply of technology workers.
5. Unemployed persons and under-utilized labour force groups are full participants in technology careers and education and training.
6. Current technology human resource and labour market information guides strategic decision-making for technology education and careers.
7. Technology professionals in BC are qualified, registered and accountable through professional registration, and enabled and fully recognized by government.
8. Internationally trained professionals are fully integrated into careers and within BC through an effective technology professional foreign credential recognition process.
9. An innovative human resource management program assists small and medium-sized businesses in BC to hire, mentor and retain technology workers.

> "TELUS and many other growing companies need many more technology workers. BC needs a major strategy that supports the recruitment, development and retention of thousands of technology workers over the coming years. Without this, our economy and productivity will suffer."
>
> (Josh Blair, PEng, Senior Vice-President of HR Strategy and Business Support, TELUS)

Strategy Areas

1. Technology human resources leadership

Strategic Direction for Technology HR in BC

ASTTBC and its partners will work with the BC Ministries of Advanced Education and Economic Development to bring together key private and public sector stakeholders to review and further develop this Technology Human Resources Strategy in order to ensure an integrated approach to maximizing private and public resources for an expanded range of technology education and training in BC.

Technology Education Leadership – A "Technology Education and Careers Council"

ASTTBC and its partners will work with the Ministry of Advanced Education and the public post-secondary education institutions to create a Technology Education and Careers Council (TECC). It would be chaired by a high-profile, respected industry/employer representative and be composed of industry, technology professionals, ASTTBC, educators, and federal and provincial governments.

This would be the leadership body overseeing/ advising on the development of a strategic direction and other priorities and recommendations in this submission.

Governance of BC Colleges, Institutes and University Colleges

ASTTBC and the recommended TECC would work with the Ministry of Advanced Education and post-secondary system to provide cross-system input on technology programs to institutions in order to achieve most effective results for the expenditure of public funds. This may be addressed in the implementation of recommendations in the Campus 2020 Report.

2. Promotion of technology careers

ASTTBC and industry and professional partners will work with Ministries of Education and Advanced Education and schools and post-secondary institutions and industry leaders to invest in and implement a campaign and on-going program to promote awareness and interest in the full range of technology careers and pathways and education and training programs and certification.

The TECC described above could assist in technology career promotion. ASTTBC could facilitate this by building on its past experiences in this area including the *TechBar* concept.

ASTTBC's charitable foundation – the Foundation for Education & Advancement in Technology – could also play a role in the advancement of technology careers. FEAT operates as an independent charitable organization established to receive contributions and donations from members of ASTTBC and others, and in turn, to provide grants, awards and bursaries for the advancement of technology, technical education and awareness, and professional development for residents of British Columbia. More than half-a-million dollars in bursaries and support for science and technology events has been provided by FEAT since 1990.

3. Technology education and training programs throughout BC

Implementation of Campus 2020 Recommendations

With the involvement of ASTTBC and other technology organizations, Campus 2020 actions should include expanding and targeting technology careers and educational programs, as per below.

Expansion and Rationalization of Technology Education Programs

ASTTBC and its partners will work with the Ministry of Advanced Education and post-secondary education institutions to act on the following technology program initiatives:

- Introduce several 'technician' programs which could lead to a certificate and also ladder into second year Diploma Program;
- Offer some technician/technologist programs in the north as there is only one 2-year applied science/engineering technology program north of Kamloops; and,
- The Ministry needs to consider rationalizing all technology programs in BC, particularly at the first year level, and by more effectively using distance learning models of delivery.

More cooperation is needed among colleges, university-colleges, technical institutes and universities to work together on a common syllabus in technology education to allow students to move around and acquire skill sets.

Expansion of High School Technology Career Preparation Programs

ASTTBC and its partners will work with the Ministry of Education support the development and expansion of high school technology career preparation programs for high school as preparation for post-secondary education programs and technology careers.

This can be achieved by building on ASTTBC's earlier successes with *TechWorks!*, creating an ACE-IT-like program for technology programs, and building on the successes of other partners.

Another aspect of this issue is recommended that the Ministry of Education and K-12 system to develop incentives and support to help develop and retain high school technology, math and science teachers.

