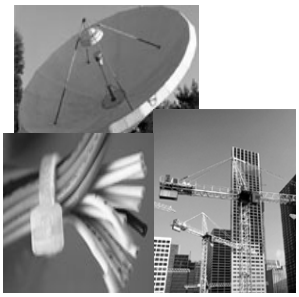


Engineers and Engineering Technicians and Technologists (ETT) Labour Market Tracking System:

Labour Market Conditions - 2008 to 2011

Engineers Canada
and
Canadian Council of Technicians and Technologists

October 2008

PRISM
Economics and Analysis

Bill Empey
Managing Partner
Prism Economics and Analysis
Suite 404
160 Eglinton Avenue East
Toronto, ON
M4P 3B5

Tel: (416)-484-6996
Fax: (416)-484-4147
website: www.prismeconomics.com

Engineers and Engineering Technicians and Technologists (ETT) Labour Market Tracking System:

Labour Market Conditions - 2008 to 2011

Contents

Executive Summary

Engineers Canada and the Canadian Council of Technicians and Technologists, with support from Human Resources and Social Development Canada, are collaborating on a major national human resources study.

The Engineering and Technology (ETT) Labour Market Study is a five part research project assessing:

- employer labour requirements
- the available workforce
- attitudes and practices related to certification and licensing
- the role of diversity groups
- globalization

Findings from all five study components have been combined into a Labour Market Tracking System that assesses conditions for engineers and engineering technicians and technologists (ETT) in Canada's provinces and regions. This report describes Version 2.0 of the Tracking System. This report updates Version 1.0; adding new data on immigration, post-secondary ETT programs, a new macroeconomic forecast and associated employment projections. Version 2.0 also reflects some of the feedback gathered from industry stakeholders reviewing Version 1.0.

Annual market assessments have been prepared for 55 engineering and engineering technicians and technologists (ETT) labour markets; covering 18 distinct occupations in six provinces and Atlantic Canada. Each market assessment is summarized in a ranking with a value from 1 to 5. The higher ranks reflect tighter markets with more difficult recruiting conditions and greater risks of supply constraints.

Annual rankings for 2008 to 2011 combine measures of:

- year to year growth in trend employment
- excess supply rates (that include the contribution of immigration and post-secondary programs)
- recruiting requirements relative to retirements
- independent industry input

Updated rankings for all 55 ETT markets are presented in this report

From the employer's perspective, the highest rankings and tightest markets are in British Columbia, Saskatchewan and Manitoba. In these provinces across the board difficulties recruiting for many ETT occupations will persist across most of the 2008 to 2011 forecast period. Tight markets are also apparent in Alberta, Quebec and Atlantic Canada in 2008 and 2009 with conditions there easing later in the period. While some Ontario labour markets pose significant

recruiting challenges, there is more evidence of weakening employment related to declining manufacturing output.

Some technician and technologist occupations are concentrated in manufacturing and related processes and jobs in these areas are vulnerable to cyclical economic weakness. As a result rankings for technical occupations are lower than in engineering in some cases. Many new jobs for engineers and technologists are related to major resource-related projects and new infrastructure. The timing and size of these projects is a crucial driver for employment patterns.

For example, major oil and gas projects in Alberta have created very tight labour markets for most ETT occupations. As these projects reach peak activity and wind down in 2009 and 2010 employment growth slows and labour markets there stabilize. In addition, declining output of conventional oil and gas production is easing labour demand. In contrast, new projects announced for Saskatchewan, Manitoba and Quebec are driving new employment for ETT occupations higher.
Exhibit No. E.1 presents examples of these conditions and the associated rankings. This is intended as a "sample" of findings and readers are invited to review a more complete set of results in Exhibit No. A.1 in the appendix.

Exhibit No. E.1

Summary of Market Rankings, Selected ETT Labour Markets, *200-2011*

	2008	2009	2010	2011
British Columbia - All Engineers	4	4	3	3
British Columbia - All Technical Occupations	4	4	4	3
Alberta - All Engineers	4	3	3	3
Alberta - All Technical Occupations	3	3	3	3
Saskatchewan - All Engineers	3	3	4	3
Saskatchewan - All Technical Occupations	4	3	4	4
Manitoba - All Engineers	3	4	4	3
Manitoba - All Technical Occupations	4	4	4	4
Ontario - All Engineers	3	3	3	3
Ontario - All Technical Occupations	3	2	3	3
Quebec - All Engineers	4	4	2	2
Quebec - All Technical Occupations	4	4	3	4
Atlantic - All Engineers	3	3	4	3
Atlantic - All Technical Occupations	4	4	4	4

Legend:

1–Significant excess of supply over demand	2–Excess of supply over demand	3–Moderate supply pressure	4–Significant supply pressures	5–Supply constraints

Source: Prism Economics and Analysis

For employers, in many markets that are characterized by modest supply constraints (a ranking of 3), the problem is not a lack of applications from candidates with up to five years experience, but with their qualifications. In particular they lack non-technical skills and / or Canadian work experience.

From the job seeker's perspective, these current conditions could be frustrating. Engineering technicians and technologists with qualifications and experience outside manufacturing will find a ready market for their skills in most provinces. But for many engineers, the surge in the arrival of permanent residents, from 1999 to 2006, created intense competition for jobs and these frustrations still linger, especially in Ontario.

Commencing in the mid-1990s, there was a surge in immigration of persons who identified their intended occupation as one of the ETT occupations. This surge reached its peak in 2001 when there were 15,863 immigrant engineers compared to 8,733 engineering graduates in the same year. The period from 1998 to approximately 2004 was also characterized by relatively stagnant ETT employment. The immigration-driven surge in supply, coupled with weak demand, resulted in significant imbalances. These imbalances were focused on Ontario, which received approximately 60% of IEGs. A consequence of this imbalance was that many international engineering graduates (IEGs) were unable to secure ETT employment. Recruitment conditions were also adverse for many recent graduates. The acute imbalances that were evident a few years ago have abated and appear to have been resolved. Many IEGs who lacked the specific qualifications that employers sought, including non-technical skills and Canadian work experience, have now left the ETT work force. As well, immigration levels have declined to more sustainable levels. In 2007, there were 5,066 immigrants in engineering occupations.

Trend Employment

In some cases the tighter labour markets (i.e. those with a rank of 4 or 5) reflect a surge in employment growth. The Tracking System begins with economic forecasts of international, national, provincial and industrial output and investment. These measures drive employment in ETT occupations; identifying periods of strong demand.

Exhibit No. E.2 and E.3 report trends in employment by province / region and for national occupations. Note that overall national employment is projected to grow by less than 2% each year over the forecast period. Also, the percent change covers five year intervals and this can conceal big cycles in the interim periods. This is the case for Saskatchewan and Atlantic Canada, where the forecast shows large employment gains for ETT occupations from 2009 to 2010.

In general, employment growth in western provinces and among computer, industrial and aerospace engineers leads other occupations and this prompts tight markets. Among technical occupations the only employment demand-driven pressure is among technical inspectors and regulatory officers.

Exhibit No. E.2

ETT Trend Employment Growth by Province and Region

Engineers				
Province/Region	**1996**	**2001**	**2006**	**2011f**
	Annual % Change			
Canada	-1%	3%	4%	4%
British Columbia	9%	-1%	8%	7%
Alberta	-1%	4%	7%	6%
Saskatchewan	-2%	-2%	9%	1%
Manitoba	0%	-3%	5%	5%
Ontario	-2%	5%	2%	2%
Quebec	-2%	2%	2%	4%
Atlantic	-5%	5%	1%	3%

Technical Occupations				
Province/Region	**1996**	**2001**	**2006**	**2011f**
	Annual % Change			
Canada	0%	5%	1%	3%
British Columbia	0%	2%	1%	4%
Alberta	2%	6%	3%	4%
Saskatchewan	3%	3%	8%	5%
Manitoba	-3%	7%	-2%	3%
Ontario	1%	6%	0%	2%
Quebec	-1%	5%	3%	3%
Atlantic	-2%	2%	2%	1%

* Compound Annual Rate of Change
Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics

Employment growth in the ETT occupations will exceed many other occupations and employers will be competing for a growing share of Canada's limited workforce.

Exhibit No. E.3 reports employment trends for national occupations. The stronger employment growth for engineers overall in comparison to technicians and technologists is related to the concentration of activity in major resource related projects and infrastructure investment. In some cases research indicates a trend for employers to substitute technologists for engineers. Moderately stronger gains for electrical, electronic, industrial and manufacturing technicians and technologists is related to this change.

Exhibit No. E.3

ETT Trend Employment Growth by Occupation, *Canada*

Engineers				
Occupation	**1996**	**2001**	**2006**	**2011f**
	Annual % Change			
Civil	-3%	2%	6%	4%
Mechanical	0%	5%	3%	5%
Electrical & Electronic	0%	1%	3%	3%
Chemical	4%	0%	3%	3%
Industrial & Manufacturing	0%	2%	-1%	3%
Computer	-2%	8%	4%	5%
Petroleum	-1%	3%	6%	5%
Aerospace	6%	-5%	6%	10%
Total	-1%	3%	4%	4%

Technical Occupations				
Occupation	**1996**	**2001**	**2006**	**2011f**
	Annual % Change			
Applied chemical technicians & technologists	1%	5%	-3%	2%
Geological, mineral & meteorological technicians & technologists	-3%	3%	0%	4%
Other technical inspectors & regulatory officers	-3%	6%	9%	5%
Civil engineering technicians & technologists	-1%	6%	4%	0%
Mechanical engineering technicians & technologists	5%	15%	8%	2%
Industrial engineering & manufacturing technicians & technologists	26%	-4%	23%	4%
Technical Occupations in Electronic & Electrical	1%	9%	-4%	4%
Technical Occupations in Architecture, Drafting, Surveying & Mapping	-1%	2%	-1%	4%
Total Technical Occupations	0%	5%	1%	3%

* Compound Annual Rate of Change
Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics

In the markets where employment growth far exceeds overall economic trends for an extended period (e.g. computer, petroleum and aerospace engineers) employers will face a challenge of attracting youth and new Canadians into these careers. There will be intense competition with other industries and occupations.

Immigration

International ETT graduates are an important source for the workforce. Indeed, the current study was prompted by the earlier research reports "From Consideration to Integration" and the findings there that potential immigrants need better labour market information to plan their job search.[1] Exhibit No. E.4 and E.5 report the number of arriving immigrants by intended ETT occupations. The wave of arrivals, especially among engineers up to 2001, likely exceeded employment opportunities at that time, and the decline from 2001 to 2006 was a major correction.

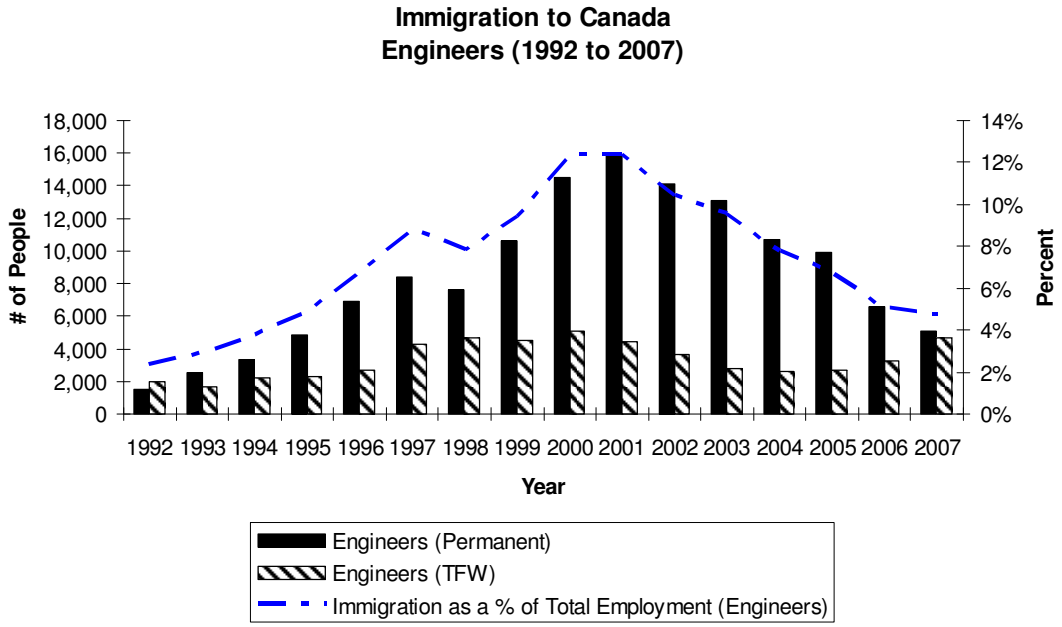
The pattern of arrivals for technical occupations is less cyclical and tracked new job creation over that period more closely. Immigration began rising in 2007 but all of the increase lately has been in temporary foreign workers.

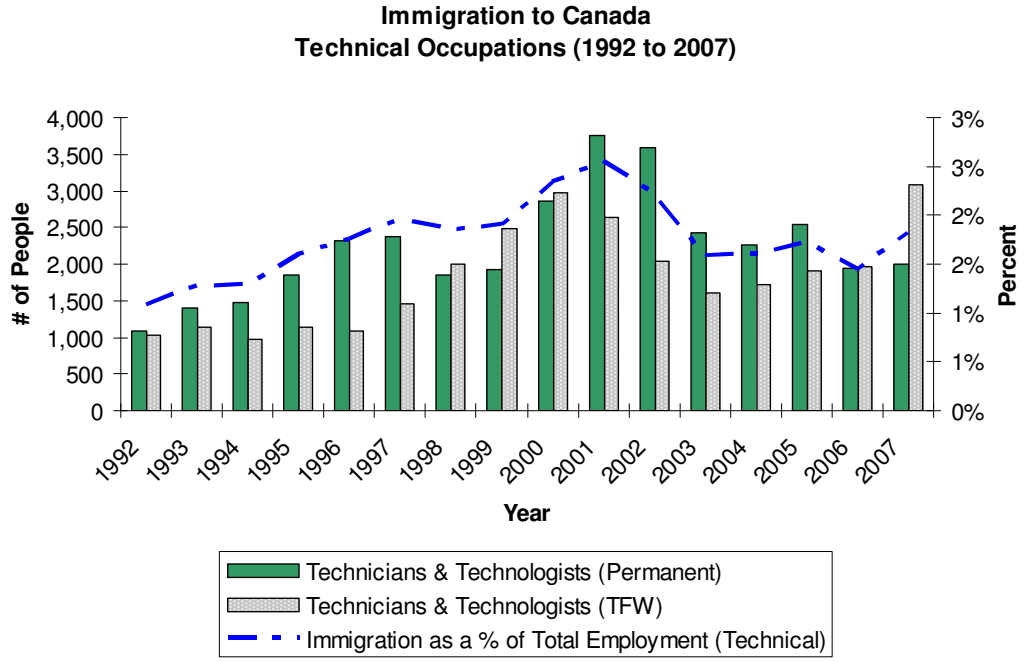
The market assessments presented here are based on evidence that the 'overhang' on the labour market that was occasioned by the surge in immigration that reached its peak in 2001 has now largely been resolved. That is to say, those IEGs who arrived between 1998 and 2004 have largely been integrated into the ETT labour market or have taken employment outside of ETT. For the most part, they are no longer part of 'effective supply' in the ETT labour market. While the social consequence of the 1998-2004 imbalance will persist for some time, the labour market consequences of the imbalance have largely been resolved.

[1] See Engineers Canada "From Consideration to Integration" research and current initiatives are described in http://www.engineerscanada.ca/fc2i/e/index.cfm

Exhibit No. E.4

Immigration to Canada, ETT Occupations (1992 to 2007), *Number of People*



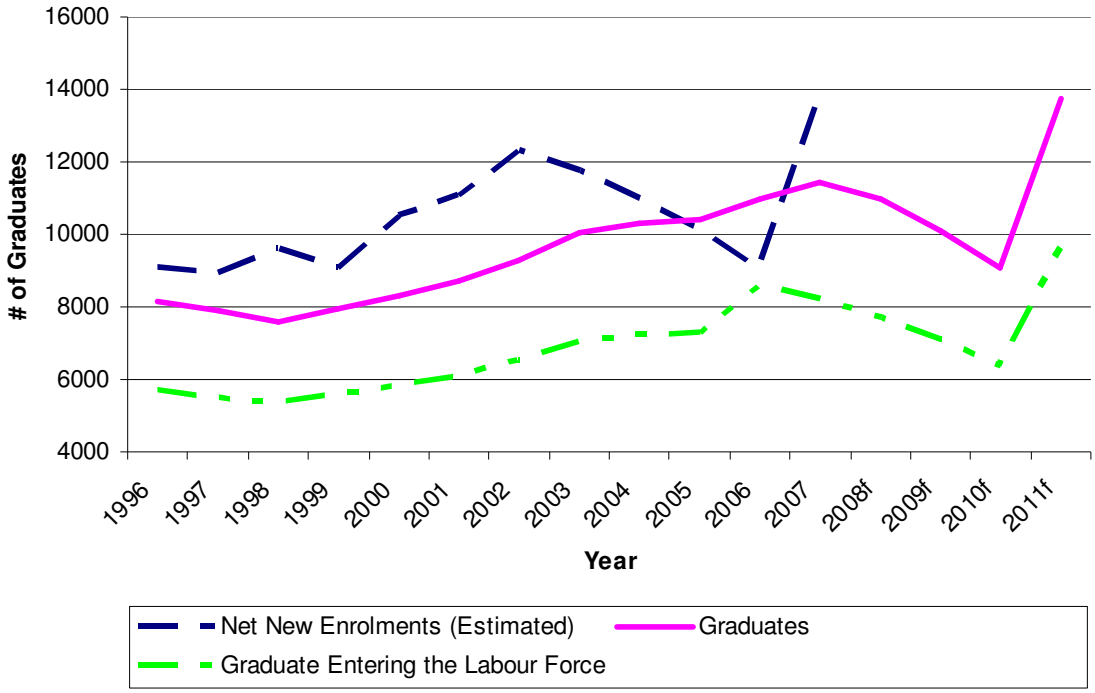


Source: Citizenship and Immigration Canada

Post-Secondary Education

The ETT Labour Market Tracking System has gathered and analyzed data on graduates from Canada's post-secondary programs as the second major source of supply to the workforce. Data for engineers, reported in Exhibit No. E.5, tracks the steady rise in graduations to 2006. While this pattern varies by discipline, the increases were generally an offset to the declining immigration.

Exhibit No. E.5
Trends in Post-Secondary Education: Projected Engineering Graduates for Canada



Source: Engineers Canada, Prism Economics

But two problems act to limit the supply to the workforce. First, the number and increase in graduates is lower than the corresponding decline in immigration. Second, the enrolment rates for these programs begin to decline in 2002. Data for 2007 show a decline in graduations and this is a natural consequence of the earlier enrolment pattern and will continue until 2010. Overall, graduations from post-secondary programs have filled the gaps left by lower immigration and limited the extent of market tightness up to 2007. Recruiting difficulties in 2008 will grow more severe as this trend reverses. [2]

[2] Data for enrolments in 2006 and 2007 contains adjustments that introduce extreme volatility.

Retirements

The final measure included in the market assessments is the age profile of the ETT workforce. Estimates of mortality and traditional rates of exit are used to calculate the number of new entrants that will be needed each year to replace retiring ETT workers to sustain the level of the 2006 workforce. Exhibit No. E.7 tracks the overall results for the ETT occupations across Canada.

Exhibit No. E.6
Age Profiles and Retirement Estimates, *ETT Occupations*

Engineers	Average Age 2007	Replacement Demand as % of Labour Force 2011
Civil Engineers	42.0	2.27
Mechanical Engineers	40.4	1.97
Electrical & electronic Engineers	40.5	1.80
Chemical Engineers	39.8	1.79
Industrial & manufacturing Engineers	39.5	1.70
Petroleum Engineers	40.1	1.75
Aerospace Engineers	39.7	1.58
Computer Engineers	37.0	0.97
Other Engineers	41.2	2.16
Total Engineers	40.2	1.81

Technical Occupations	Average Age 2007	Replacement Demand as % of Labour Force 2011
Applied chemical technicians & technologists	37.1	1.33
Geological, mineral & meteorological technicians & technologists	38.6	1.56
Other technical inspectors & regulatory officers	42.6	2.38
Civil engineering technicians & technologists	38.6	1.63
Mechanical engineering technicians & technologists	38.3	1.69
Industrial engineering & manufacturing technicians & technologists	38.0	1.40
Construction estimators	43.1	2.60
Technical occupations in electronic & electrical engineering	38.0	1.43
Technical occupations in architecture, drafting, surveying & mapping	37.9	1.54
Total Technical Occupations	38.7	1.62

Source: Statistics Canada Census 2006, and Prism Economics and Analysis

There are wide variations in age profiles, for instance individuals in technical occupations are generally younger than engineers, and certain groups (notably Inspectors and Regulatory Officers and Construction Estimators) are generally older. A small difference in average age estimates from the Census corresponds to potentially large variations in demands for new entrants to replace retirements. By 2010 these demographic effects will impose significant demands. It will be common for retirement related demands to exceed new jobs, created to meet economic growth in some years and labour markets.

Conclusions

Tight labour markets for the ETT workforce across Canada will persist until 2011 creating constraints and difficulty in recruiting qualified ETT staff. For about half of the occupations these constraints will be most apparent recruiting specialized staff with over 5 years experience with fewer problems for new entrants. But for many markets, especially in the West, the recruiting challenges will also apply to new entrants and applicants with up to five years experience.

Labour shortages and recruiting problems (i.e. ranks of 4) will sometimes be caused by a surge in employment that are associated with resource and infrastructure projects. Tight market conditions will be more generally associated with the declining number of new entrants to ETT occupations. This decline reflects both low levels of immigrants intending to work in ETT jobs and modest declines in graduates from post-secondary programs.

For example, the rankings of the ETT labour markets in 2008 find that 22 of 55 markets have a rank of "4" indicating significant supply pressures. On the other extreme there is just one occupation with a ranking of "2" indicating that there is an excess of supply over demand and recruiting will face few difficulties.

These findings encourage national and local initiatives that promote careers in ETT occupations for youth, new Canadians and non-traditional groups. The ETT Labour Market Tracking System allows a strategic approach to these efforts as it identifies specific opportunities by discipline, region and time. Employer recruiting plans, immigration priorities and job search strategies can also be guided by the findings reported here.

Industry stakeholders are encouraged to consider applications for the Labour Market Tracking System and to promote its use. Feedback and suggestions for improvements are always welcome. More information on the system is available on the Engineers Canada – CCTT Labour Market Study at http://www.engineerscanada.ca/e/

1. Introduction and Objectives

Major projects, rising resource production and a backlog of infrastructure needs have created momentum in Canada's economy that will continue to drive job opportunities for over 533,000 engineers and engineering technicians and technologists (ETTs). When these opportunities are added to the growing number of retiring Baby Boomers they create the risk of labour shortages and recruiting challenges for employers. This report assesses labour markets in Canada; considering developments since the 1990s and projecting conditions from 2008 to 2011. Analysis includes patterns of industrial output and investment, regional conditions, immigration, post-secondary education, along with retirement patterns.

In late 2008, labour market conditions are tight and often feature labour shortages and recruiting challenges; especially in Western Canada. In Ontario some ETT occupations work intensively in manufacturing and related markets where conditions have weakened. In addition, there is a risk that weak financial markets, declining confidence and tight credit conditions may curtail investment into 2009. This report assumes that these risks do not prompt an extended recession across Canada. Activity slows in 2008 and into 2009, but normal economic expansion resumes later.

Labour market conditions described in this report are intended to guide employers, recruiters, career seekers, immigration, and education planners and industry leaders. General trends combine with major projects and distinctive features to shape 55 ETT labour markets.

Findings reported here identify changing labour market conditions in each market including:

- Surges in employment related to big projects, shifting industry conditions or weakening industry activity that will prompt job losses.
- Changing levels of immigration in key occupations.
- Patterns of enrolment and graduations in key post-secondary programs.
- Age distributions of the local workforce and related retirement patterns.

Labour market changes will be associated with new patterns of labour shortages as employers find new challenges matching the skills and experience of job candidates with their needs. Industry and firm strategies that would address these risks are considered including:

- New industry or employer specific training priorities that develop needed skills and experience.
- New industry or employer attraction and retention activities that address shifting markets.
- The potential for interprovincial migration by occupation.
- Likely substitution of candidates with related skills, experience and qualifications.
- New priorities for recruiting students and expanding post-secondary education for ETT occupations.
- Industry priorities for government policies and practices.

1.1 Mandate of Engineering and Technology Labour Market Study

Engineers Canada and the Canadian Council of Technicians and Technologists, with support from Human Resources and Social Development Canada, together launched the Engineering and Technology Labour Market Study in 2007. The Labour Market Tracking System described here is a core product of this five part research process. Elements of the Tracking System are linked to findings in other components of the study.

The Study Steering Committee draws together over thirty stakeholders in all ETT occupations from across Canada.[3] Industry initiatives and related research have targeted labour market risks and uncertainties including:

- international competition and globalization
- demographic change
- new technologies
- changes in work organization and expectations
- environmental and other regulations
- recruiting challenges
- integrating international workers

The ETT Tracking System creates labour market information that will integrate this work, project market conditions taking account of these challenges, and provide timely and practical recommendations.

1.2 Mandate for ETT Labour Market Tracking System, *Version 2.0*

This report documents Version 2.0 of the ETT Labour Market Tracking System which:

- Creates a statistical description of labour markets that can be updated annually.
- Creates a short-term forecast and assessment of labour market supply – demand balances.
- Integrates research on licensure, certification, work place boundaries, diversity, and globalization.
- Updates labour market assessments with new analysis and projections of economic conditions, demographics, industry projections and other features.
- Assesses alternative policies and recommendations representing the interests of ETT occupations and employers.

This version of the ETT Tracking System is based on a June 2008 forecast of Canadian, provincial, and industry specific economic conditions.[4] Results from the 2006 Census have been incorporated to adjust employment estimates and retirement calculations.

[3] More details on the project are available on the website www.engineerscanada.ca/etlma/index/dfm
[4] The economic projections used to forecast employment levels from 2008 to 2011 are prepared by the Centre for Spatial Economics. A brief summary of the forecast is included in Appendix B. See "The C4SE Provincial Economic Forecast, June 2008"

1.3 Report Structure

This introduction is followed by an overview of the ETT labour markets and key findings. Details for each of the 55 ETT markets are included in Appendix A. Section 3 describes the employment profiles for each ETT occupation. Section 4 presents the impact of immigration and Section 5 reviews the role of post-secondary education. Section 6 considers the age profile and retirement implications. The final section offers conclusions and a description of the next steps.

2. Labour Market Conditions for ETT Occupations

This section of the report provides an overview of the system coverage and describes the rankings assigned to market conditions. Market highlights, by region and occupation, identify both tight and weak markets.

2.1 Coverage by Occupation and Province / Region

The coverage of the ETT Tracking System is determined by the extent of reliable statistics and the needs of stakeholders. Exhibit No. 2.1 describes the occupations and locations included in the system.

Fifty-five distinct labour markets are identified by discipline and region. More detailed market definitions (e.g. applied chemical technicians / technologists in Ontario) are often not included because of data limitations. These limitations are most important for employment estimates. Where the workforce in a market is relatively small, employment estimates provided by Statistics Canada are not reliable and cannot be used.[5] These data limitations require that smaller occupations be grouped together and are labelled as "other" groups. For example, a national occupational category that draws together metallurgical, mining, geological and other engineers is called "other engineers".

Industry feedback clearly indicates that more detailed results by province and occupation would add to the value of the system. Efforts to add this detail are under consideration and would involve extensive industry participation.

[5] There are two primary sources of employment estimates: the Census and the Labour Force Survey (LFS). The Census is a relatively reliable source based on a large sample. Census data is only available every five years with the latest data in 2006. The Labour Market Tracking System makes extensive use of the Census information for ETT occupations. The LFS is a monthly household survey that tracks changes in market conditions. This survey has a much smaller sample and is not reliable for many ETT occupations. Limitations to the LFS are the major constraint on adding more detail to the system.

Exhibit No. 2.1
Coverage, *Occupations by Region*

Occupation by Region – Engineers								
Occupation	**Canada**	**Atlantic**	**Quebec**	**Ontario**	**Manitoba**	**SK**	**Alberta**	**BC**
1. Civil engineers	✓		✓	✓			✓	
2. Mechanical engineers	✓		✓	✓			✓ Mech, Elec, & Chem Engineers	
3. Electrical & electronics engineers	✓		✓	✓				
4. Chemical engineers	✓		Other Engineers					
5. Petroleum engineers	✓			✓			✓	
6. Industrial & manufacturing engineers	✓			✓			Other Engineers	
7. Aerospace engineers	✓			Other Engineers				
8. Computer engineers	✓			✓				
9. Other Engineers including metallurgical and materials, mining & geological engineers	✓			Other Engineers				
	✓							
	✓							
Total Engineers	Σ	✓	✓	Σ	✓	✓	✓	✓
Source: Prism Economics & Analysis								

✓ = Labour Market Tracking
Σ = Sum of Individual Labour Markets
Other Occupations (residual)
Mechanical, electrical & electronic, & chemical grouped

<Exhibit No. 2.1 continues on next page>

Occupation by Region - Technical Occupations								
Occupation	**Canada**	**Atlantic**	**Quebec**	**Ontario**	**Manitoba**	**SK**	**Alberta**	**BC**
10. Applied chemical technologists & technicians	✓							✓ Other Technical Occupations
11. Geological, mineral & meteorological technologists & technicians	✓							
Technical occupations in physical sciences	Σ		✓	✓			✓	
12. Other technical inspectors & regulatory officers	✓		✓	✓			✓ Other Technical Occupations	
13. Civil engineering technicians & technologists	✓							
14. Mechanical engineering technologists & technicians	✓							
15. Industrial engineering & manufacturing technologists & technicians	✓							
16. Construction estimators	✓*							
Technical occupations in civil, mechanical & industrial engineering	Σ		✓	✓				✓
17. Technical occupations in electronic & electrical engineering	✓		✓	✓			✓	✓
18. Technical occupations in architecture, drafting, surveying & mapping	✓		✓	✓			✓	✓
Total Technical Occupations	Σ	✓	Σ	✓	✓	✓	Σ	Σ

*Market Ranking not available

Source: Prism Economics & Analysis

✓ = Labour Market Tracking

Σ = Sum of Individual Labour Markets

Technical Occupations in Physical Sciences

Technical Occupations in Civil, Mechanical, Industrial & Manufacturing

Other Occupations (residual)

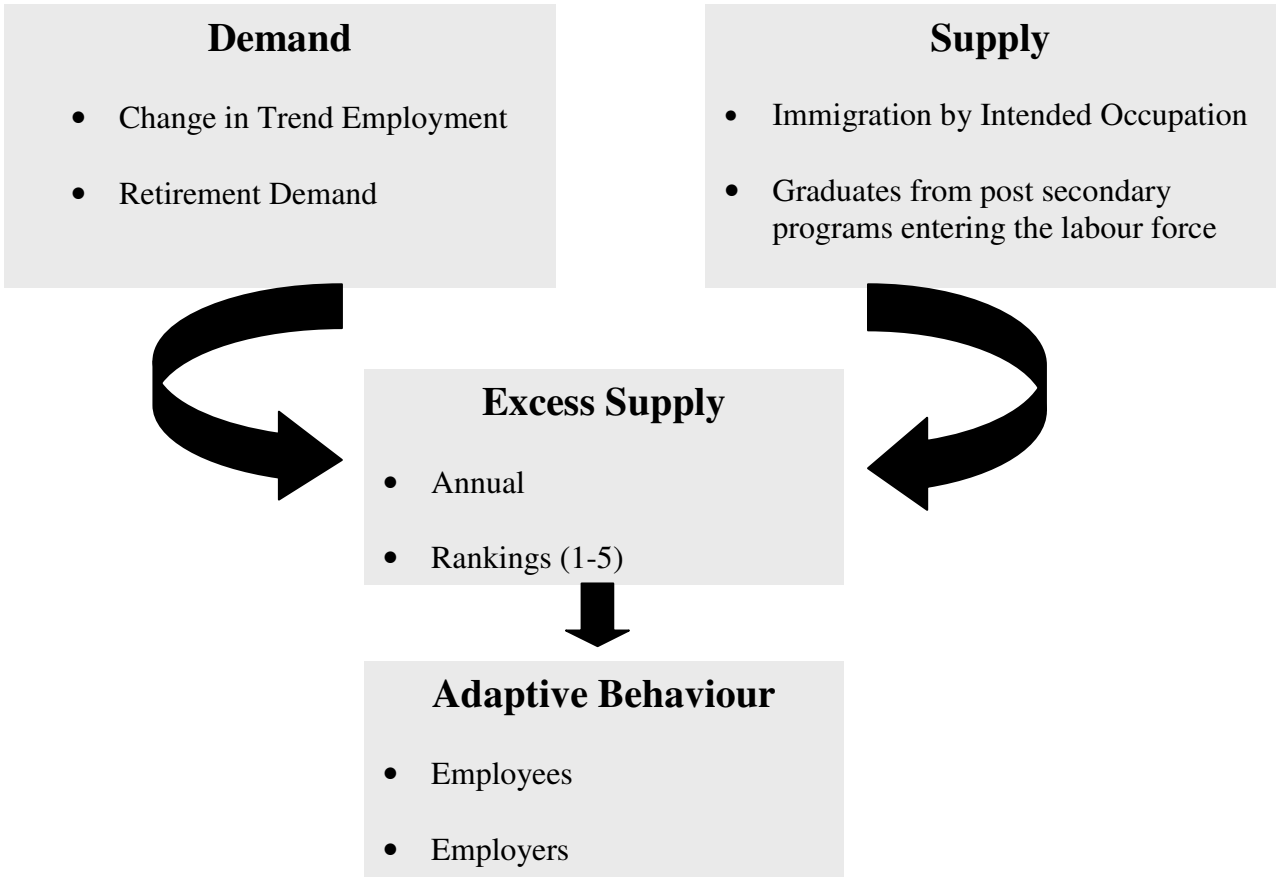
2.2 Rankings Defined

Each labour market identified in Exhibit No. 2.1 is assessed with an annual ranking that summarizes data on:

- excess supply
- retirement patterns
- annual rate of change in employment
- industry input

These measures are combined in general, annual market rankings. Exhibit No. 2.2 summarises the structure of the system.

Exhibit No. 2.2
ETT Labour Market Tracking System, *Summary of Main Components*



Excess supply is measured for each market as supply less demand or;

Excess Supply = (Immigration + Graduation from Post Secondary Programs) – (Change in Trend Employment + Replacement Demand (Retirements))

Rankings are set on a scale from 1 to 5 with 1 representing a very weak labour market and 5 a tight market. From the perspective of ETT employers each market condition is described when recruiting encounters:

RANKING 1 – Significant excess of supply over demand
… no difficulty in recruiting qualified ETT staff with 0-5 years or 5-10 years of Canadian experience at established compensation norms within the local labour market.

RANKING 2 – Excess of supply over demand
… no difficulty in recruiting qualified ETT staff with 0-5 years or with 5-10 years of Canadian experience at established compensation norms within the local or regional labour market. *The geographic range of recruiting and the range of acceptable qualifications is broader than in 1*

RANKING 3 – Moderate supply pressures
… difficulty in recruiting qualified ETT staff with more than 5 years of Canadian experience, with industry or technology-specific skills, and with appropriate non-technical skills. The time required to fill these positions is typically longer than historic norms. Vacancies sometimes need to be re-posted. Employers actively solicit applications from outside the local and regional labour market and reimburse applicants for travel expenses related to interviews, etc. However, these moderate supply pressures are generally not evident in recruiting ETT staff with 0-5 years of Canadian experience.

RANKING 4 – Significant supply pressures
… difficulty *across the board in recruiting qualified ETT staff* in the local and regional labour market. It is normal practice to actively solicit applications from outside the local and regional labour market and to reimburse applicants for travel expenses related to interviews. Employers are generally obliged to improve offered terms of compensation and to assist with re-location costs. Recruitment difficulties lead many employers to increase their use of third-party recruiters and to increase their outsourcing of engineering and technology work to consultancies or staff the assignment with ETT workers from another region. There is a significant increase in the risk of project delays and compensation-driven cost escalations.

RANKING 5 – Supply constraints
… *systemic difficulty* in recruiting qualified ETT staff. International recruiting is common among large employers. There is widespread perception that the consulting sector is working at full capacity and that there is little, if any, remaining scope to outsource engineering and technology work to qualified consultancies with a known track record.

These five rankings are used to characterize ETT labour markets across Canada in the next section. Details, including measures in support of the rankings, are provided for all markets in

Appendix A.[6] Market rankings have been prepared for each year from 2008 to 2011. Industry stakeholders will be invited to discuss these findings and compare their experience and expectations with the empirical measures for each market. The tracking system would allow industry assessments of labour market conditions to be entered directly into the rankings

2.3 Summary of Findings, *Engineering*

With just one exception, *every engineering labour market covered in the ETT Tracking system in 2008 reports either moderate or significant supply pressures (rankings of 3 or 4).* These conditions imply difficulty recruiting experienced engineers (over five years) in every market and difficulties finding more junior engineers in eleven markets. Conditions ease only slightly in 2009 as weakness in the manufacturing sector cuts into jobs. In 2010 and 2011 more markets move to moderate or excess supply as projects end and the numbers of graduates rises. At the end of the period, the most important tight labour markets are related to major projects that are announced already.

In cases where the analysis describes very small markets (e.g. Manitoba, Saskatchewan and Atlantic Canada) there is a risk that measures reported here will not coincide with industry experience. There is also the possibility that the mobility of engineers, especially those in consulting firms, across industries, disciplines or regions could equalize some of the expected recruiting challenges.

Tight market conditions in 2008 and 2009 may contribute to the observed tendency in some markets for technologists to take on roles that have traditionally been assigned to engineers.

Regional and Industry Comments

Markets rankings fall into a pattern with tighter markets in the west – starting in British Columbia and through Alberta, and the prairies. Tighter markets, apparent in Exhibits No. 2.3 and 2.4, move eastward across the period from 2008 to 2011. Thus, engineering labour markets are tightest in Alberta in 2008, in British Columbia in 2008 and 2009, in Saskatchewan, along with Manitoba from 2009 to 2011. By 2011 the current extreme tightness in British Columbia and Alberta has eased off as major projects reach completion and the provincial economies slow down.

This pattern extends to Quebec and Atlantic Canada where conditions are tightening in 2008 and major resource projects and related infrastructure will gradually add to recruiting pressures for engineers. Conditions in Atlantic Canada peak in 2010.