Broadening the Polytechnic Concept in British Columbia

It is recommended that the Ministry of Advanced Education expand the concept of polytechnics by reviewing the mandates of Okanagan College and university colleges and considering converting some or all to polytechnics. ASTTBC would be able assist and BC should look at the experiences of other jurisdictions in this regard.

Lifelong Technology Learning

ASTTBC recommends that the Ministry of Advanced Education encourage and even provide incentive, post-secondary institutions to expand flexible lifelong learning, for technology professionals, including part-time seminars, workshops, on-line formats to help ensure sustained competency. ASTTBC and other professional bodies should facilitate this through continuing professional education.

Integration with Applied Research

Applied research activities are increasingly integrated with human resource innovations and strategies for improving workplace productivity. Policy-makers, industry and professional associations and companies should not lose sight of the opportunity for synergy in this area by ensuring applied research is part of a broader strategy to improve the technology workforce and business productivity and competitiveness.

4. Technology human resource labour market information

ASTTBC and its partners will work with the BC Ministries of Advanced Education and Economic Development, in partnership with BC Stats and ASTTBC initiate a special study to develop a model for measuring current and projecting future technology occupation labour supply, labour demand, and labour supply/demand gaps.

This can be carried out in two stages, the first being the simpler approach of working with special BC Stats and/or Statistics Canada runs of existing data. The second step would be to build a made-in-BC model and extrapolate from existing data and possibly using new data. ASTTBC would set up an advisory committee of its members, industry representatives, educators and others to advise government departments on this.

5. Foreign credential recognition

It is recommended that the BC and federal governments collaborate with ASTTBC to increase internationally trained professionals entry into and certification in technology occupations through targeted, streamlined foreign credential recognition, technology mentoring, technology-specific language training, technology bridging programs, etc.

This work could start with ASTTBC and its partners working with the Ministry of Economic Development and Service Canada on a comprehensive pilot project with immigrant service groups and professional immigrants to facilitate this. Also, perhaps resources could be accessed from the new $43 million WelcomeBC initiative for immigrant services. ASTTBC has the largest database of international assessments of foreign technical credentials among its sister organizations across Canada, and could use this capacity to facilitate foreign credential recognition.

6. SME Recruitment and Retention

Small and medium-sized enterprises (SMEs) that employ technologists and technicians need support to enable them to recruit, retain and develop technical employees through innovative HR practices. This should include retaining mid-career and older workers. An estimated 52.6% of ASTTBC members have 19 or more years of experience and 30.7% have more than 25 years experience. As a "proxy" for age, this implies a significant proportion of technologists are in their 40s and 50s and approaching some form of retirement.[15] ASTTBC will work with small business groups (e.g. the BC Chamber of Commerce), local agencies and the Ministries of Economic Development and Small Business and Revenue to support small businesses to provide on-the-job training and innovative HR practices for technical employees, including supervisors and managers.

[15] ASTTBC, *Member Compensation Survey 2007*.

ASTTBC recommends that some type of government financial incentive be created that could be used by employers to hire, training or retain technology workers. This could involve expanding the eligibility of the current BC Training Tax Credit Program beyond apprentices to make eligible employers of technology workers.

7. Under-Represented Labour Force Groups

Aboriginal People and Communities in Technology Careers and Education

ASTTBC would like to partner with industry groups, the BC and federal governments and the BC Aboriginal Human Resources Development Society to develop and implement an Aboriginal Technology Education and Careers Pilot Project. The BC government should support ASTTBC in seeking federal (Services Canada) funding for this project.

Women in Technology Careers and Education

ASTTBC will work with industry groups, the BC and federal governments, women in technology and technology employers to expand women's participation in technology education and careers. This would build on ASTTBC's existing efforts in this regard. ASTTBC also intends to advocate for government supports and programs to help single mothers, women returning to the workforce, and older women to help them develop their skills, pursue entrepreneurial opportunities, or enable them to remain in the workforce on a flexible basis.

Implementation

As part of the final Technology HR Strategy, a detailed Implementation Plan will be developed.