There is a tendency built into the system for larger groupings of the ETT workforce to reflect more balanced markets or moderate supply pressures (i.e. a ranking of 3). For example, the rankings for all ETT occupations in Ontario, and nationally are often a "3". This reflects the

[6] A summary of all the rankings is provided with this report and detailed statistical tables are provided on the website; http://www.engineerscanada.ca/etlms/index.cfm

tendency for imbalance in one small group to be offset by another. The averaging of all the factors may obscure specific examples of tight or loose markets. These situations depend on the mobility and substitutability of skills and work experience across the ETT occupations.

The major factors driving these labour market cycles are economic. The resource boom and related pressure on infrastructure is strongest now in British Columbia and Alberta. Activity is spreading to Saskatchewan. Design, construction and operation of new hydrocarbon extraction, distribution, mining, electrical generation, agricultural related facilities, and related infrastructure are driving ETT employment. These conditions are set out in more detail in Section 3.

Other supply side factors are driving the rankings and create different perspectives for employers and job seekers. For employers, in many markets that are characterized by modest supply constraints (3), the problem is not a lack of applications from candidates with up to five years experience, but with their qualifications. In particular they lack non-technical skills and / or Canadian work experience.

From the job seeker's perspective, these current conditions could be frustrating. For many engineers, the surge in the arrival of permanent residents, from 1999 to 2006, created intense competition for jobs and these frustrations still linger, especially in Ontario. Commencing in the mid-1990s, there was a surge in immigration of persons who identified their intended occupation as one of the ETT occupations. This surge reached its peak in 2001 when there were 15,863 immigrant engineers compared to 8,733 engineering graduates in the same year. The period from 1998 to approximately 2004 was also characterized by relatively stagnant ETT employment. The immigration-driven surge in supply, coupled with weak demand, resulted in significant imbalances. These imbalances were focused on Ontario, which received approximately 60% of IEGs. A consequence of this imbalance was that many international engineering graduates (IEGs) were unable to secure ETT employment. Recruitment conditions were also adverse for many recent graduates. The acute imbalances that were evident a few years ago have abated and appear to have been resolved. Many IEGs who lacked the specific qualifications that employers sought, including non-technical skills and Canadian work experience, have now left the ETT work force. As well, immigration levels have declined to more sustainable levels. In 2007, there were 5,066 immigrants in engineering occupations. These conditions are set out in more detail in Section 4.

Exhibit No. 2.3
Summary of Rankings, *Engineers by Province/Region*

	2008	2009	2010	2011
British Columbia	4	4	3	3
Comment: Strong expansion in resource-based and infrastructure projects drives employment to 2010 and then job growth reaches a plateau. Immigration declined from a peak of 2700 in 2000 to a low of 1,000 in 2007. The age profile of the engineer workforce is older than average and replacement demand adds to market tightness. Graduations from CEAB programs are on a general upward trend, but gains do not fully offset declining immigration. Markets remain tight and recruiting difficult until at least 2010.				
Alberta	4	3	3	3
Comment: Strong expansion in resource-based and infrastructure projects drove employment and created tight markets into 2008. Lower production of conventional oil and gas and some moderation in other sectors creates a gradual easing of the extremely tight markets of the past years. Immigration, including temporary foreign workers has grown strongly in 2007 and 2008. Graduations from CEAB programs are also rising and help to gradually ease recruiting problems. The age profile of the engineer workforce is younger than average and replacement demand does not add to market tightness. Markets remain tight in 2008 and recruiting key skills remains difficult until 2011.				
Saskatchewan	3	3	4	3
Comment: Very large resource-based (uranium and potash) and infrastructure projects are now planned or started and will create tight markets into 2009 and 2010. Employment demands for engineers depends on whether work is located in the province or accessed from outside locations. Rankings shown here assume extensive use of outside consultants. Immigration is limited. Graduations from CEAB programs are rising and help to fill new jobs. The age profile of the engineer workforce is average and replacement demand adds to market tightness. Even with extensive use of outside consulting, markets will grow tight by late 2009.				
Manitoba	3	4	4	3
Comment: Major infrastructure and resource projects are driving employment gains in 2009 and 2010. Employment demands for engineers depend on whether work is located in the province or accessed from outside locations. Rankings shown here assume use of outside consultants. Immigration is limited but has increased recently and now approaches historic high levels. Graduations from CEAB programs are rising and help to fill new jobs. The age profile of the engineer workforce is average and replacement demand adds to market tightness. Even with use of outside consulting, markets will grow tight by late 2009.				

<Exhibit No. 2.3 continues on the next page>

	2008	2009	2010	2011
Ontario	3	3	3	3
Comment: Weakness in manufacturing activity and financial uncertainty is spreading and threatens to undermine research and investment. The impact of these changes may be limited. The steady decline in immigration since 2000 has not been matched by rising graduations from CEAB programs and recruiting remains difficult for key skills and experienced engineers. The annnounced nuclear generation projects are not included in this forecast. There is a risk that these projects will create serious recruiting challenges for specialized and experienced engineers. The age profile of the engineer workforce is older than average and replacement demand adds to market tightness.				
Quebec	4	4	2	2
Comment: Major projects in manufacturing and resource related sectors are expected to end in 2009 and work declines in 2010 and then growth resumes in 2011. Utility projects grow to 2009, pause in 2010 and resume growth in 2011; providing civil and electrical jobs. Immigration increased in 2007 and if current levels are sustained the added supply will equal the high and steady number of graduates from CEAB programs. Indeed, 2007 levels of supply may be excessive for the expected level of job creation in 2010 and 2011. The age profile of the engineer workforce is younger than the national average and replacement demand will not aggravate market tightness.				
Atlantic	3	3	4	3
Comment: Major projects in manufacturing (refining) and resource related (off shore oil and gas) are expected to expand, steadily creating jobs, especially in Newfoundland and Labrador and New Brunswick. Immigration is moderate and graduations from CEAB programs are rising moderately. Current immigration and post-secondary enrolment patterns will not be adequate to meet peak demands for these projects in 2010. The age profile of the engineer workforce is older than the national average and replacement demand will aggravate market tightness. Recruiting problems, especially for specialized and experienced engineers, will continue to be a challenge across the forecast period.				
Canada	3	3	3	3
Comment: Overall national conditions reflect recruiting difficulties finding many specializations and experienced engineers. Labour shortages expected in the West and Quebec may be eased through access to consulting services from Ontario. The expected timing and magnitude of large infrastructure and resource projects are a crucial assumption; especially in Alberta, Saskatchewan and Quebec. The pattern across all the markets is for growth in investment to peak in 2009 and slow at high but stable levels in 2010 and 2011. Immigration is assumed to remain at 2007 levels. Graduates from postsecondary programs increased in 2006 and 2007, and remain well above ten year average levels.				

Source: Prism Economics and Analysis

Comments by Discipline

Exhibit No. 2.4 reports rankings for each engineering occupation at the national level. In some cases the rankings reflect notable conditions in specific markets. For example civil engineering in Quebec is a very tight market related to infrastructure projects. Rankings for chemical, industrial and manufacturing engineers reflect conditions in Ontario. Industry comments also indicate that the ranking for petroleum engineers may be overstated and for chemical engineers understated as the former are more focused on conventional oil and gas where production is declining. At the same time there is rising demand for chemical engineers in the oil sands projects.

Exhibit No. 2.4

Summary of Rankings, *Engineers by Occupation*

	2008	2009	2010	2011
Civil	4	4	4	3
Comment: Strong employment growth, concentrated in infrastructure projects, is expected across the forecast period. Construction industry employment is more cyclical; surging to 2009 and levelling off in 2010 and 2011. Immigration holds at 2007 levels; just half of peak values in 2000. Gains in graduations from post-secondary programs are large relative to past trends but do not make up for lower immigration. The age profile is older than other disciplines and replacement demands will add to market tightness. Recruiting challenges for special skills and experience will continue across the forecast period.				
Mechanical	3	3	3	3
Comment: Employment growth is moderated by exposure to weaker manufacturing activity. Immigration holds at 2007 levels; just half of peak values in 2000. Graduations from post-secondary programs are close to ten year averages and do not make up for lower immigration. The age profile is close to the average for all engineers and replacement demands will add to market tightness. Recruiting challenges for special skills and experience will continue across the forecast period.				
Electrical & electronic	3	3	3	3
Comment: Utility projects create strong employment demand across all four years but this is balanced by the weakness in manufacturing activity. Immigration has fallen to half of peak values while the number of post-secondary graduates remains at ten year average levels. Recruiting challenges will remain for special skills and work experience especially in project related areas. The age profile for electrical and electronic engineers is close to the average for all engineers and this will contribute to recruiting challenges.				
Chemical	3	2	3	2
Comment: Employment projections are tied to manufacturing output and general consulting; resulting in only modest demand. Industry input suggests that chemical engineers are in demand in Alberta and other markets and rankings here may underestimate market conditions. Immigration is down to half peak levels and graduations from CEAB programs are holding at ten year average levels. The age profile for chemical engineers is close to the average and this will contribute to recruiting challenges.				
Industrial & manufacturing	4	4	3	3
Comment: Strong employment growth projections from 2007 to 2009 are linked to projects in refining, ethanol and other resource related projects. This activity eases and employment is flat in 2010 and 2011. Immigration increased in 2007 and graduations from CEAB programs are rising. The age profile for this occupation is younger than the average and this will have a limited impact on recruiting challenges.				
Computer	3	3	3	2
Comment: Overall rankings conceal recruiting challenges. Cyclical recovery doubled employment from 2003 to 2007 and markets were tight. Growth is moderating from 2008 to 2011. Supply is catching up to demand. Immigration has stabilized at half of the 2000 peak values and graduations from CEAB programs are still below past trends. The age profile for this occupation is much younger than the average and this will help to ease recruiting challenges.				

<Exhibit No. 2.4 continues on the next page>

	2008	2009	2010	2011
Petroleum	3	3	3	3
Comment: Consistent growth in employment is linked to resource based projects in many provinces. Supply measures for this occupation are not reliable as, for example, few CEAB programs identify this specialty. Industry input suggests that demand here may be met from the pool of chemical and other related disciplines. The age profile for this occupation is much older than the average and this will add to recruiting challenges.				
Aerospace	4	4	3	2
Comment: A strong cyclical gain in employment from 2006 to 2009 is followed by a modest decline. There are few CEAB programs that identify this discipline and limited immigration so that demand readily exceeds supply signalling shortages. Census data indicates that the age profile for this group is normal and some recruiting pressure will be related to replacing retiring engineers. The limited information in the tracking system does not identify skills, qualifications and experience for this group and the most likely interpretation is that recruiting needed specialties and experience in these occupations will remain a challenge.				
Total Engineers	3	3	3	3
Comment: Job opportunities for engineers have grown more rapidly than for most other occupations and this pattern will persist across the forecast period. The strongest employment growth will be in 2008 and 2009 as large resource related and infrastructure projects start and reach completion. Slower employment growth in 2010 and 2011 will allow supply to catch up to demand. Immigration had declined by 2007 to half the levels reported in 2000 and 2001. Gains in graduations from CEAB programs have filled in only part of the decline in immigration so that the supply of new engineers has been limited. Overall this has created significant recruiting challenges in finding needed skills and experience. These conditions will persist across the forecast period. As growth in new jobs eases in 2010 and 2011, retirements rise and replacement demands dominate recruiting.				

Source: Prism Economics and Analysis

2.4 Summary of Findings, *Technical Occupations*

Historical data and projections measuring the components of the rankings for technical occupations are not as strong as those available for engineers. It is particularly difficult to track enrolments and graduations from post-secondary programs for these groups. Detailed immigration data is available but has a limited impact as immigration is not as large relative to the labour force supply for technical occupations as for engineers.

Provincial and regional rankings are set out in Exhibit No. 2.5. A similar pattern of labour market tightness in the west is apparent. Recent tightness in British Columbia and Saskatchewan is related to strong employment growth. Easing conditions in the west, during 2009 and 2010 relate to weaker manufacturing and the completion of large infrastructure, along with resource projects. Weaker economics in Ontario reduce opportunities for technical occupations. The labour market for technicians and technologists in Quebec is among the strongest. This is concentrated in civil, mechanical, electrical, architectural, and inspectors and regulators. The biggest driving force is a recent government initiative to repair infrastructure.

Exhibit No. 2.5

Summary of Rankings, *Technical Occupations by Province / Region*

	2008	2009	2010	2011
British Columbia	4	4	4	3
Comment: Strong growth in most sectors adds employment for all technical occupations. Immigration rose moderately in 2007 and sustains above average levels to 2011. Graduations from college programs are assumed to continue at 2007 levels which are down from 2004 to 2006. Markets are tight and recruiting for special skills and experienced technicians will be a challenge. The age profile for these occupations is older than average and replacing retiring workers will contribute to skill shortages.				
Alberta	3	3	3	3
Comment: Strong employment growth from 2005 to 2007 slows to manageable rates in all occupations from 2008 to 2011. Strong demand in the oil sands and infrastructure projects is offset by declining conventional oil and gas production. Immigration rose to record levels in 2007 and this rate is assumed to continue for the forecast period. Graduations from colleges remain at high levels. The age profile for Alberta technical occupations is younger than average and replacing retiring workers will not aggravate skill shortages. Recruiting for special skills and experience will be a challenge. Technicians and technologists working in Alberta and originally from other provinces may be attracted back home.				
Saskatchewan	4	3	4	4
Comment: Employment growth accelerates from 2008 to 2010 as major projects start up. Activity is concentrated in mining and agriculture-related expansions. Labour shortages are driven by very limited international immigration and rising college graduations. Saskatchewan will need to attract technicians and technologists from other Canadian jurisdictions to meet demands. The age profile of the workforce is average and retirements will add to recruiting problems. Labour shortages may delay projects.				
Manitoba	4	4	4	4
Comment: Strong employment growth is linked to utilities, infrastructure and mining projects. International immigration and college graduations have been rising but are starting from a low base. Labour shortages are expected and may delay projects. The age profile of technicians and technologists in Manitoba is close to the national average and recruiting to replace retiring technicians will be a challenge.				
Ontario	3	2	3	3
Comment: Employment declines in most occupations in 2008 and grows very slowly in 2009 in response to declining manufacturing output. Normal employment growth resumes in 2010 and is strongest in infrastructure and construction related activities. Note that the expansion of the nuclear generation facilities is ***not*** included in the investment assumptions. Immigration and college graduations have settled down to levels just below recent historical norms. The age profile for the workforce is average and will contribute to recruiting difficulties. Ontario is a target for employers from other provinces, who are recruiting specialty skills and experience.				

<Exhibit No. 2.5 continues on the next page>

	2008	2009	2010	2011
Quebec	4	4	3	4
Comment: Mining projects in 2008 and utility projects in 2009 drive big jumps in employment for technical occupations. Mining projects ending in 2010 weaken labour markets for chemical and geological techs but work continues for civil and mechanical, electrical, and other occupations. Overall labour markets are tight and labour shortages threaten. Graduations from college programs are rising and may continue to expand to meet demands. Immigration is strong but has shifted to temporary workers. Age profiles are younger than average for most occupations except civil, mechanical and regulators. Significant difficulties recruiting most occupations will persist and shortages will be apparent among experienced techs.				
Atlantic	4	4	4	4
Comment: Major projects are starting in energy (off shore oil), processing (refineries, LNG) and infrastructure. Work is concentrated in Newfoundland and Labrador and New Brunswick. Projects extend past 2012 and employment grows steadily across the period for the tech occupations. International immigration levels are quite limited and regional college programs are projected to run at a steady state similar to recent past. New Brunswick and Newfoundland employers are recruiting local technicians and technologists working in the West. Labour shortages are likely and recruiting specialized and experienced staff will be a challenge. The age profile of tech occupations in Atlantic Canada is older than average and hiring to replace retiring workers will virtually double labour requirements.				
Canada	3	3	3	3
Comment: National totals conceal most of the important regional and occupational market imbalances. Outside of Ontario, markets tend to be tight and recruiting challenges will persist across the forecast interval for technical inspectors and regulators and across 2008 and 2009 for civil, chemical, mineral, metallurgical technicians and technologists. Market imbalances noted here may be resolved by rising international immigration, interprovincial mobility, and rising graduations from college programs. Technicians and technologists are younger than engineers and their age profile falls close to national averages. Recruiting to replace retiring workers will grow steadily across the forecast and these hiring requirements will surpass projected new jobs by 2011.				

Source: Prism Economics and Analysis

Comments by Discipline

Exhibit No. 2.6 sets out the national rankings for the technical occupations. These rankings are often dominated by specific circumstances that are noted in the comments. Industry comments and the forecasts for industry drivers add some specifics to explain the rankings. For example, the ranking for electrical and electronic engineering technologists is misleading as the market for electrical is notably strong in Quebec and in Manitoba, but weaker in Ontario. Similarly the weak ranking for mechanical engineering technicians and technologists may be misleading as this occupation has higher rankings in Quebec.

Further comments on the national rankings for the technical occupations are included in Exhibit No. 2.6.

Exhibit No. 2.6
Summary of Rankings, *Technical Occupations by Province/Region*

	2008	2009	2010	2011
Applied chemical technicians & technologists	4	4	3	3
Comment: Steady growth from 2007 to 2011 in general industry applications is complemented by strong employment gains from 2007 to 2010 in processing industries including ethanol and energy related projects. International immigration is on a downward trend and now adds fewer new entrant than college programs. Current levels of immigration and graduations will match the slowing demand from new employment and markets move towards better balance. Chemical technicians and technologists are younger than others and retirement demands are not a prominent challenges. Labour shortages will persist to 2010 and skill shortages will present recruiting challenges across the entire forecast period.				
Geological, mineral & meteorological technicians & technologists	3	3	3	3
Comment: Moderate and steady employment across the 2007 to 2011 period is balanced by current levels of international immigration and college graduations. The age profile for this group is average and hiring to fill retirement vacancies remains well below new employment opportunities. Skill shortages and recruiting challenges will remain in situations where special skills and experience are sought.				
Other technical inspectors & regulatory officers	4	4	4	4
Comment: Above average and steady employment growth is related to both strong non-residential construction activity and associated public administration requirements. Shortages are likely as there are few immigrants with needed institutional knowledge and few training programs to prepare new entrants. Specialized work experience is likely needed and there are few qualified persons. Recruiters for these occupations will be focused on a competitive market that may be restricted geographically by needed institutional knowledge.				
Civil engineering technicians & technologists	4	3	3	3
Comment: Current strength in 2008 and steady growth in employment from 2009 to 2011 is related to the non-residential construction boom and infrastructure projects in most provinces. Moderately strong international immigration and college programs are meeting these demands. The age profile is slightly older than for other technicians and technologists. Current labour shortages will ease leaving shortages of specialized skill and experience.				
Mechanical engineering technicians & technologists	2	2	2	2
Comment: Employment growth is limited in a few markets by weakness in manufacturing, but added jobs and retirement needs are covered by rising international immigration and the largest college programs across the technical occupations. This supply satisfies recruiting requirements for all but the special skills and most experienced techs.				

<Exhibit No. 2.6 continues on the next page>

	2008	2009	2010	2011
Industrial engineering & manufacturing technicians & technologists	3	3	3	3
Comment: Strong employment growth in these occupations from 2003 to 2006 created labour shortages that have been slowly improved by rising immigration and college graduates. Employment growth is very weak from 2008 to 2010 but some skill shortages will persist. The workforce age profiles are very young and recruiting to fill retirements will be a small proportion of requirements to fill new jobs.				
Technical occupations in electronic & electrical engineering	3	3	3	2
Comment: Strong employment growth in 2008 and 2009 is related to utility projects and general economic growth. This is a relatively large group and job creation is supported by the largest enrolment in ETT college programs. Current shortages that have been slowly improved by rising immigration and college graduates. The age profile for electronic and electrical engineering technicians is younger than average and hiring to replace retirements will be a small proportion of demand across the forecast interval.				
Technical occupations in architecture, drafting, surveying & mapping	3	3	3	4
Comment; Employment growth for this group was strong from 2004 to 2007 creating tight labour markets. Job growth slows to below average rates from 2008 to 2011. Immigration has been rising and college programs are graduating over half of the numbers needed to meet job creation. The age profile is younger than average and replacing retirements will not be a major burden. Recruiting special skills and experience will continue to be a challenge.				
Total Technical Occupations	3	3	3	3
Comment; Growth in employment for some technical occupations lags because of weakness in the manufacturing sector. In general the markets are tight and employers will continue to face recruiting challenges especially where they seek special skills and experienced workers. Immigration surged in 2007 but this was concentrated in temporary foreign workers. College programs are the most important source of entry level recruits and these programs will provide from three quarters to 100% of needed recruits from now to 2011. Labour shortages will gradually ease.				

Source: Prism Economics and Analysis

2.5 Conclusions

Most of the labour markets reported here are characterized by moderate or significant supply pressures. This implies that significant recruiting challenges – especially for candidates with specializations or more than five years experience -- will be a normal condition. In fact labour market conditions are being driven in Canada by long-term structural features that will limit both youth entering and experienced job seekers. Demographic trends drive the former with expected declines in the crucial 15 to 19 and 20 to 24 age groups. At the same time, weak labour markets for ETT work in the 1990s creates a gap in the age structure of the current workforce. Fewer new jobs were available at that time, which means a shortage of candidates with ten or more years experience.

The rankings in the tracking system have been constructed to reflect other structural features that are distinct to the ETT situation. For example, it is clear that the surge in immigration eight to ten years ago, leaves a large group of international engineering graduates in the workforce but they are not employed as engineers or perhaps in ETT jobs. To the extent that this group continues to seek jobs in the original occupations they constitute an important supply. While their skills and experience may not fit recruiting targets, their presence offers competition for both new Canadian graduates and arriving immigrants. This would create a skewed perception with employers experiencing skill shortages, while a large potential ETT workforce continues to apply for jobs.

3. Trends in ETT Employment by Industry and Region

Historical levels and patterns of change in employment in the ETT occupations are the core of the system. This updated version of the tracking system incorporates recently released data from the 2006 Census. There were 191,600 engineers and 269,900 engineering technicians and technologists in the ETT workforce at that time for a total workforce of 461,000.[7]

A forecast for employment in each of the 55 markets is prepared by tracking historical and projected measures of change in industry output and investment. These industry measures are, in turn, linked to measures of global, national and provincial economic conditions. Appendix B includes a more detailed description of the updated macroeconomic and industry conditions that drive employment.[8]

Exhibit No. 3.1 describes past and expected future demands for engineers in each province and region. Overall employment for engineers has grown at an annual rate of just over 4.0% over the period from 2001 to 2006; just slightly ahead of overall national employment. Employment growth is projected to sustain the same pace from 2006 to 2010.

The strongest increase in employment is in Western Canada and is driven by the resource boom and the associated need for infrastructure. Note that the growth rates are cumulative across the five year interval and this measure misses the strong growth in Saskatchewan from 2009 to 2010. These same factors drive employment gains in Quebec and Atlantic Canada in the forecast period from 2008 to 2011. Employment opportunities are more limited in Ontario where weak growth in the United States and associated impacts on manufacturing hold the economy back.

[7] Version 1.0 of the tracking system measured a slightly larger workforce as it included appliance and electronic service repair technicians. This large group was removed from the ETT work force for this version on the grounds that most workers in this occupation were qualified as trades or had only secondary school.

[8] Economic forecasts of economic and industry conditions are provided by the Centre for Spatial Economics from their June 2008 Provincial forecast.

Exhibit No. 3.1

ETT Trend Employment by Province and Region, *Engineers*

Number of Workers

Engineers					
Province/Region	**1992**	**1996**	**2001**	**2006**	**2011f**
	# of Workers				
Canada	148134	140505	163759	196184	232553
British Columbia	9843	13902	13277	19835	26348
Alberta	19443	18493	22902	32010	41135
Saskatchewan	2783	2591	2358	3570	3697
Manitoba	3872	3851	3293	4105	4961
Ontario	65608	59742	74483	84271	92552
Quebec	37765	34586	37978	42923	49384
Atlantic	8458	6858	8833	9138	10293

Annual Percent Change

Engineers				
Province/Region	**1996**	**2001**	**2006**	**2011f**
	Annual % Change*			
Canada	-1%	3%	4%	4%
British Columbia	9%	-1%	8%	7%
Alberta	-1%	4%	7%	6%
Saskatchewan	-2%	-2%	9%	1%
Manitoba	0%	-3%	5%	5%
Ontario	-2%	5%	2%	2%
Quebec	-2%	2%	2%	4%
Atlantic	-5%	5%	1%	3%

* Compound Annual Rate of Change

Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics.

Exhibit No. 3.2, presents the history and projections for trend employment in the technical occupations in each province and region. Trend employment growth for the technicians and technologists averages just 1.0% over the 2001 to 2006 period; held back by the decline in manufacturing activity that began in 2003 and 2004. Employment growth accelerates from 2006 to 2011; led largely by activity in the west.

Stronger growth of technical occupations is spread across all the provinces, with weakness in Ontario the most apparent. Workers in technical occupations have been vulnerable to weakness in manufacturing and services industry and the geographic impact of this is most apparent in Ontario.

Exhibit No. 3.2

ETT Trend Employment by Province and Region, *Technical Occupations*

Number of Workers

Technical Occupations					
Province/Region	**1992**	**1996**	**2001**	**2006**	**2011f**
	# of Workers				
Canada	195264	195606	250818	269902	307442
British Columbia	24945	25237	28066	29003	34585
Alberta	24570	26287	35687	42128	49062
Saskatchewan	3138	3483	3983	5921	7219
Manitoba	7628	6795	9345	8408	9407
Ontario	68991	70945	95587	94708	104069
Quebec	49037	46966	60945	71808	82176
Atlantic	15106	13952	15664	16968	17896

Annual Percent Change

Technical Occupations				
Province/Region	**1996**	**2001**	**2006**	**2011f**
	Annual % Change*			
Canada	0%	5%	1%	3%
British Columbia	0%	2%	1%	4%
Alberta	2%	6%	3%	4%
Saskatchewan	3%	3%	8%	5%
Manitoba	-3%	7%	-2%	3%
Ontario	1%	6%	0%	2%
Quebec	-1%	5%	3%	3%
Atlantic	-2%	2%	2%	1%

* Compound Annual Rate of Change
Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics

The next two Exhibits move the focus to occupations. National results are presented here and complete details by occupation and provinces/region are available in Appendix A. Exhibit No. 3.3 tracks employment for engineering occupations.

Over the historical period, the three largest disciplines; civil, mechanical and electrical all share similar rates of growth. Compound growth rates in Exhibit No. 3.3 average over important cycles. For example, computer engineering enjoyed a boom in the period leading up to 2001 and then entered a downturn. A recovery in employment in computer engineering is now underway and is expected to extend to 2011.

Above average employment growth is also apparent in the recent past for petroleum engineering and this strength is expected to ease as a consequence of the projected easing of the resource cycle.

Exhibit No. 3.3
ETT Trend Employment by Occupation, Engineers, *Canada*

Number of Workers

Engineers					
Occupation	**1992**	**1996**	**2001**	**2006**	**2011f**
	# of Workers				
Civil	33806	30098	32610	44431	52498
Mechanical	24939	25164	31489	36723	44146
Electrical & Electronic	30326	30626	32059	36955	41091
Chemical	7103	8294	8244	9428	10645
Industrial & Manufacturing	19840	20153	21807	20807	23422
Computer	15446	14133	20867	25117	30407
Petroleum	6413	6221	7271	9883	11860
Aerospace	3610	4485	3448	4685	6747
Total	148134	140505	163759	196184	232553

Annual Percent Change

Engineers				
Occupation	**1996**	**2001**	**2006**	**2011f**
	Annual % Change*			
Civil	-3%	2%	6%	4%
Mechanical	0%	5%	3%	5%
Electrical & Electronic	0%	1%	3%	3%
Chemical	4%	0%	3%	3%
Industrial & Manufacturing	0%	2%	-1%	3%
Computer	-2%	8%	4%	5%
Petroleum	-1%	3%	6%	5%
Aerospace	6%	-5%	6%	10%
Total	-1%	3%	4%	4%

* Compound Annual Rate of Change
Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics

Exhibit No. 3.4 tracks employment growth for the technical occupations. The tendency to stronger growth noted above is concentrated in inspectors and regulatory officers, civil, along with mechanical and industrial technicians and technologists

The weaker forecast for the technical occupations; especially chemical and electrical is attributed to the current slump in manufacturing.

Exhibit No. 3.4
Trend Employment in ETT Occupations, Technical Occupations, Canada

Number of Workers

Technical Occupations					
Occupation	**1992**	**1996**	**2001**	**2006**	**2011f**
	# of Workers				
Applied chemical technicians & technologists	28651	30226	38893	33301	35737
Geological, mineral & metallurgical technicians & technologists	10904	9604	10967	10846	12565
Other technical inspectors & regulatory officers	22963	20671	27346	42929	52182
Civil engineering technicians & technologists	10467	9963	13513	16773	16649
Mechanical engineering technicians & technologists	4398	5402	10739	15543	16677
Industrial engineering & manufacturing technicians & technologists	2986	7457	5961	16486	19461
Technical Occupations in Electronic & Electrical	44166	46183	69628	56108	65153
Technical Occupations in Architecture, Drafting, Surveying & Mapping	63308	60788	67675	65313	74951
Total Technical Occupations	195264	195606	250818	269902	307442

Annual Percent Change

Technical Occupations				
Occupation	**1996**	**2001**	**2006**	**2011f**
	Annual % Change*			
Applied chemical technicians & technologists	1%	5%	-3%	2%
Geological, mineral & meteorological technicians & technologists	-3%	3%	0%	4%
Other technical inspectors & regulatory officers	-3%	6%	9%	5%
Civil engineering technicians & technologists	-1%	6%	4%	0%
Mechanical engineering technicians & technologists	5%	15%	8%	2%
Industrial engineering & manufacturing technicians & technologists	26%	-4%	23%	4%
Technical Occupations in Electronic & Electrical	1%	9%	-4%	4%
Technical Occupations in Architecture, Drafting, Surveying & Mapping	-1%	2%	-1%	4%
Total Technical Occupations	0%	5%	1%	3%

* Compound Annual Rate of Change
Source: Statistics Canada, Prism Economics and Analysis and the Centre for Spatial Economics

The compound annual growth rates in Exhibits No. 3.1 through 3.4 reflect long-term trends. Year to year variations are common and can impact market conditions and rankings.

Exhibits No. 3.5 and No. 3.6 highlight the year to year variability and cycles in selected occupations. The cumulative change in employment is measured with an index number equal to 100 in 1991. Exhibit No. 3.5, tracking engineers, notes the impact of the recession in the early 1990s on most engineering disciplines and also signals the extreme magnitude of both the gains and losses for computer engineers. Exhibit No. 3.6, tracking the technical occupations, captures the gains and losses for electrical and electronic technicians and the importance of groups like inspectors and regulatory officers.

Exhibit No. 3.5

ETT Trend Employment, Growth by Occupation, *Engineers in Canada*

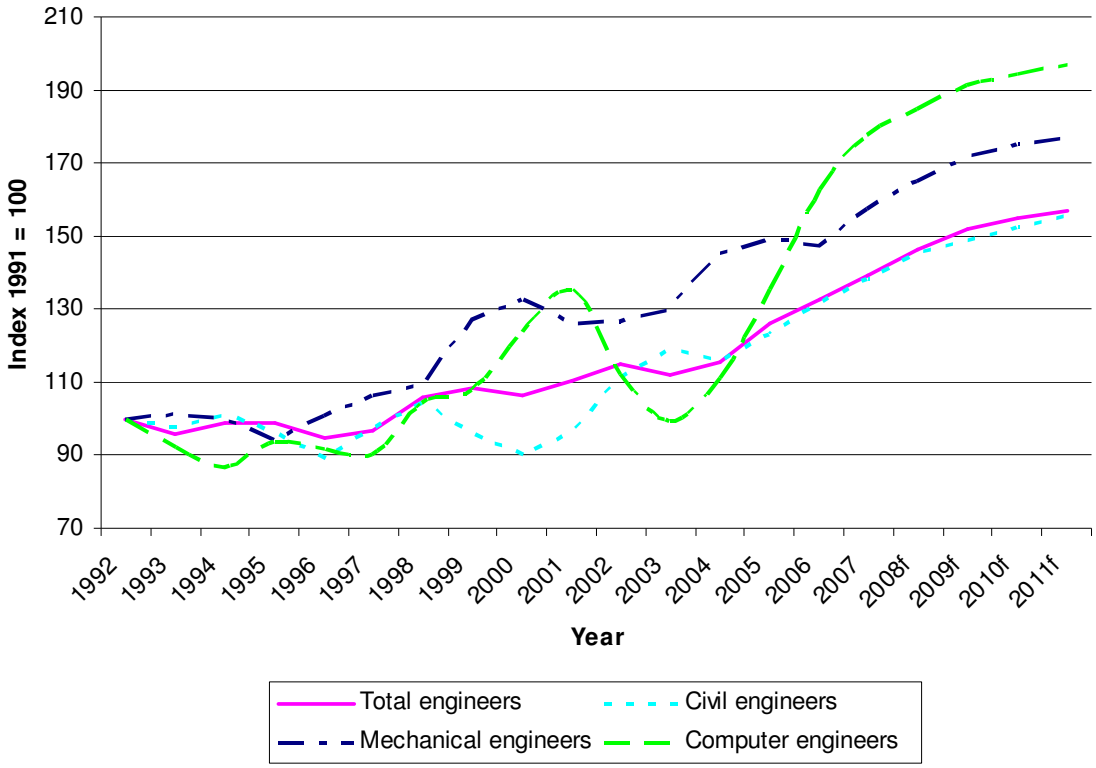
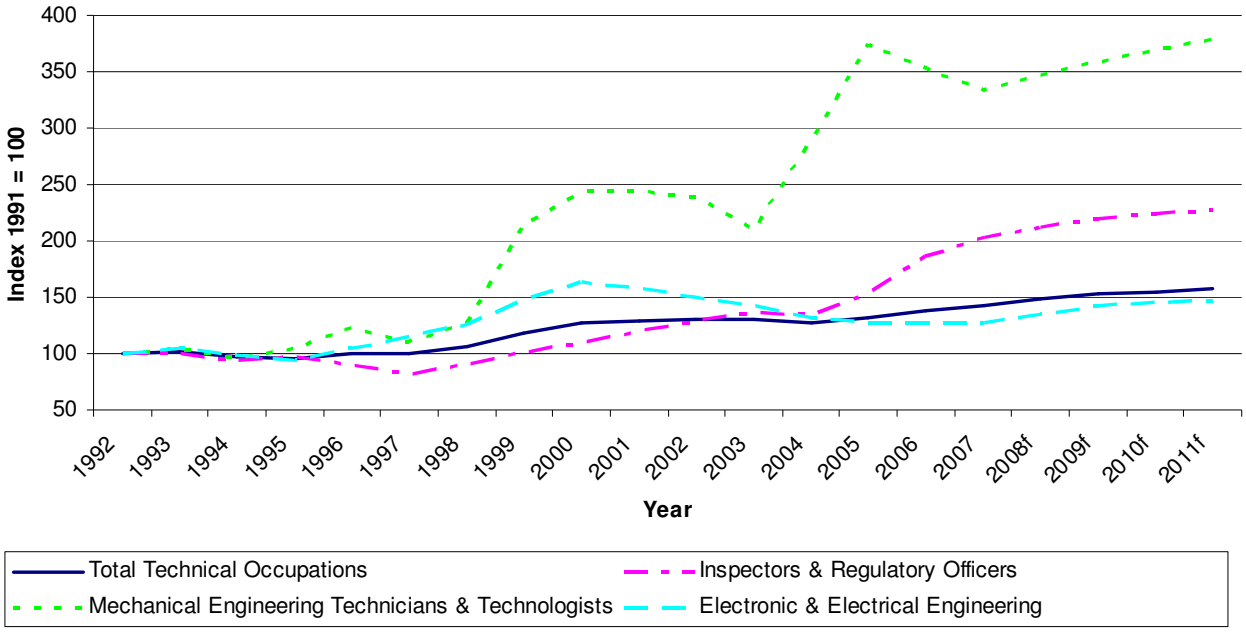


Exhibit No. 3.6

ETT Trend Employment, Growth by Occupation, *Technical Occupations in Canada*



The annual and cumulative change in trend employment is a prime determinant of the labour market rankings. Excess supply measures the capacity of immigration and graduates from post-secondary programs to meet the annual change in trend employment. Demographic trends and the number of expected retirements are added as a demand side factor and the year to year change for this factor is not highly variable. Changes in trend employment are the most variable component of the ranking system and are the most likely cause of year-to-year changes in rankings.

Appendix A provides annual measures for each of the 55 labour markets. A more detailed data set containing history and forecast values for each component of the rankings will be available on the Engineering and Technology Labour Study website.

4. Trends in Immigration

The arrival of foreigners seeking employment in ETT occupations is a major factor in labour markets. The "From Consideration to Integration" reports prepared by Engineers Canada and Human Resources and Social Development Canada, starting in 2003, provided detailed research into the experience of immigrants and their employers. Many current initiatives are based on recommendations arising from that work and seek to facilitate the integration of International Engineering Graduates into ETT jobs. Indeed, this labour market study and the tracking system were recommended by the From Consideration to Integration Steering Committee and the Engineers Canada Board of Directors as an extension of the earlier research and are intended to improve the timing of the arrival and the process of integrating these workers.

This section reports on historical patterns of arriving immigrants and the implications for projected labour market conditions. Historical data is available from 1990 to 2007.[9] The level of immigration reported for each ETT labour market in 2007 is used as the projected level of arrivals in each forecast year-from 2008 to 2011.

There are two categories of arriving immigrants: permanent residents and temporary foreign workers. Each group makes a distinctive contribution to the labour supply.

Permanent residents have completed a detailed screening process and are accepted into Canada on the basis of their education and work place skills. They are expected to enter the Canadian workforce in their intended occupation. However, evidence reported in related research indicates that not all arriving permanent residents are successful.[10] Historical problems integrating international engineering graduates may have been solved and a larger proportion of newly arrived immigrants may be able to meet industry demand. It would be reasonable to assume, however, that the permanent residents counted here may not all meet employer needs.

Temporary foreign workers arrive under different circumstances. A work permits is issued to both immigrants and employers who have already agreed to hire the candidate. By definition then, arriving temporary foreign workers are added to the ETT workforce. Their employment, however, is limited to one or two years and they are restricted to working for one employer. Research suggests that many temporary workers are able to stay longer or convert to permanent resident status. Over the projected period in the tracking system, temporary foreign workers are removed from the workforce after two years in weak markets.