Roles

All key stakeholders will need to be involved in the implementation of the Technology HR Strategy. In addition to ASTTBC itself and its members, it will be imperative that employers of technology workers and industry associations are engaged and committed to action. As well, provincial and federal governments and high school and post-secondary educators must be involved.

These roles will be clearly defined in the final strategy, after engagement and consultation of these groups during finalization of the strategy. A key part of the implementation of the strategy will be the creation of a Technology Education and Careers Council to oversee and champion the promotion of technology education and careers and this strategy.

Resources

ASTTBC will work with industry leaders to confirm government and non-government funding needed to implement the Technology HR Strategy. This was started at the Technology Skills Roundtable/Industry Call to Action on June 19

of this year (see next section). ASTTBC itself will continue to contribute its own resources to the strategy. For example, it has contributed approximately $150,000 to date as well as many in-kind contributions.

It also should be noted that there are a number of important actions the BC Government can contribute that would not involve incremental public funds.

5. NEXT STEPS

This Technology Human Resources Strategy incorporates the findings of the 2005 *Building Technology Careers* conference, discussions with various stakeholders, and the June 19, 2007 *Roundtable on Technology Skills Shortage: Industry Takes Action* (see Appendix 5). It has been released as a draft with key stakeholder groups during the summer, and then will be finalized and implemented at an October 31, 2007 Roundtable during National Technology Week. The input-gathering steps to finalize the strategy may also include a survey of technology employers and workers. As indicated, the finalized Strategy will include a detailed work plan and implementation schedule. Part of this strategy includes a set of short-term steps to establish momentum and early accomplishments. These steps focus on moving ahead in the short-term while the long-term strategy is completed this fall.

ASTTBC Short-Term Steps

1. Establish a **Technology Education and Careers Council** of senior industry and employer representatives and other stakeholders to oversee and champion this Action Plan.
2. Develop and implement a **Technology Human Resource Strategy….Technology Skills 2O2O**.
3. Sponsor and resource a **Technology Skills Roundtable** on October 31, 2007, during National Technology Week.
4. Champion for and develop a **Technology Skills Advanced Education Strategy** that includes targeted spaces and initiatives for technology programs in public post secondary colleges, institutes and university colleges.
5. **Initiate programming in K – 12** to enhance awareness of, and participation in, technology education and careers.
6. Partner with governments to initiate a **Technology Skills Labour Market Information Project** to develop provincial, regional and sectoral labour market demand and supply projections for technology occupations.
7. Partner with governments to initiate a **Technology Skills Foreign Credential Assessment, Recognition & Mentoring Demonstration Project**.
8. Oversee the development of a package… **Practical HR Tools for Small & Medium-Sized Businesses** …to recruit, mentor and retain technology professionals.
9. Partner with governments to pilot test a program to support **lifelong learning for and retention of mid-career and older technology professionals**.
10. Initiate a program to engage **under-utilized labour force groups**, including women, First Nations and British Columbians with disabilities.

We need your feedback, suggestions and questions ASAP

Please click on: tech2020@asttbc.org

APPENDICES

Appendix 1 – Definition of Technology Occupations as per NOC Categories

Appendix 2 – ASTTBC Strategic Direction

Appendix 3 – Recommendations from "Building Technology Careers"

Appendix 4 – "Shaping Our Future – Building Technology Careers"

Appendix 5 – Summary of June 19, 2007 "Technology Skill Shortage Roundtable"

APPENDIX 1 – Definition of Technology Occupations as per NOC Categories

MAJOR GROUP 21

PROFESSIONAL OCCUPATIONS IN NATURAL AND APPLIED SCIENCES

211 Physical Science Professionals

2111 Physicists and Astronomers
2112 Chemists
2113 Geologists, Geochemists and Geophysicists
2114 Meteorologists
2115 Other Professional Occupations in Physical Sciences

212 Life Science Professionals

2121 Biologists and Related Scientists
2122 Forestry Professionals
2123 Agricultural Representatives, Consultants and Specialists

213 Civil, Mechanical, Electrical and Chemical Engineers

2131 Civil Engineers
2132 Mechanical Engineers
2133 Electrical and Electronics Engineers
2134 Chemical Engineers

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.