Exhibit No. 4.1 breaks out the pattern of inflows into both permanent and temporary categories for engineers. The most dramatic evidence is the wave of arriving permanent residents that begins in 1998, peaks in 2000, and then subsides; still falling in 2007. At the peak, the arrivals added over 12% to the workforce already in Canada. For over four years the annual increment was more than 10% of the workforce so that the total surge must have increased the engineering

[9] Immigration data presented here was provided by Citizenship and Immigration Canada in a special compilation from Facts and Figures, 2006.
[10] See "Engineering and Technology Labour Market Study, Interim Report, September 2008", page 11.

workforce by more than 50%. It is likely that many of these new permanent residents did not find work in ETT occupations.

The market assessments presented here are based on evidence that the 'overhang' on the labour market that was occasioned by the surge in immigration that reached its peak in 2001 has now largely been resolved. That is to say, those IEGs who arrived between 1998 and 2004 have largely been integrated into the ETT labour market or have taken employment outside of ETT. For the most part, they are no longer part of 'effective supply' in the ETT labour market. While the social consequence of the 1998-2004 imbalance will persist for some time, the labour market consequences of the imbalance have largely been resolved.

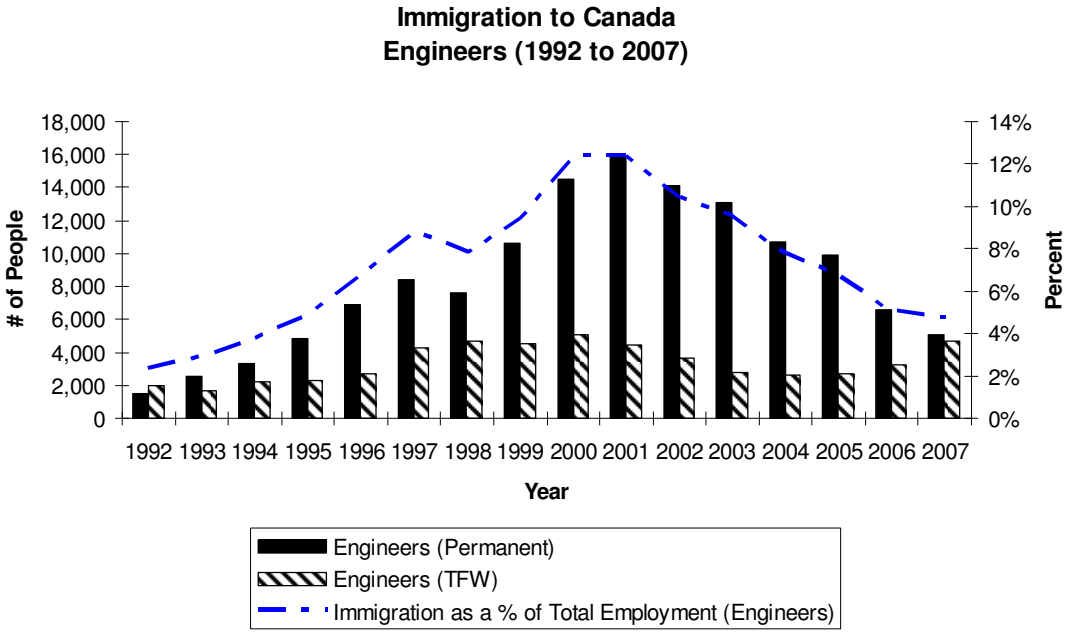
It is notable that the receding wave of permanent residents continues even in 2007. As labour market conditions improved from 2005 on, the international adjustment came through temporary foreign workers. Based on anecdotal evidence and the reported pace of applications for this class of immigrant, the international contribution will continue to be temporary.

The shift to recruiting international engineering graduates (IEGs) as temporary foreign workers may be related to the experience of employers who report recruiting difficulties with permanent residents who lack non-technical skills. Recruiting temporary foreign workers may help employers access needed technical skills (perhaps from related offshore businesses) without making a full time commitment to a new Canadian.

Exhibit No. 4.2 breaks out the same history for technicians and technologists. International technology grads form a much smaller part of the picture. While the workforce for technical occupations is 60% of the total ETT complement, technicians and technologists are just 35% of total immigration. Further, over the entire period, half of arriving technicians and technologists have been temporary foreign workers.

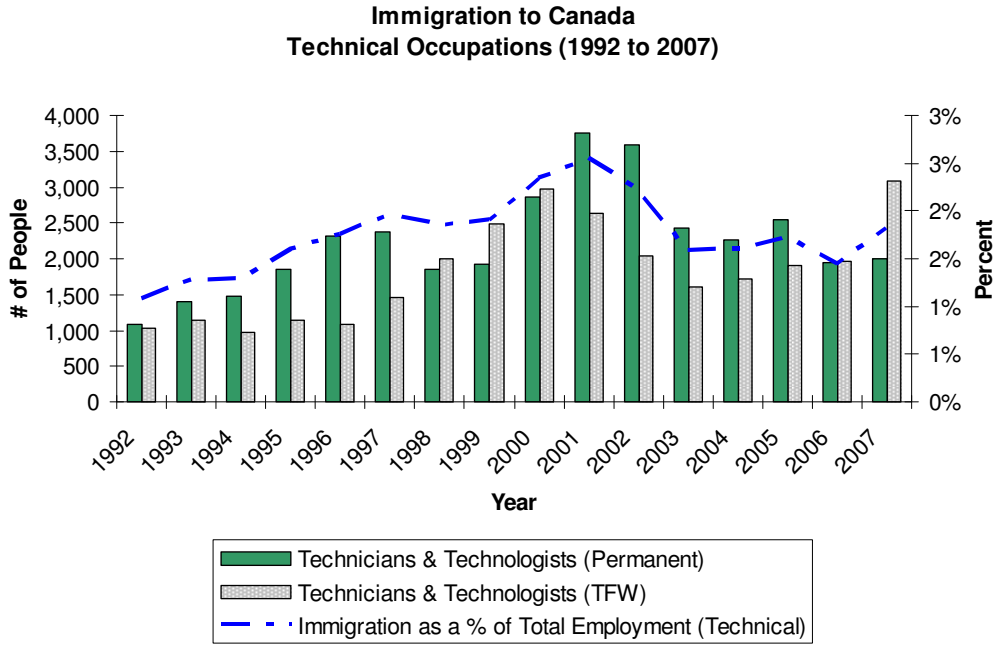
For both engineers and technicians and technologists, the relative importance of temporary foreign workers has risen steadily and peaks in 2007. When this finding is added to the history of arriving engineers, it is clear *that the potential contribution of international graduates to the long-term pool of ETT skills is limited.*

Exhibit No. 4.1
Immigration to Canada, Engineers (1990 to 2006)



Source: Citizenship and Immigration Canada

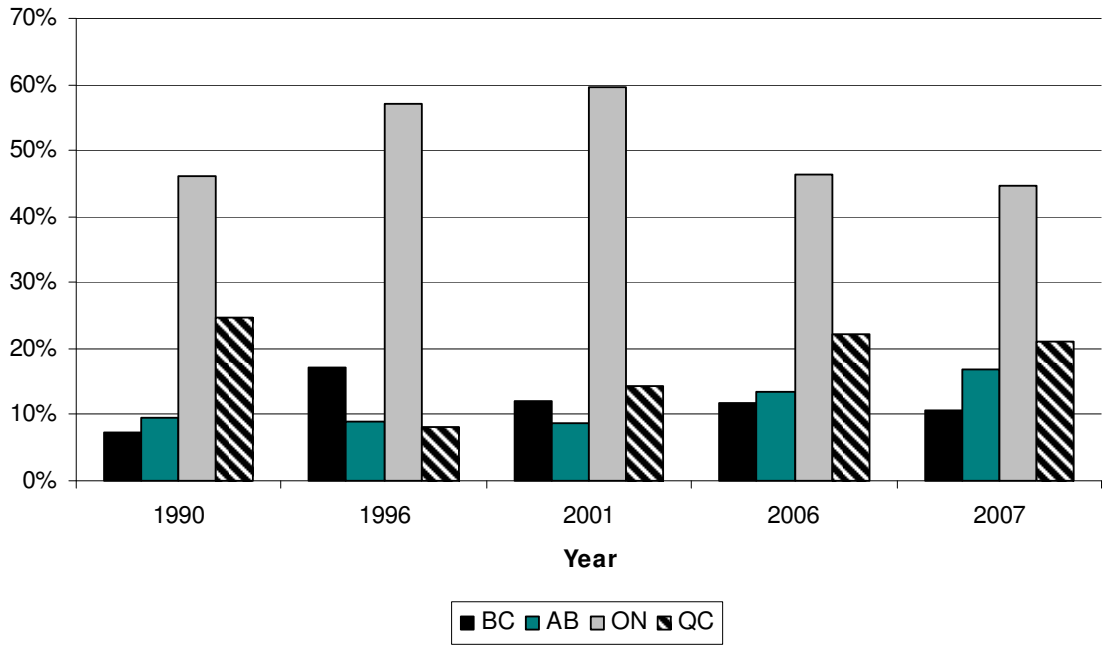
Exhibit No. 4.2
Immigration to Canada, Technicians and Technologists (1990 to 2006)



Source: Citizenship and Immigration Canada

There is an important regional and occupational dimension to the contribution of international ETT graduates.

Exhibit No. 4.3
Percent Distribution of ETT Foreign Workers, by Province, *1990-2007*



Source: Citizenship and Immigration Canada

The trend in the distribution of arrivals across selected provinces (shown in Exhibit No. 4.3 for the full 1990 to 2007 period) indicates that half of the new workforce settle in Ontario and a much smaller proportion in other provinces. There are important cycles in the distribution and the 2007 results likely reflect the evolving economic trends reported in Section 3. In particular, Ontario's share of incoming ETT migration was at a record low, while British Columbia and Alberta are close to high points. The rise in the relative immigration to Quebec is notable. In all cases the level of immigration has fallen over the interval from 2001 to 2007. Exhibit No. 4.4 tracks the relative rates of decline.

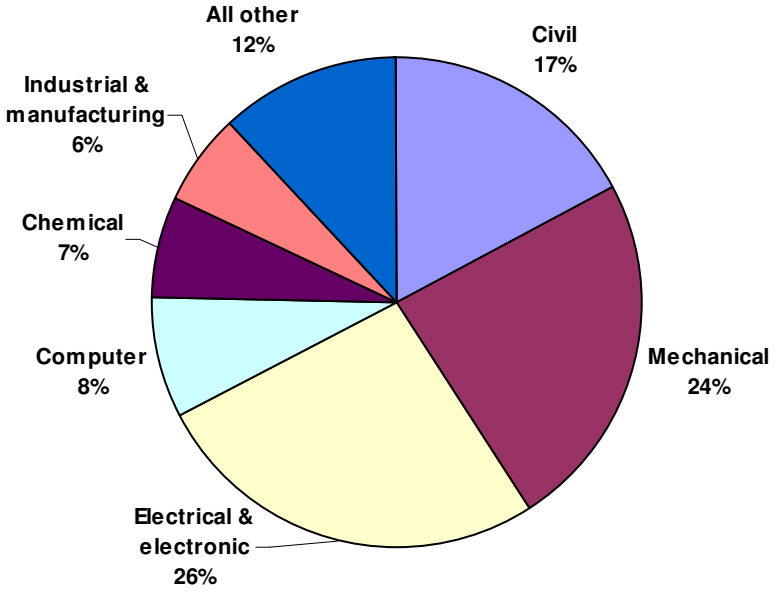
Exhibit No. 4.4
Permanent and Temporary Immigration to Canada, All ETT Occupations, *Provincial Details*

	% Change 2001 to 2007
Atlantic	-49%
Quebec	-18%
Ontario	-58%
Manitoba	-10%
Saskatchewan	-22%
Alberta	8%
British Columbia	-52%
Canada	-44%

Source: Citizenship and Immigration Canada

There are equivalent shifts in the distribution of immigration by discipline. Exhibit No. 4.5 turns first to Engineers. Over the historical period from 1990 to 2006, electrical, mechanical and civil have dominated the arrivals. These proportions are generally stable across the period, but there is greater variation in computer engineering.

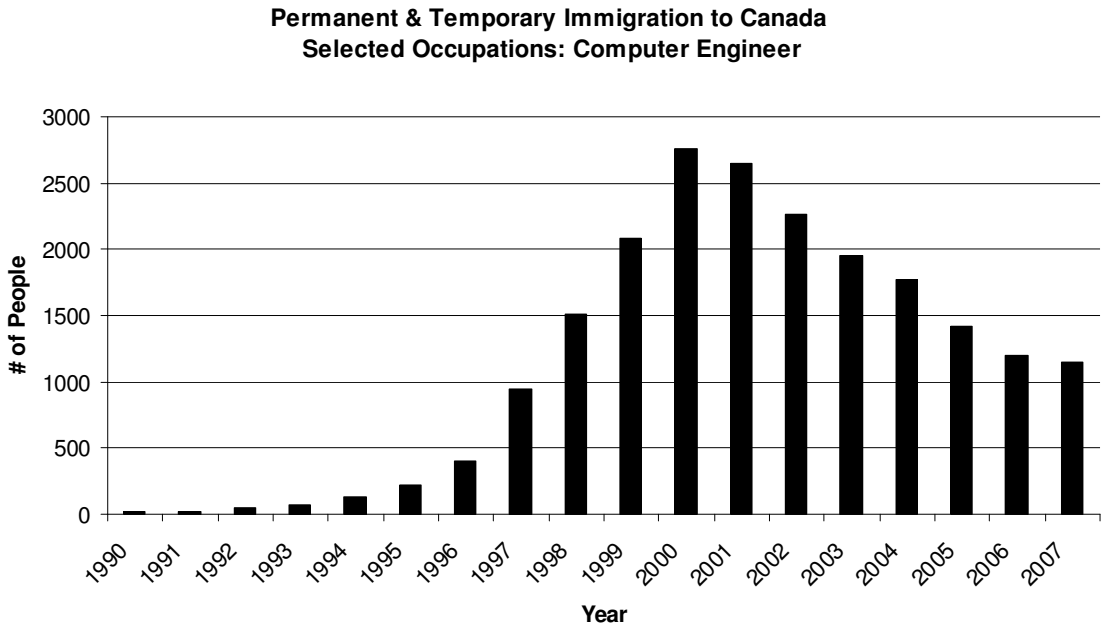
Exhibit No. 4.5
Permanent and Temporary Immigration to Canada, Engineering Occupations (1990 to 2007), *Total*



Source: Citizenship and Immigration Canada

Exhibit No. 4.6 tracks the arrivals of Computer Engineers. The implication here is that computer engineers have been disproportionately impacted by the immigration trends described in this section.

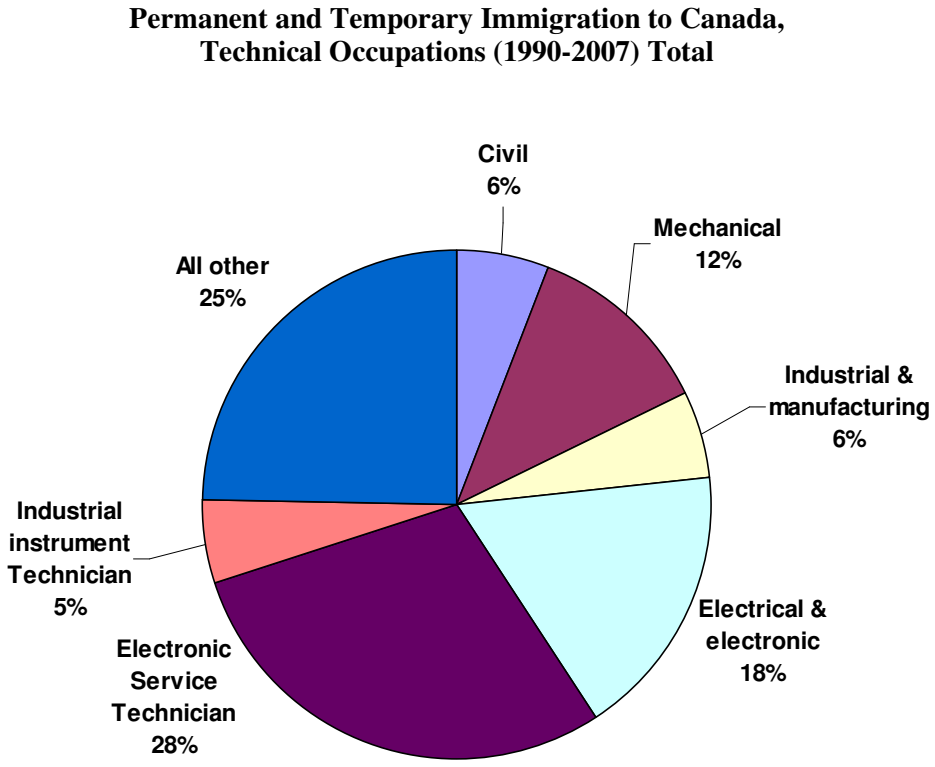
Exhibit No. 4.6
Permanent and Temporary Immigration to Canada, Selected Occupations: *Computer Engineer*



Source: Citizenship and Immigration Canada

Turning next to the technical occupations, Exhibit No. 4.7 tracks the long-term distribution by discipline and shows the equivalent focuses on civil, electrical and mechanical technicians and technologists. The proportions reported in Exhibit No. 4.7 remain roughly constant across the period with the notable exception of electronic service technicians.

Exhibit No. 4.7
Permanent & Temporary Immigration to Canada,
Technical Occupations (1990 to 2007), *Total*



Source: Citizenship and Immigration Canada

Immigration trends described here explain contradictory perceptions of ETT labour markets. In particular, employers would describe difficulties recruiting specific needed skills and new employees with extended Canadian experience if they are recruiting from a workforce with many international ETT graduates who arrived at a time of oversupply and could not find work. At the same time Canadian ETT graduates would notice the growing competition for jobs from international ETT graduates and describe a market dominated by excess supply. This would be especially true in computer engineering in Ontario. Declining immigration reduces excess supplies in many labour markets. Ontario's share of immigration exceeds its share of the national ETT workforce and these excesses may reflect a misallocation of immigration plans based on Ontario's experience.

5. Trends in Post-Secondary Education

This section of the report describes trends in post-secondary education in the ETT occupations. Results are divided between Engineering and Technician and Technologist programs. The most complete results are reported in Exhibits No. 5.1 through No. 5.8 and reflect analysis of annual data collected by Engineers Canada for engineering programs.[11] Data on enrolments and graduation from college programs for technicians and technologists was gathered by the research team and does not provide a homogeneous measure across provinces and occupations.

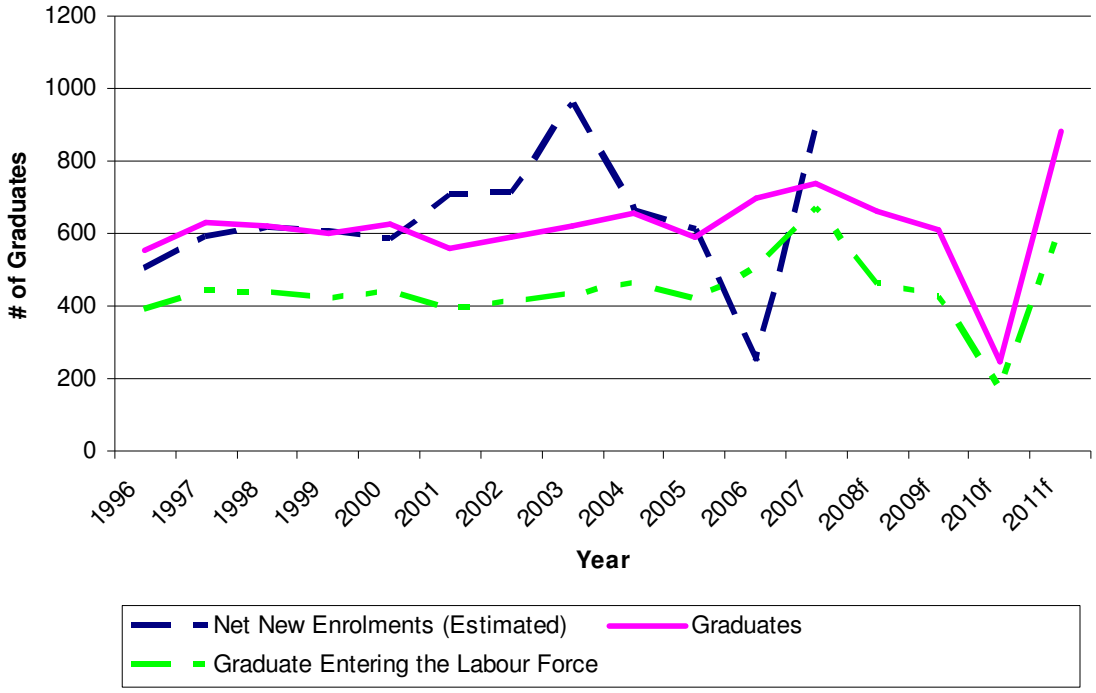
5.1 Engineering Enrolment and Graduation by Region and Discipline

Post-secondary engineering programs approved by the Canadian Engineering Accreditation Board (CEAB) provide Engineers Canada with annual total enrolment and graduates data. These results, covering the period from 1996 to 2007, track past trends and allow an estimation of future graduations using net new enrolments four years earlier. This simple process makes no allowance for withdrawals (students leaving programs after their first year) and the normal attrition as some graduates chose not to work in ETT positions.[12] Research completed for other study component provides some guidance on the magnitude of these losses and the current version of the tracking system assumes a uniform attrition rate of 30%.[13] The assumed addition to the engineering workforce each year from 2008 to 2011 is equal to 70% of the enrolment in Canadian Engineering Accreditation Board's programs four years earlier.

In general, this simple extrapolation provides an adequate representation of past trends and has the advantage of reflecting the likely future impact on graduations of major recent changes in enrolments. These results are used in the rankings in Section 2 and are discussed here by province and region.

[11] Sources reviewed include "Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2001 to 2005", Engineers Canada.
[12] This methodology uses the Engineers Canada data to calculate estimated net new enrolments in each program as (Enrolment in year t) less (enrolment in year t-1) plus (graduations in year t)
[13] See Engineering and Technology Labour Market Study, Interim Report, September 2008, page 10

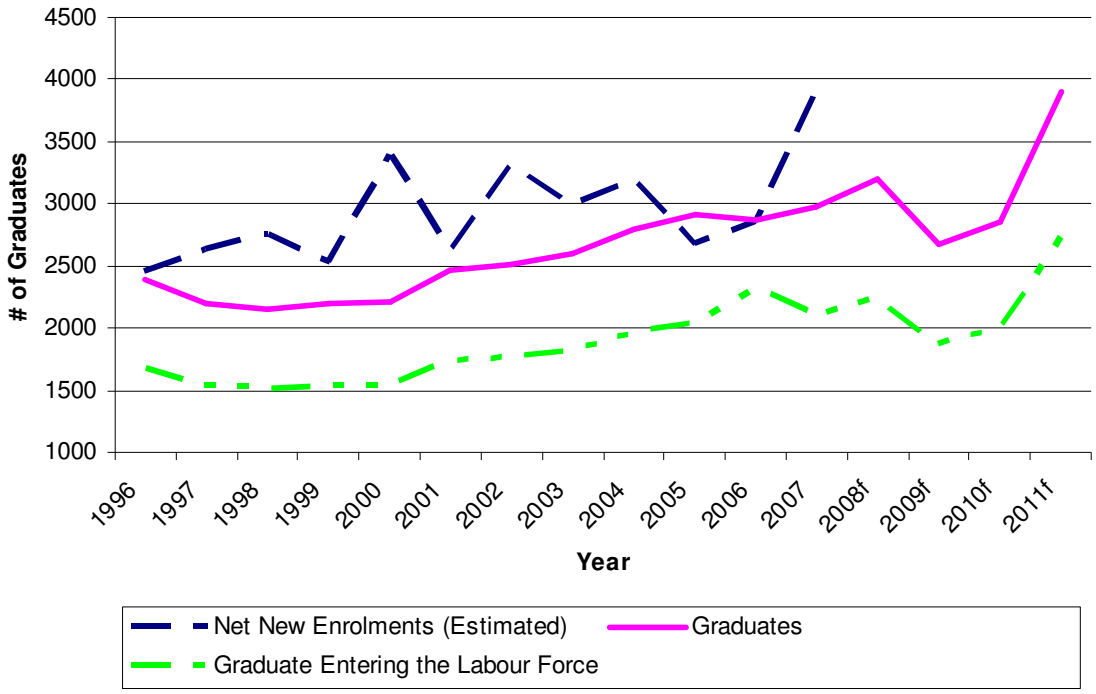
Exhibit No. 5.1
Trends in Post-Secondary Education: Projected Engineering Graduates for Atlantic Canada



Source: Engineers Canada and Prism Economics and Analysis

For Atlantic Canada the highlight is the peak in enrolment in 2003 and the related peak in graduations in 2007. Past enrolment trends suggest that this brief peak is past and trend levels of graduations will return to lower levels from 2008 to 2010. A major surge in enrolments in 2007 will end the expected four year decline in graduations in 2011.

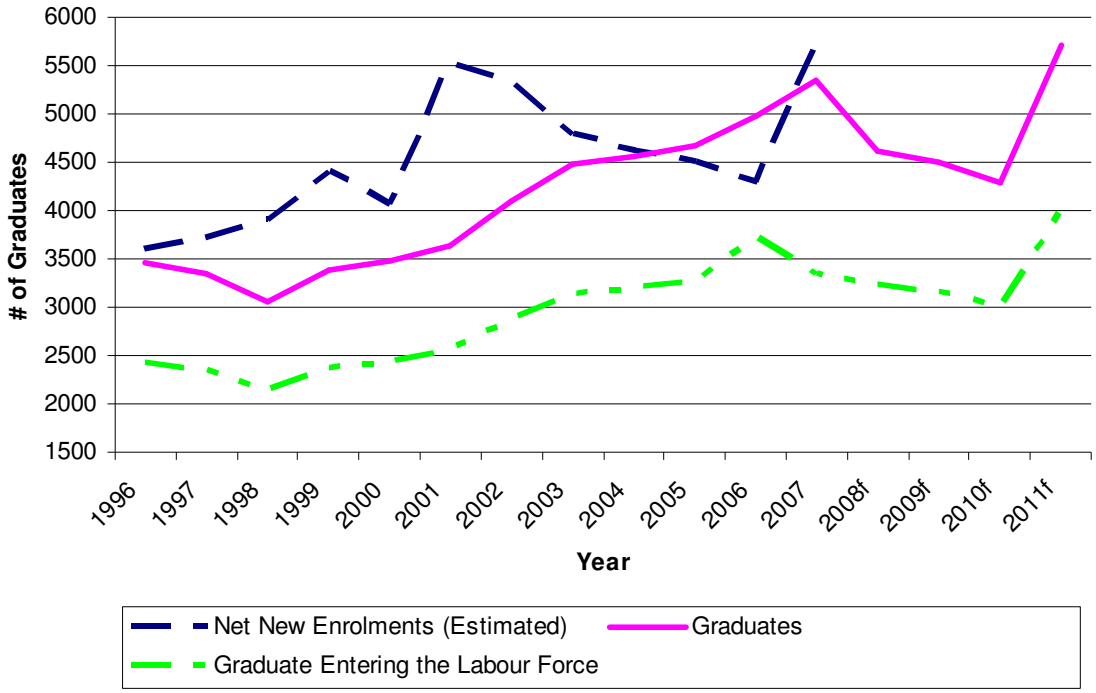
Exhibit No. 5.2
Trends in Post-Secondary Education: Projected Engineering Graduates for Quebec



Source: Engineers Canada and Prism Economics and Analysis

Graduations from Quebec programs grew slowly to record high levels in 2006. Past enrolments trends include a modest four year decline from 2002 to 2005, but have been slowly rising over the longer term. These enrolments seem likely to sustain the new high levels but major gains are not expected. Quebec also reported a big gain in enrolment in 2007 and many students in this group expected to cap a long-term rising trend in graduations in 2011.

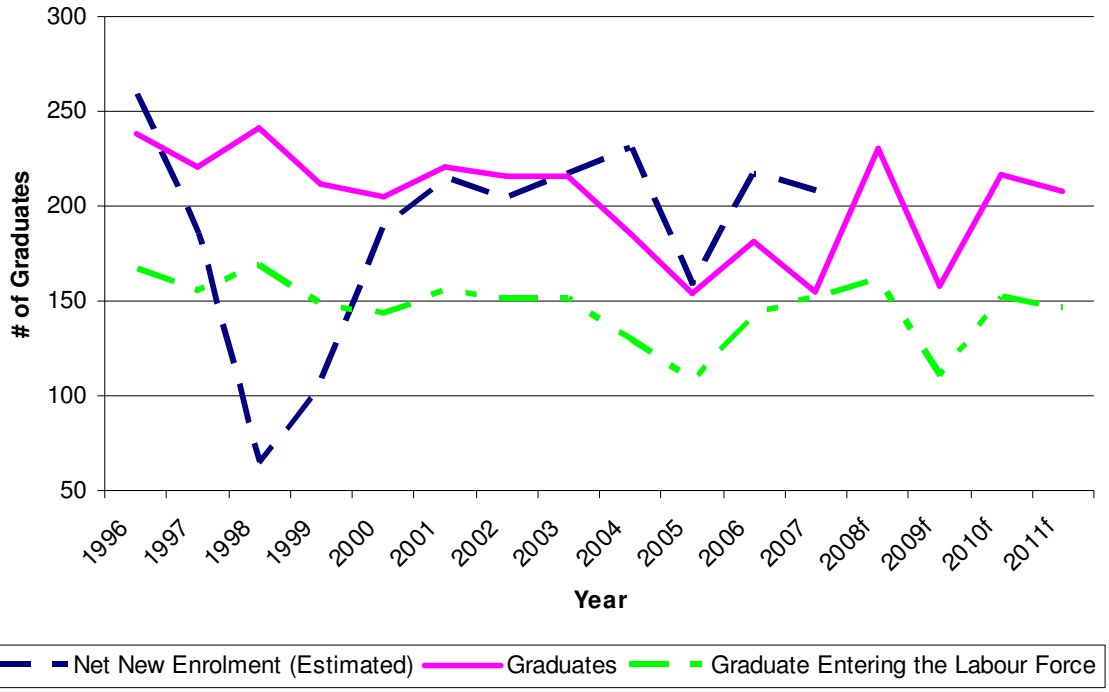
Exhibit No. 5.3
Trends in Post-Secondary Education: Projected Engineering Graduates for Ontario



Source: Engineers Canada and Prism Economics and Analysis

Engineering programs in Ontario have increased graduate ranks by over 50% from 1989 to 2005. These gains act to offset the reported decline in immigration noted in Section 4 above. However, enrolments peaked in 2001 and then decline to 2005. There will be an associated drop in graduations from 2008 to 2010. Like Quebec and the Atlantic provinces, enrolments jumped in 2007, and these gains should break the downward trend in graduations in 2011.

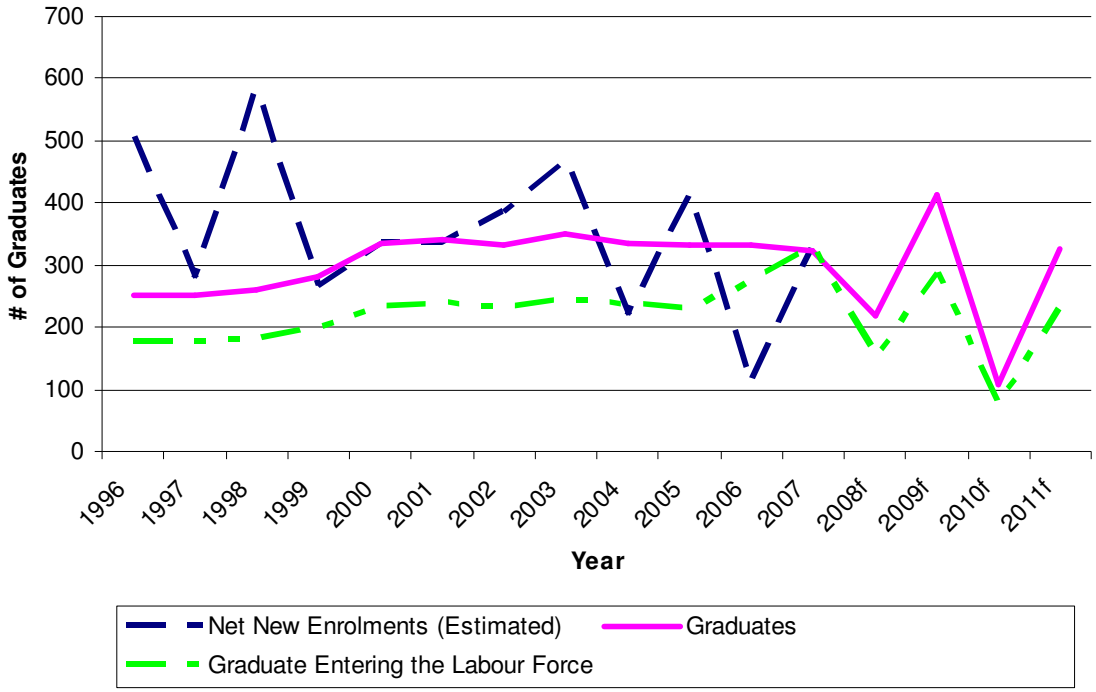
Exhibit No. 5.4
Trends in Post-Secondary Education: Projected Engineering Graduates for Manitoba



Source: Engineers Canada and Prism Economics and Analysis

Enrolments and graduations from Manitoba's engineering program have fluctuated around a trend of 200 and this is expected to continue across the forecast period from 2008 to 2011. Manitoba is one of the few provinces with no enrolment gains in 2007. A well established trend will graduate just fewer than 200 new engineers each year until 2011.

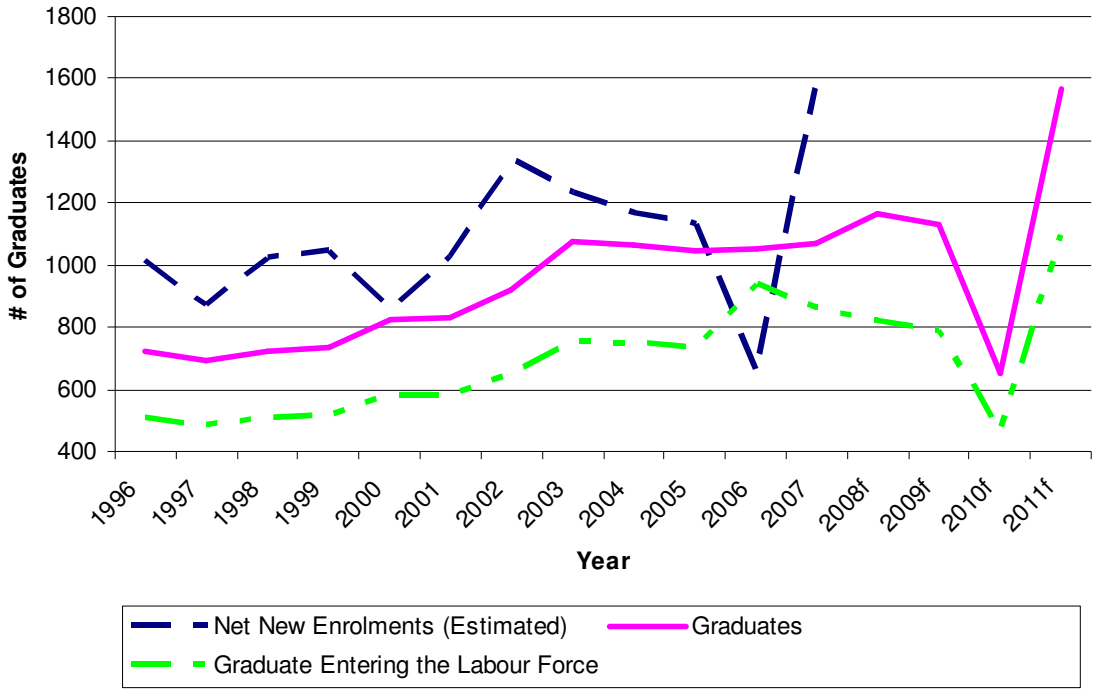
Exhibit No. 5.5
Trends in Post-Secondary Education: Projected Engineering Graduates for Saskatchewan



Source: Engineers Canada and Prism Economics and Analysis

A gradual but steady increase in graduations from Saskatchewan programs will be interrupted in 2008 as a consequence of the downturn in enrolments that began in 2004. Enrolment gains in 2007 will not be enough to restore long-term average levels. Engineering graduations will average just below 300 between 2008 and 2011. This pattern is not consistent with both immigration levels and growing employment potential.

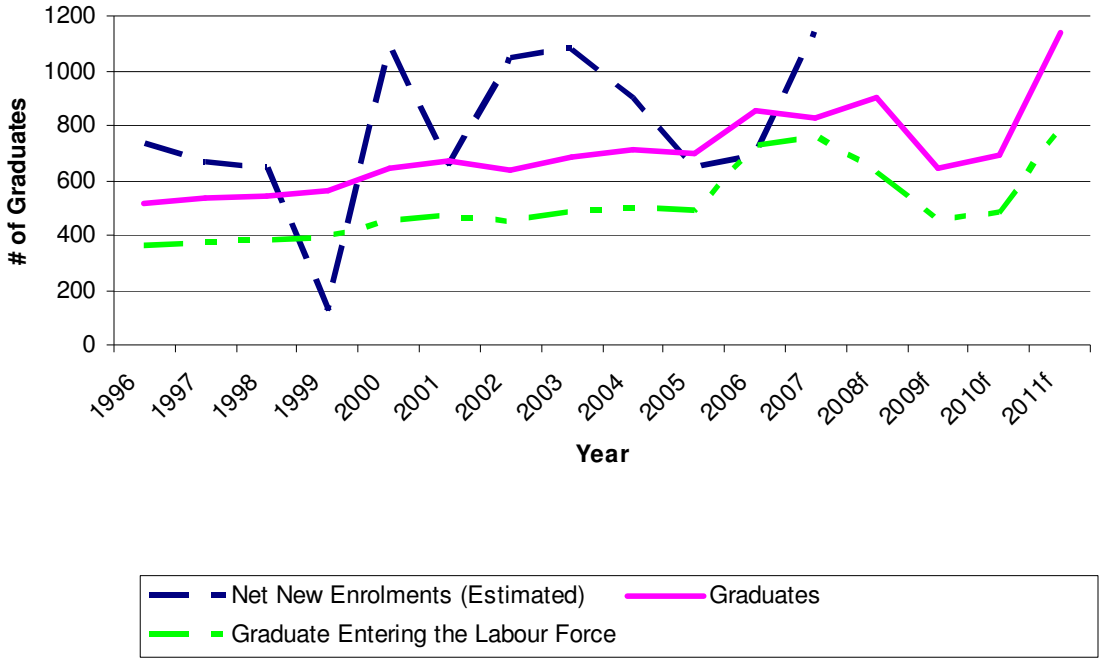
Exhibit No. 5.6
Trends in Post-Secondary Education: Projected Engineering Graduates for Alberta



Source: Engineers Canada and Prism Economics and Analysis

Engineering programs in Alberta have doubled graduations from 1997 to 2005 and enrolment levels should sustain this new, high level from 2008 to 2010. The Engineers Canada data reports wide swings in enrolments from under 700 in 2006 to over 1500 in 2007. These swings will average out in the next four years to sustain an overall growing trend.