215 Architects, Urban Planners and Land Surveyors

2151 Architects
2152 Landscape Architects
2153 Urban and Land Use Planners
2154 Land Surveyors

216 Mathematicians, Statisticians and Actuaries

2161 Mathematicians, Statisticians and Actuaries

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

MAJOR GROUP 22

TECHNICAL OCCUPATIONS RELATED TO NATURAL AND APPLIED SCIENCES

221 Technical Occupations in Physical Sciences

2211 Chemical Technologists and Technicians
2212 Geological and Mineral Technologists and Technicians
2213 Meteorological Technicians

222 Technical Occupations in Life Sciences

2221 Biological Technologists and Technicians
2222 Agricultural and Fish Products Inspectors
2223 Forestry Technologists and Technicians
2224 Conservation and Fishery Officers
2225 Landscape and Horticulture Technicians and Specialists

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

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

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

226 Other Technical Inspectors and Regulatory Officers

2261 Non-Destructive Testers and Inspectors
2262 Engineering Inspectors and Regulatory Officers
2263 Inspectors in Public and Environmental Health and Occupational Health and Safety
2264 Construction Inspectors
Railway Traffic Controllers and Marine Traffic
2275 Regulators

228 Technical Occupations in Computer and Information Systems

2281 Computer Network Technicians
2282 User Support Technicians
2283 Systems Testing Technicians

MAJOR GROUP 32

TECHNICAL AND SKILLED OCCUPATIONS IN HEALTH

321 Medical Technologists and Technicians (Except Dental Health)

3211 Medical Laboratory Technologists and Pathologists' Assistants
3212 Medical Laboratory Technicians
3213 Veterinary and Animal Health Technologists and Technicians
3214 Respiratory Therapists, Clinical Perfusionists and Cardio-Pulmonary Technologists
3215 Medical Radiation Technologists
3216 Medical Sonographers
3217 Cardiology Technologists
3218 Electroencephalographic and Other Diagnostic Technologists, n.e.c.
3219 Other Medical Technologists and Technicians (Except Dental Health)

APPENDIX 2 – ASTTBC Strategic Direction

VISION:

ASTTBC is the model association for technology professionals.

MISSION:

To serve the public by regulating and supporting technology professionals' commitment to a safe, healthy, and sustainable society and environment.

GOALS:

1. Self governing professional legislation and regulation that protects the public interest.
2. Assured rights to practice and utilization of qualifications within the scope of the Technology Professionals' education, training and experience.
3. Professional standards and regulation for certification, accreditation, ethics and accountability that reflect contemporary social expectations.
4. Consistent and universal recognition of Technology Professionals by employers, governments, other professionals and regulatory bodies.
5. Member services that enhance professional, career, business and personal interests.
6. Technology education and careers are valued and supported.
7. The association and its members are involved as key stakeholders and contributors to public policy in areas in which Technology Professionals have a demonstrated interest and expertise.
8. Sustained excellence in governance and management of the association.

APPENDIX 3 – Recommendations from "Building Technology Careers"

The following are recommendations from the June, 2005 "Building Technology Careers" conference sponsored by ASTTBC.

What YOU Can Do… Stakeholder Group Action Steps

Here's what is required now to meet the growing labour market demand for technologists and technicians…

Government

- Provide funding and support for initiatives that promote careers in the science and engineering technologies, a category of careers distinct from information and computer technology on the one hand and the trades on the other.
- Provide added funding to post secondary colleges and institutes for the development, maintenance and upgrading of technology training programs.
- Modify existing legislation to ensure the full utilization of technology professionals. Continue to recognize technology professionals within government legislation that identifies 'qualified professionals'.
- Partner with associations and industry to develop a pilot program for integrating foreign-trained professionals (cross-cultural awareness, ESL training, job search skills, credential recognition, work placements/internships) and reduce the complexity and length of the immigration process for foreign professionals.
- Ensure the K–12 education system supports and encourages more students to pursue and succeed in math and the sciences while building student awareness of careers in the technologies.