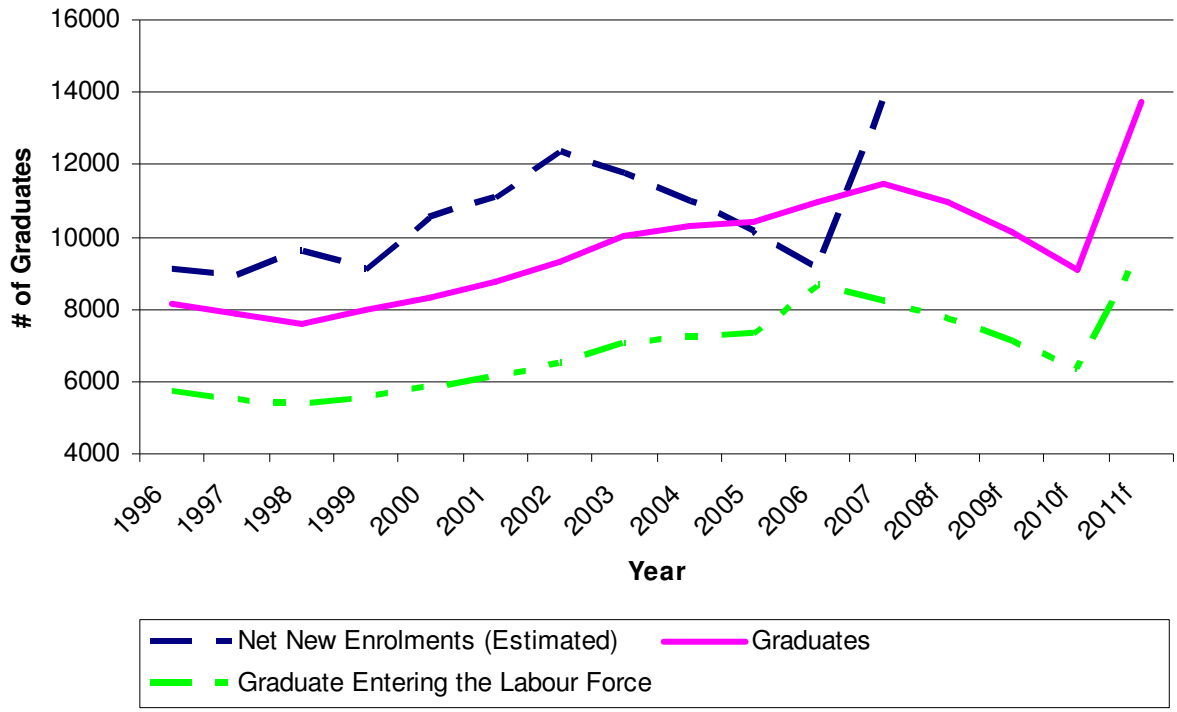
Exhibit No. 5.7
Trends in Post-Secondary Education: Projected Engineering Graduates for British Columbia



Source: Engineers Canada and Prism Economics and Analysis

Steady gains in British Columbia graduations have matched a more variable pattern of enrolments from 1996 to 2005. An extended decline in enrolments from 2003 to 2005 may limit graduations in 2008 and 2009 and this may have an impact on market conditions. Joining most other provinces, British Columbia reported a major gain in enrolments in 2007. Averaging out recent fluctuations should provide for a stream of over 800 graduates from 2008 to 2011.

Exhibit No. 5.8
Trends in Post-Secondary Education: Projected Engineering Graduates for Canada



Source: Engineers Canada and Prism Economics and Analysis

National trends reported in Exhibit No. 5.8 reflect the steady gains in graduations from programs in Quebec, Ontario, Saskatchewan, Alberta and British Columbia. The impact of slower gains in enrolments in recent years will show up in national graduation trends from 2008 to 2010. Overall engineering graduations from 2008 to 2011 will likely average just over 11,000 with little change over recent results.

The consistent trend across the provinces shows declining enrolments that begin between 2002 and 2004 and seem to be bottoming out in 2007. This pattern may be a reaction to the immigration surge from 1998 to 2001 and associated competition for engineering jobs.

5.2 Technician and Technologists Programs by Region and Discipline

There has been no national tracking of post-secondary programs for engineering technicians and technologists. The consultants have begun this process by mapping existing community college programs for technicians and technologists into the occupations in the ETT Labour Market Tracking system. Once programs were identified, the colleges or provincial governments were contacted and asked for enrolment and graduation data. Exhibit No. 5.9 reports the overall results of this effort.

Exhibit No. 5.9
Trends in Post-Secondary Graduates, Technical Occupations, *All ETT Occupations*

	2000	2002	2004	2006	2007 to 2010* (Average)
British Columbia	n.a	n.a	1881	1730	1611
Alberta	n.a	n.a	n.a	1304	1417
Saskatchewan	180	260	325	364	316
Manitoba	n.a	381	394	360	353
Ontario	6072	6786	7277	7383	7383**
Quebec	1003	955	1151	1660	1743
Atlantic	n.a	n.a	680	696	696

* Based on actual 2007 data for British Columbia and Saskatchewan

**Enrolment data unavailable for graduate projections

n.a. = not available
Source: Prism Economics

The findings reported here are preliminary and partial. Consistent measures that span a number of years are not yet available and trends cannot be identified. Results reported above for selected provinces allow market assessments with the additional assumption that the pace of recent graduations will be sustained from 2008 to 2010.

6. Demographics and Retirement Patterns

A growing proportion of Canada's Baby Boomers (born between 1947 and 1965) are approaching retirement. This presents a growing human resource challenge as employers seek to replace senior and experienced engineers and engineering technicians and technologists.

Depending on the age profile of the occupation, the demographics will require replacing anywhere from 1% to 3% of the workforce each year by 2010. This is a significant demand considering that the average annual increase in employment driven by new opportunities will average between 3% and 4%.

The ETT Labour Market Tracking System adds a measure of retirement to the assessment of conditions. The measure, reported in Exhibits No. 6.1 through No. 6.3, begins with the age distribution of each labour force in 2006. Using past rates of exit from the workforce and mortality rates at each age, the system calculates the number of exiting workers who must be replaced to sustain the workforce at the original 2006 level.

Exhibit No. 6.1 reports the findings for engineers using the average age in 2006 and the associated number and proportion of the workforce expected to exit. There are important differences among occupations with civil engineers having the oldest age profile and computer engineers the youngest.

It is notable that the age profiles of all, but especially the oldest; occupations are in the very early stages of a demographic shift that will last for at least two decades. The proportion of the workforce retiring will steadily increase from these current levels.

Exhibit No. 6.1
Age Profiles and Retirement Estimates, Engineers in Canada

Occupation	Average Age	Exit from Labour Force		Replacement Demand as % of Labour Force
	2007	2008	2011	2011
Civil Engineers	42.0	1122	1132	2.27
Mechanical Engineers	40.4	814	850	1.97
Electrical & electronic Engineers	40.5	575	599	1.80
Chemical Engineers	39.8	187	189	1.79
Industrial & manufacturing Engineers	39.5	251	325	1.70
Petroleum Engineers	40.1	274	218	1.75
Aerospace Engineers	39.7	73	64	1.58
Computer Engineers	37.0	213	260	0.97
Other Engineers	41.2	168	205	2.16
Total Engineers	40.2	3450	3777	1.81

Source: Statistics Canada 2006 Census, and Prism Economics and Analysis

Exhibit No. 6.2 reports the same measures for the technical occupations. This group is younger- reflecting the shorter period of education and preparation. Electrical and electronic technicians and technologists are among the youngest while the inspectors and regulators are the oldest. Entry to the latter group likely requires specific work experience and perhaps additional training. This group stands out among the occupations for the importance of the age profile driving the ranking.

Exhibit No. 6.2
Age Profiles and Retirement Estimates, Technical Occupations in Canada

Occupation	Average Age	Exit from Labour Force		Replacement Demand as % of Labour Force
	2007	2008	2011	2011
Applied chemical technicians & technologists	37.1	361	449	1.33
Geological, mineral & meteorological technicians & technologists	38.6	198	192	1.56
Other technical inspectors & regulatory officers	42.6	856	1042	2.38
Civil engineering technicians & technologists	38.6	294	301	1.63
Mechanical engineering technicians & technologists	38.3	203	212	1.69
Industrial engineering & manufacturing technicians & technologists	38.0	76	116	1.40
Construction estimators	43.1	330	308	2.60
Technical occupations in electronic & electrical engineering	38.0	699	840	1.43
Technical occupations in architecture, drafting, surveying & mapping	37.9	991	1060	1.54
Total Technical Occupations	38.7	3777	4325	1.62

Source: Statistics Canada 2006 Census, and Prism Economics and Analysis

Exhibit No. 6.3 reports the age profiles by province. There are some surprises here with, for example, the British Columbia ETT workforce among the oldest provincial groups while Quebec is among the youngest. This finding is contrary to the overall population profiles.

It is often the case that workforce age profiles found in the Census are different from the current situations in individual firms, localities or industry segments. These differences can sometimes be traced to intense periods of hiring or other distinct factors. Age profiles and related recruiting issues can often play a dominant role in human resource management; overwhelming market cycles as a priority issue.

Exhibit No. 6.3
Age Profiles and Retirement Estimates, All ETT Occupations, *by Province*

Provincial Region	Average Age	Exit from Labour Force		Replacement Demand as % of Labour Force
	2007	2008	2011	2011
British Columbia	41.1	957	920	2.04
Alberta	39.0	1330	1218	1.42
Saskatchewan	39.6	226	139	1.60
Manitoba	39.6	369	232	1.71
Ontario	39.6	2932	3117	1.76
Quebec	37.9	1683	1805	1.53
Atlantic Canada	39.4	552	385	1.97
Canada	39.3	7173	500	1.95

Source: Statistics Canada 2006 Census and Prism Economics and Analysis

7. Conclusions and Next Steps

7.1 Skill Requirements and the Nature of Shortages

The national rankings for the ETT occupations suggest moderate or significant supply pressures and recruiting difficulties especially for experienced or senior positions. These conclusions draw on the empirical results that drive the labour market tracking system. But these results can be combined with findings from other components of the ETT Labour Market Study. Together these results allow a more complete understanding of labour market conditions by defining two distinct types of shortages.

In any labour market, a shortage can arise from a **labour shortage** *per se,* that is to say, relative to demand, an absolute insufficiency in the number of people with the formal educational qualifications to fill employers' hiring requirements.[14] The labour market tracking system is designed to identify **labour shortages**. These are the conditions where markets are ranked with a four or five and are currently centered in the West and Quebec. These labour shortages are expected to spread into Atlantic Canada as new resource and infrastructure projects are started. There are important example of labour shortages among computer and petroleum engineers, inspectors, and regulatory technicians and technologists.

Exhibit No.7.1 identifies all the ETT labour markets with labour shortages in the current projection. In general these shortages are phased out as employment growth eases or immigration and post-secondary programs expand.

[14] The distinction between labour and skill shortages is introduced in the Interim Report. see page 38.

Exhibit No. 7.1
Summary of Market Rankings, Selected ETT Labour Markets

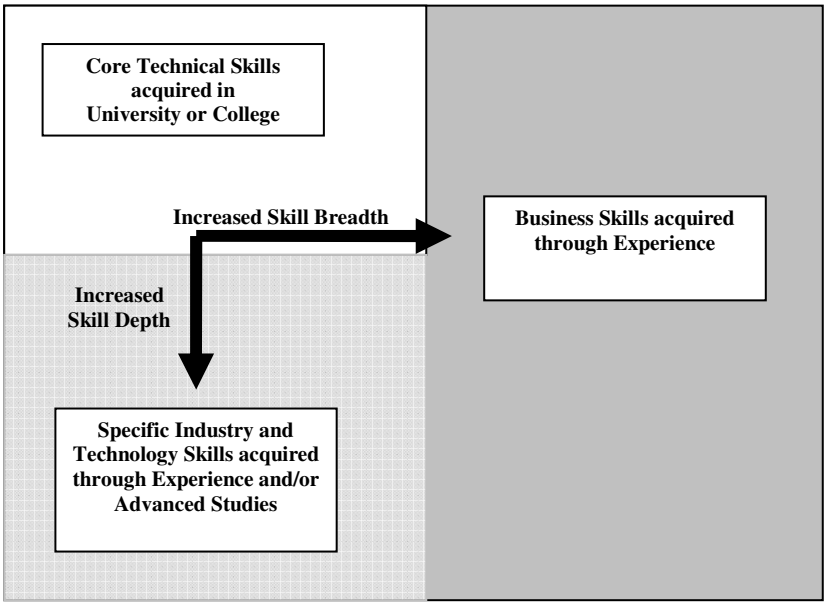
	2008	2009	2010	2011
Canada - All ETT Occupations	4	3	3	3
Canada - Civil Engineers	4	4	4	3
Canada - Industrial & Manufacturing Engineers	4	4	3	3
Canada - Petroleum Engineers	4	4	4	4
Canada - Aerospace Engineers	4	4	3	2
Canada - Applied Chemical Technicians & Technologists	4	4	3	3
Canada - Other Technician Inspectors & Regulatory Officers	4	4	4	4
Canada - Civil Engineering Technicians & Technologists	4	3	3	3
British Columbia - All ETT Occupations	4	4	4	3
British Columbia - All Engineers	4	4	3	3
British Columbia - All Technical Occupations	4	4	4	3
British Columbia - Technical Occupations in Civil, Mechanical and Industrial Engineering	4	4	3	3
British Columbia - Technical Occupations in Electronics and Electrical Engineering	4	4	3	2
British Columbia - Technical Occupations in Architecture, Drafting, Surveying and Mapping	4	4	4	4
Alberta - All ETT Occupations	4	3	3	3
Alberta - All Engineers	4	3	3	3
Alberta - Other Technical Occupations	4	3	4	4
Saskatchewan - All ETT Occupations	4	3	4	4
Saskatchewan - All Technical Occupations	4	3	4	4
Manitoba - All ETT Occupations	4	4	4	4
Manitoba - All Technical Occupations	4	4	4	4
Ontario - Technical Inspectors and Regulatory Officers	4	4	4	4
Ontario - Technical Occupations in Architecture, Drafting, Surveying and Mapping	4	3	4	4
Quebec - All ETT Occupations	4	4	3	3
Quebec - All Engineers	4	4	2	2
Quebec - All Technical Occupations	4	4	3	4
Quebec - Civil engineers	4	4	4	3
Quebec - Mechanical engineers	4	4	2	2
Quebec - Electrical and electronics engineers	4	4	2	3
Quebec - Technical Occupations in Physical Sciences	4	4	2	1
Quebec - Technical Inspectors and Regulatory Officers	4	5	4	4
Quebec - Technical Occupations in Civil, Mechanical and Industrial Engineering	4	4	4	4
Atlantic - All Technical Occupations	4	4	4	4

Source: Prism Economics and Analysis

However, labour shortage is not the only cause of shortage. A shortage can also arise from a **skills shortage**, that is to say, from a shortage of persons with the *right* mix of technical and non-technical skills or the *right* industry or technology skills. While a skills shortage can arise in any occupational labour market, professional labour markets are especially vulnerable to skill shortages. This is because, in professional labour markets, there is much more granularity and specificity in employers' skills requirements. Employers rarely seek to hire an engineering or technology professional *per se*. Rather, they endeavour to recruit a professional who has a particular type of industry experience, is familiar with particular types of technology, and also has significant non-technical skills acquired through experience.

Exhibit No. 7.2 illustrates the nature of skill requirements in the engineering and technology labour market.

Exhibit No. 7.2
Schematic Representation of Professional Skills in Engineering and Technology Occupations



Recent university graduates in engineering or college graduates in technology come to the labour market with core technical skills. These are shown in the upper-left quadrant in Exhibit No. 7.2. It is reassuring that the *2007 Engineering and Technology Employer Survey* shows a high level of employer satisfaction with these skills.[15] However, o*nly a small minority of engineering and technology jobs have a skill profile that is limited to the core technical skills acquired in university or college*. By far the preponderance of jobs require specific industry and technology skills and business skills. Business skills are variously termed 'non-technical skills' or 'soft

[15] In the *2007 Engineering and Technology Employer Survey,* 87% of respondents expressed satisfaction with the science-based skills of recent engineering graduates, while for technologists and technicians the satisfaction levels were respectively 89% and 84%.

skills'. They include written and oral communications skills, contract administration skills, project management skills, team-working skills, and business case analysis skills, among others. In the skill model portrayed in Exhibit No. 7.2, we describe an increase in specific industry and technology skills as an increase in 'skill depth'. An increase in business skills is termed an increase in 'skill breadth'.

Skill depth and skill breadth are acquired through experience, although advanced studies and continuing professional development can partially substitute for experience. When employers speak of shortages, they often do *not* mean that there is a shortage of job applicants with the formal educational qualifications needed. Rather, employers mean that they are unable to recruit employees with the requisite skill depth and skill breadth.

There is no reliable methodology for measuring the extent of a skills shortage or employers' perceptions of a skills shortage. Consequently, we cannot say definitively whether the skills shortage problem is more acute today than previously. However, the evidence suggests that there may have been a ratcheting up of skills shortage conditions. The *2007 Engineering and Technology Employer Survey* indicates the following:

- More than one-fifth of employers are dissatisfied with the *non-technical* skills of experienced engineers and technologists. For recent graduates, the proportion is one-third. By contrast, dissatisfaction with technical skills is much lower - 5% or less for experienced engineers and technologists.

- Asked to rank a range of non-technical skills, by far the majority of employers ranked most of these skills between 'essential' and 'very important'.

- More than 50% of employers identified serious weakness in the *non-technical* skills of internationally educated professionals as the greatest obstacle to hiring them into engineering jobs.

Only survey data based on consistent samples and questions over time would enable us to draw a definite conclusion that skill shortages are more troublesome today. We do not have such data, and must rely, therefore, on interviews and focus groups. These suggest that the problem of skill shortages is serious, that it certainly is not getting less serious, and that it may be getting more serious.

Two reasons may explain why skill shortages could be worse today. The first, as noted, is the influx in immigration. Between 2000 and 2006, immigration accounted for more than 60% of the increase in the supply of engineers. Internationally educated professionals are widely perceived by employers as lacking the relevant skill depth and skill breadth. Second, there is evidence of a 'cohort problem'. Many employers report that their greatest difficulty is in recruiting engineers with 6-10 years of professional experience. This is an 'echo effect' from the 1990s. During that decade the Labour Market Tracking Model estimates that employment was essentially static.

Many graduates were compelled to take employment outside engineering and technology or to take jobs for which they were over-qualified. The result is that, in recent years, there has been a shortage of persons with 6-10 years of experience.

Other trends may also be important. Some have suggested that, as a result of increased competitive pressures stemming from globalization and de-regulation, companies may be less able to hire junior engineers and technologists and invest in their training.

In the design of the rankings for the labour force monitor, the intention was to include the characteristics of a "skill shortage" in the moderate and more severe supply pressures category. In moderate situation there would be a rough balance of the need to fill new jobs and replace retiring workers, with the expected arrival of immigrants and new graduates. But this balance would avoid a labour shortage while still leaving a skill shortage. In particular the availability of temporary foreign workers and new graduates would certainly aggravate the recruiting problems described by employers in the 2007 survey.

The reader can refer to Appendix A for a complete accounting of market rankings and consider the ETT occupations facing skill shortages.

7.2 Industry Action

These findings invite a discussion of plans that will prepare the ETT workforce and employers for future challenges. These challenges fall into three broad categories:

- Relocating skilled ETT employees who are displaced from current jobs.
- Adding to the pool of skilled ETT workers available to fill new jobs and replace exiting workers.
- Improve industry and firm based initiatives aimed at non-technical skills.

Many initiatives are already underway and research in other components of the current Labour Market Studies will provide further ideas. Findings reported here help to focus on these ideas and provide detailed background for each of the 55 labour markets. Implications for initiatives and action plans for each stakeholder groups are reported below.

Industry Associations

It is important that national and provincial industry associations continue initiatives that encourage new entrants into education and training programs that prepare for careers in ETT occupations. Findings here demonstrate that demand for new entrants to replace retiring ETT employees is rising and will often exceed demands related to industry growth. *Cyclical weakness in markets should not be seen as a reason for limiting training, professional development and reduced investment in promoting careers.*

These findings reinforce efforts to attract and engage diversity groups in ETT careers. Efforts to promote immigration through new permanent residents in specific ETT occupations are clearly a

priority. Current efforts to improve promotion, facilitate job search, assess credentials, and integrate new arrivals are critical. In particular, these findings suggest that a fine-tuned immigration promotion should be matched with plans for expanding post-secondary programs.

Post-Secondary Programs

A steady rise in graduations from post-secondary programs from 2002 to 2008 had the advantage of partly offsetting the coincident decline in immigration. These offsetting impacts managed to sustain a rough balance in ETT markets, at least for engineers. These events had the advantage of drawing new entrants from the population of young Canadians in place of immigration. This was likely not a product of industry cooperation but rather simply good fortune. But time may be running out for this balancing. Exhibit No. 5.8 for example, implies that graduations will soon drop reflecting declining enrolments that began in 2002.

These findings suggest that Canada's engineering programs need to begin an immediate process of raising enrolments – certainly computer, petroleum, aerospace, and perhaps electrical and civil programs. Reviving these programs will not be enough to avoid continuing tight markets in 2009 and 2010.

While the data on post-secondary programs for the technicians and technologists is not as precise, there is some evidence to support adding to enrolments in these programs as well. Certainly rankings are high and recruiting challenges threaten for applied chemical technicians, and technologists and technical occupations in architecture, drafting and related work.

There are reports of declining enrolment in many college technology programs. This trend is not consistent with rankings expected in ETT markets. Expanding technology programs is essential for the integration of investments in new technologies, along with expanding research and development. Current reliance on temporary workers is not a long-term alternative. The core of an initiative will be persuading employers to commit to hiring college grads. Close collaboration between colleges and employers is essential so that programs teach needed skills.

Post-secondary programs will not be able to meet short-term increases in employment. Attention then shifts to immigration and the policies and initiatives that will attract international ETT graduates to Canada as permanent residents.

Governments

Governments across Canada have studied these labour markets and consulted with the industry. The common conclusion is that there are current or coming shortages in the ETT occupations and actions are needed to fill gaps. Governments, and the employers who petition them, are turning to overseas markets. Many immigration initiatives are underway and the findings reported here confirm their importance. Indeed, tight markets and recruiting problems might be avoided over the forecast period as immigration revives and needed international ETT graduates are placed in the new jobs from 2008 to 2010. But the emerging reliance on temporary foreign workers will not provide a long-term solution. Specifically it will not address, indeed it may aggravate, the skills shortages problem.

There are many opportunities to move Canadians with needed ETT skills from weak to strong markets. Ontario emerges as the target from this point of view and these opportunities are bringing recruiters into many Ontario communities in search of these skills. While engineering credentials are now fully transferable, there are still some barriers to inter provincial mobility that interfere with this process and these should be a top priority for government. It is clear that the cost and time required to fill jobs with other Canadians is lower than placing international ETT graduates. The Canadian economy will continue to be divided by strong economic growth and new resource related job opportunities in some regions and recession and lost manufacturing employment in others. These conditions require internal mobility to achieve the best short-term solution to labour market dislocation.

Employers

Findings reported here confirm and fine tune recruiting strategies already in place among ETT employers. Certainly, evidence gathered in the employer survey, prepared as part of the ETT studies, shows that the geographic scope of recruiting is reaching beyond local markets and into other countries.

Similarly, research is confirming that employers are turning more to technologists and alternative work qualifications to get critical work done in the face of tight market conditions.

Past and projected growth in employment in the consulting industry is also a signal of tight markets and employers reaching outside the firm for ETT related services.

7.3 Next Steps

This second version of the labour market tracking system will serve as the basis for another round of validation and industry consultation. Six focus group sessions, with technicians, technologists and engineers and other key stakeholders, will be planned for late in 2008. These sessions will review the effectiveness of the proposed system and engage groups in each province as contributors to the tracking process.

Early feedback provides strong support for the proposed system. In particular, comments include approval for the ranking system and the measures that drive the analysis. A common request was to provide more detail. Where possible stakeholders want to identify more occupations and ask for province specific reports. Detailed results could also extend to a description of market conditions specific to industries (e.g. oil and gas), consulting firms, international competition, and work functions (e.g. project managers).

Further analysis can support many of these requests. This would include more rigorous statistical connections between economic activity and employment trends; including tracking international consulting and outsourcing trends specific to each labour market.

Success with future version of the tracking system will depend on the regular participation of industry leaders and related stakeholders including post-secondary institutions, government, and

employers. This participation will be encouraged at the provincial level and could involve gathering new information on markets through access to local compensation surveys.

Appendices

Appendix A:
Labour Market Assessments, Detail by Occupation

More detailed results, including annual measures of trend employment, immigration, retirements, graduations from post-secondary programs, rates of excess supply and rankings, can be found on the ETT Labour Market Tracking System website,
http://www.engineerscanada.ca/etlms/e/pub_pr.cfm

Exhibit No. A.1 provides a complete listing of the rankings for all the labour markets.

Exhibit No. A.1
Complete listing of the rankings for all the labour markets

	2008	2009	2010	2011
Canada – All ETT Occupations	4	3	3	3
Canada – All Engineers	3	3	3	3
Canada – All Technical Occupations	3	3	3	3
Canada - Civil Engineers	4	4	4	3
Canada - Mechanical Engineers	3	3	3	3
Canada - Electrical & Electronic Engineers	3	3	3	3
Canada - Chemical Engineers	3	2	3	2
Canada - Industrial & Manufacturing Engineers	4	4	3	3
Canada - Computer Engineers	3	3	3	2
Canada - Petroleum Engineers	4	4	4	4
Canada - Aerospace Engineers	4	4	3	2
Canada - Applied Chemical Technicians & Technologists	4	4	3	3
Canada - Geological, Mineral & Meteorological Technicians & Technologists	3	3	3	3
Canada - Other Technician Inspectors & Regulatory Officers	4	4	4	4
Canada - Civil Engineering Technicians & Technologists	4	3	3	3
Canada - Mechanical Engineering Technicians & Technologists	2	2	2	2
Canada - Industrial Engineering & Manufacturing Technicians & Technologists	3	3	3	3
Canada - Technical Occupations in Electronic & Electrical Engineering	3	3	3	2
Canada - Technical Occupations in Architecture, Drafting, Surveying & Mapping	3	3	3	4

<Exhibit No. A.1 continues on the next page>

	2008	2009	2010	2011
British Columbia - All ETT Occupations	4	4	4	3
British Columbia - All Engineers	4	4	3	3
British Columbia - All Technical Occupations	4	4	4	3
British Columbia - Technical Occupations in Civil, Mechanical and Industrial Engineering	4	4	3	3
British Columbia - Technical Occupations in Electronics and Electrical Engineering	4	4	3	2
British Columbia - Technical Occupations in Architecture, Drafting, Surveying and Mapping	4	4	4	4
Alberta – All ETT Occupations	4	3	3	3
Alberta – All Engineers	4	3	3	3
Alberta – All Technical Occupations	3	3	3	3
Alberta - Civil engineers	3	3	4	3
Alberta - Mechanical, Electrical and Chemical Engineers	3	2	3	3
Alberta - Petroleum Engineers	3	3	3	4
Alberta - Technical Occupations in Physical Sciences	3	3	3	3
Alberta - Other Technical Occupations	4	3	4	4
Alberta - Technical Occupations in Electronics and Electrical Engineering	3	3	3	3
Alberta - Technical Occupations in Architecture, Drafting, Surveying and Mapping	3	3	3	3
Saskatchewan - All ETT Occupations	4	3	4	4
Saskatchewan - All Engineers	3	3	4	3
Saskatchewan - All Technical Occupations	4	3	4	4
Manitoba - All ETT Occupations	4	4	4	4
Manitoba - All Engineers	3	4	4	3
Manitoba - All Technical Occupations	4	4	4	4

<Exhibit No. A.1 continues on the next page>

	2008	2009	2010	2011
Ontario - All ETT Occupations	3	3	3	3
Ontario - All Engineers	3	3	3	3
Ontario - All Technical Occupations	3	2	3	3
Ontario - Civil engineers	3	3	3	3
Ontario - Mechanical engineers	3	2	3	3
Ontario - Electrical and electronics engineers	3	2	3	3
Ontario - Industrial and manufacturing engineers	2	2	3	3
Ontario - Other Engineers	3	2	2	3
Ontario - Technical Occupations in Physical Sciences	3	3	3	4
Ontario - Technical Inspectors and Regulatory Officers	4	4	4	4
Ontario - Technical Occupations in Civil, Mechanical and Industrial Engineering	2	2	3	3
Ontario - Technical Occupations in Electronics and Electrical Engineering	2	2	2	3
Ontario - Technical Occupations in Architecture, Drafting, Surveying and Mapping	4	3	4	4
Quebec - All ETT Occupations	4	4	3	3
Quebec - All Engineers	4	4	2	2
Quebec - All Technical Occupations	4	4	3	4
Quebec - Civil engineers	4	4	4	3
Quebec - Mechanical engineers	4	4	2	2
Quebec - Electrical and electronics engineers	4	4	2	3
Quebec - Technical Occupations in Physical Sciences	4	4	2	1
Quebec - Technical Inspectors and Regulatory Officers	4	5	4	4
Quebec - Technical Occupations in Civil, Mechanical and Industrial Engineering	4	4	4	4
Quebec - Technical Occupations in Electronics and Electrical Engineering	3	3	4	3
Quebec - Technical Occupations in Architecture, Drafting, Surveying and Mapping	3	3	3	3
Atlantic - All ETT Occupations	3	4	4	4
Atlantic - All Engineers	3	3	4	3
Atlantic - All Technical Occupations	4	4	4	4

Source: Prism Economics and Analysis

Appendix B:
The Economic Background

This Appendix describes the provincial and industrial analysis and projections that determine employment conditions.

B.1 Factors Driving Growth by Industry and Region

The historical patterns of employment growth for the ETT occupations are projected into the future based on provincial and industrial economic conditions. Results from the ETT Employer Survey and an evaluation of statistical sources identified eight industries that are key drivers of employment in the ETT occupations:

1. Primary Industries
2. Manufacturing
3. Construction
4. Utilities
5. Professional, Scientific & Management Services
6. Public Administration
7. Other Services
8. All Other Industries

Rankings reported in Section 2 and the employment projections in Section 3 are based on the provincial and industrial forecasts, prepared in June 2008, by the Centre for Spatial Economics.[16]

B.2 Economic Forecast, *Summary*

It is expected that employment in the ETT occupations will respond to changes in both output and investment in the industries noted above. The evolving economic fortunes of employers are anticipated by changing conditions and highlights of the economic scenario are set out in Exhibit No. B.1.

The main findings are that North American activity will slow to a crawl in 2008 as a result of the United States sub prime mortgage problems and related credit restrictions. In addition, the rapid rise in commodity prices will drive higher output and major new investment projects – especially in Western Canada.

The effect of the credit crunch is projected to ease during 2009 and commodity prices are expected to decline from high levels reached in 2008. The result is a return to more balanced

[16] See "The Centre for Spatial Economics, Provincial Economic Forecast June 2008". Tara Schill, Arron Stokes, Ernie Stokes. A copy of the forecast document will be available on the ETT Labour Study website.

growth by 2010. Weakness is apparent in industries and provinces where resource activity is offset by weaker consumer demands and lower manufacturing activity.

Exhibit No. B.1
Macroeconomic Conditions

	Annual % change				
	2007	**2008**	**2009**	**2010**	**2011**
United States GDP	2.2	1.3	2.9	3.3	3.1
Canada GDP	2.7	1.3	2.5	2.5	2.9
- Residential construction	3.2	0.1	0.7	-1.6	1.3
- Non-residential construction	3.9	6.0	9.6	1.9	-2.3
- Machinery & equipment investment	5.1	5.6	5.3	-2.1	0.8
Global Indicators:					
WTI Oil - US$/BBL	9.4	59.0	-13.0	-1.8	-2.1
Agricultural Prices US$	14.7	17.5	5.3	4.0	2.7
Henry Hub Natural Gas US$/MMBTU	-5.1	42.8	-3.1	-4.1	-3.2
Metals & Minerals US$	5.7	3.5	0.3	-1.5	-1.8

Source: Centre for Spatial Economics, June 2008 Forecast

Implications for the provincial economies are set out in Exhibit No. B.2. Ontario is most vulnerable to the macroeconomic environment with Newfoundland, Manitoba, Saskatchewan, Alberta, and British Columbia all able to sustain activity from resource investment. Quebec also gains from new investments in mines and electrical generation and distribution and infrastructure.

Exhibit No. B.2
The Provincial Economies

	Annual % change				
	2007	**2008**	**2009**	**2010**	**2011**
OUTPUT					
Canada	2.7	1.3	2.5	2.5	2.9
British Columbia	3.1	2.8	3.7	2.7	2.6
Alberta	3.3	2.4	3.4	3.2	3.9
Saskatchewan	2.8	3.4	3.9	2.2	2.4
Manitoba	3.3	2.8	3.7	2.0	2.2
Ontario	2.1	0.4	1.9	2.5	3.0
Quebec	2.4	0.8	1.9	2.1	2.6
New Brunswick	1.6	1.4	2.3	1.7	2.6
Nova Scotia	1.6	1.4	1.7	1.5	2.4
Prince Edward Island	2	1.2	2.1	2.2	2.4
Newfoundland	9.1	1.0	4.0	4.7	1.9
INVESTMENT					
Canada	4.9	5.3	4.1	-0.4	-0.7
British Columbia	5.6	19.8	12.5	-13.8	-5.4
Alberta	4.4	0.7	2.7	4.1	-1.4
Saskatchewan	3.5	12.9	7.8	1.7	-7.1
Manitoba	18.5	13.7	16	-10.9	-3.6
Ontario	3.7	0.7	1.8	2.1	1.2
Quebec	8.2	7.7	9.8	-2.4	2.1
New Brunswick	3.5	11.3	6.0	2.1	12.1
Nova Scotia	-4.4	12.1	1.7	-2.9	-0.4
Prince Edward Island	17.1	6.6	11.7	7.1	-5.6
Newfoundland	-4.8	13.9	42.5	33.5	0.2

Source: Centre for Spatial Economics, June 2008 Forecast

The pattern of investment in 2010 is important for some of the ETT occupations. This economic scenario is based on lists of major construction projects across Canada and many of the largest investments were scheduled for completion in 2010. At this point there are no new projects listed to replace the activity and this leads to a decline in resource investment activity in British Columbia, Alberta, Saskatchewan, and Manitoba. Newfoundland and Labrador is a notable exception as major new resource projects are now planned for later in the forecast period. ETT occupations that are aligned to resource projects are vulnerable to weaker employment in this scenario.

A breakdown of output and investment patterns by industry is reviewed in Exhibit No. B.3

Exhibit No. B.3
Industry Output and Investment, *Canada*

	Annual % change				
	2007	**2008**	**2009**	**2010**	**2011**
OUTPUT					
Primary Industries	0.3	1.6	3.5	2.8	7.7
Construction	4.4	4.4	5.1	0.9	-0.4
Manufacturing	-1.1	-3.5	-1.0	3.1	3.8
Utilities	3.7	1.1	2.8	2.4	2.5
Professional, Scientific & Management Services	3.5	1.0	2.1	2.4	2.7
Public Administration	1.7	2.2	2.3	2.2	2.2
Other Services	2.9	2.7	3.0	3.2	2.6
All Other Industries	3.8	2.2	2.5	2.6	2.6
Total Economy	2.6	1.3	2.5	2.5	2.9
INVESTMENT					
Primary Industries	6.5	4.9	3.2	10.1	3.3
Construction	1.9	3.1	1.6	1.2	-1.2
Manufacturing	10.1	10.4	6.2	-7.2	1.3
Utilities	17.1	3.2	14.0	8.5	3.0
Professional, Scientific & Management Services	7.5	0.5	-1.4	2.3	2.9
Public Administration	4.7	4.0	-0.8	0.8	-0.4
Other Services	9.7	0.0	3.5	-5.4	-1.5
All Other Industries	4.4	5.4	1.3	-4.9	-0.2
Total Economy	4.9	5.3	4.1	-0.4	-0.7

Source: Centre for Spatial Economics, June 2008

Strength in investment in primary industries and utilities is a major boost for ETT occupations while the weakness in manufacturing will hurt other groups. In general, the technicians and technologists are engaged in production, maintenance, repair and service work that is at risk in the manufacturing, service and other industries. Output in the Professional, Scientific and Management Services industry is an indicator for the consulting industry. Engineering consulting is a major employer and acts as a filter that redistributes the ETT workforce across industries and regions. Activity measured in Exhibit No. B.3 and used to adjust ETT employment is not tightly related to the fortunes of engineering consulting and future efforts will seek to improve these links and better reflect the impact of economic conditions on engineering consulting businesses.

The overall trends identified here point to a general slowing of employment growth in most ETT occupations. The deceleration is most apparent in investment and construction activity and

includes slower growth in resource and infrastructure activity. Production and service activity is also on a decelerating or declining trend. These economic changes will act to slow the rate of employment growth. Section 3 considers these implications in more details.

Filename: Labour Market Tracking Ver 2 Final.doc
Directory: C:\Documents and Settings\Sonya Tomas\My Documents\Engineering and Technology Labour Market Study Data\Component 2\SupplyDemand Report
Template: C:\Documents and Settings\Sonya Tomas\Application Data\Microsoft\Templates\Normal.dot
Title: Engineering and Engineering Technicians and Technologists (ETT) Labour Market Tracking System
Subject:
Author: Bill Empey
Keywords:
Comments:
Creation Date: 10/8/2008 1:47:00 PM
Change Number: 5
Last Saved On: 10/8/2008 1:58:00 PM
Last Saved By:
Total Editing Time: 9 Minutes
Last Printed On: 10/8/2008 1:58:00 PM
As of Last Complete Printing
Number of Pages: 81
Number of Words: 18,614 (approx.)
Number of Characters: 106,102 (approx.)