Employers & Companies

- Sponsor and partner in innovative technology training and career awareness initiatives and programs. Promote technologists and technicians as respected career paths, and support professional certification and registration with ASTTBC, calling for these credentials in career ads while also encouraging employees to become registered and to take an active role in the Association.
- Encourage employees to serve on Parent Advisory Councils, meet with teachers, participate in school career days as well as science and tech fairs, and establish scholarships and relationships with schools, trustees and other key influencers.
- Promote and create demonstration projects to expand workforce career development, along with regional recruitment and retention programs, forming employer groups within sectors and among small and medium size enterprises.
- Adopt progressive recruitment, retention and human resources strategies that recognize the value of human capital investment, and attract and inspire employees by providing mentoring, career planning, leadership development and top-notch training.

Associations

- Create campaign promoting the essential role of technologists and technicians, career opportunities available, and consolidate/update existing technology career information providing one-stop locations or a web-based 'technology career portal'.
- Facilitate the integration of foreign-trained professionals, working with government, employers and educational institutions to streamline credentialing and Prior Learning Assessment & Recognition (PLAR) programs, and coordinate workplace preparation, job placement and mentoring programs.
- Partner with, and present a strong business case to, government, educational institutions and industry to establish the urgent need to increase and expand technology training programs and funding throughout all provincial regions, tying efforts to local employer needs and jobs.
- Create K–12 school promotions to build technology career awareness with youth including: 'techs in schools' mentoring programs; interactive resources and 'real-life' labour market info and stories; summer 'tech camps'; 'young tech champions' awards; and resource kits for teachers and guidance counsellors. Use methods and media that 'speak' to youth.

Post Secondary Educators

- Promote technologist and technician education options through promotional campaigns linked to labour market demand. Produce a flowchart that clearly depicts the links between the education and credentialing options in science, engineering and technology in Canada, and how this may differ from models common in other parts of the world.
- Tie technology programs to recruitment needs and timetables of local industry and employers – customize training schedules, formats and content to specific employer group needs while maintaining core standards and foundational skills.
- Provide opportunities to more easily 'bridge' education and certification between trades, technologies and applied sciences, and improve communication between funders and programs.
- Imbed 'soft skills' curriculum within technology and other programming to meet employer demand for these diverse and flexible skills increasing student job preparation and advancement potential.

Career & Guidance Counsellors & Teachers

- Educate students and parents about the incredible career opportunities available in the lesser known technologies by providing 'real-life' labour market data in the career and personal planning courses and through programs such as technologists and technicians in schools, all using interactive resources and media directed at teens.
- Promote technology education through colleges, institutes and universities as a progressive and viable schooling option equally with university programs and trade apprenticeships, and help students in selecting appropriate prerequisite science and math courses.
- Help shift student and parent misperceptions about technology careers promoting the key role they play, the certification and professional designations available, and the challenging and interesting work.
- Integrate technology career titles and education options into career testing and career exploration resources, materials, guidebooks and libraries, and promote technology career options to all potential groups including youth, women, aboriginals, immigrants and adults in career transition.

Technologists & Technicians

- Actively participate in your personal career development, growth and advancement by pursuing advanced education, professional development and credentialing.
- Use a systematic process for tracking credentials and certification courses, professional experience, and planning for professional development opportunities, such as ASTTBC's CareerManager® system.
- Obtain and develop the soft skills (communications, customer service, project and people management) that are sought by employers in order to prepare for career advancement and leadership roles.
- Volunteer for and support initiatives that build the profession such as on-the-job mentoring of trainees and foreign-trained professionals, 'techs in schools' programs and career awareness presentations.

APPENDIX 4 – "Shaping Our Future – Building Technology Careers"

See separate summary report brochure addendum. Or find it online by visiting www.asttbc.org/conference.

APPENDIX 5 – Executive Summary of June 19, 2007 "Technology Skill Shortage Roundtable"

Thirty-five senior industry representatives from construction, engineering, manufacturing, resource, technology and other companies joined the Honourable Colin Hansen, Minister of Economic Development and staff of the Applied Science Technologists and Technicians of BC to identify priorities and solutions for addressing an increasing shortages of technology workers in British Columbia.

ASTTBC Executive Director, John Leech indicated that this Roundtable is an industry "call to action" and the result of a two-year process started in 2005 through the identification of challenges and priorities at ASTTBC's *Building Careers* in *Technology* conference, where he made a commitment for ASTTBC to take leadership with others to tackle the issues before it is too late.

Chaired by Josh Blair, Senior Vice-President of HR Strategy and Business Support, TELUS and supported by Kerry Jothen, CEO of Human Capital Strategies and ASTTBC staff, the Roundtable started with a discussion of the following questions regarding the technology skills shortage:

- What is the #1 issue?
- What should be the top 3 priorities?
- What actions or solutions should be added to the Technology Skills Action Plan?
- What is the #1 action to be taken by Government regarding these issues and priorities?

The key themes among the responses to these questions from participants were:

1. Increasing a sense of urgency for action among stakeholders
2. Increasing awareness and promotion of technology careers among young people and those who influence them (e.g. parents, teachers, peers);
3. Developing and making available technology-specific labour market information;
4. Reforming curriculum and flexible program delivery of education and post-secondary education related to technology careers;
5. Improving foreign credential recognition and making better use of the talents of immigrants; and,
6. Increasing access to retraining, updating and lifelong learning among technology workers and workers in other careers.

After listening to the preceding discussion, the Honourable Colin Hansen, Minister of Economic Development provided keynote remarks, including the following:

- BC has recorded the lowest unemployment rates ever earlier this year, has created 370,000 next new jobs since 2001, and major projects in BC total $124B compared to $47B in 2001.
- One thing that threatens our continued economic growth is labour shortages – even with utilizing all 650,000 expected high school students by 2015, we'd be short by more than 350,000 workers when we look at growth of 1 million job openings by then.
- The WorkBC Action Plan has been created to work with industry and others to respond to this challenge.
- We really need partnerships – government in a supportive role (not lead); we need more flexibility in the workplace including access for Aboriginal people, accommodation for persons with disabilities, etc.
- We don't need more bricks and mortar – we need things like online learning – trades training is leading the way on this – what better group than ASTTBC to do this for technology education.
- 2010 Winter Games will allow BC to showcase all of its strengths – a springboard – this would be a great opportunity for ASTTBC to showcase technician and technologists success stories and careers.

Each participant was asked to identify priority actions and solutions vis-à-vis the Technology Skills Action Plan. The #1 priority was clearly the need to increase awareness and promote technology careers among young people and others. Other priorities were:

- Creating and making better use of technology occupational labour market information;
- Adopting changes and innovative approaches and programs in the K-12 and Post-Secondary systems;
- Making better use of immigrants and streamlining and fast-tracking foreign credential recognition was quite topical; and,
- Supporting , retraining and retaining people already in the workforce.

Josh thanked participants for their active participation and emphasized the need to create some type of technology leadership body following the event. Josh reiterated his and TELUS' commitment to continuing to support the Technology Skills Action Plan and subsequent actions to bring it to life. He summarized the key priorities arising from the roundtable discussion as follows:

- Awareness and promotion of technology careers (including establishing a sense of urgency);
- The need for a post-secondary education strategy;
- Streamlining and increasing foreign credential recognition of internationally trained workers;
- The need for all stakeholders to partner and collaborate;
- Industry involvement and action in the above four areas.

John thanked Josh for his contribution and TELUS for its co-sponsorship of the Roundtable and their continuing support and participation. John also thanked all industry participants for their valuable contribution and expressed hope that they and others will keep involved in the next steps of implementing the Action Plan and a long-term Technology Skills HR Strategy. He urged the BC Technology Industries Association to help ASTTBC ensure a broadened, integrated strategy for technology careers.

The immediate next steps will be:

- Distribution of a Roundtable meeting summary within a few weeks;
- Distribution of a draft Technology Skills HR Strategy for feedback later this summer;
- The October 31 Technology Skills Shortage Roundtable at the Morris J. Wosk Centre for Dialogue.

Lastly, John encouraged industry leaders to stay involved to ensure that employers step up to the plate in participating in short and long term technology skills strategies.