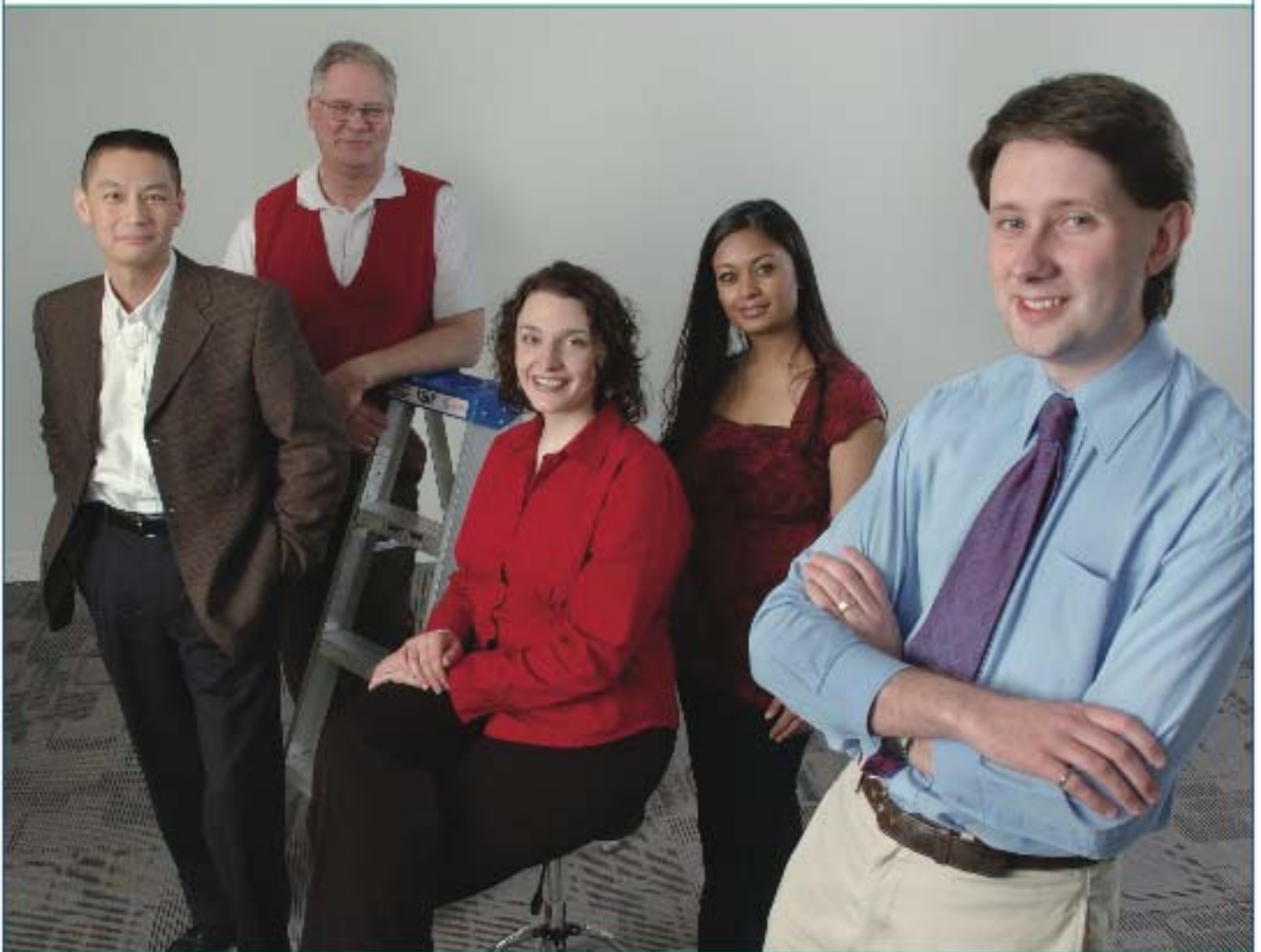




The Association of Professional Engineers,
Geologists and Geophysicists of Alberta

White Paper: Labour Market Assessment 2007 – 2016 for Engineers, Geologists and Geophysicists in Alberta



May 2007

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Mission

We serve the public interest by regulating the practices of engineering and geoscience in Alberta, by providing leadership for our professions, and by upholding our Members in their professional practices.

Vision

We will be a valued agent of excellence in professional practice and an internationally respected leader of the engineering and geoscience professions.

Guiding Principles

Self Regulation:	ongoing self regulation of the professions benefits the public and the professions.
Public Interest:	The protection of the public is paramount in all that we do.
Professionalism:	Skilled and ethical practice is provided by our Members.
Relevance:	Value is delivered to our Members and other stakeholders.
Trust:	Our professional reputation and ability to serve society is founded on earned public trust.
Fairness:	Everyone is treated fairly, and with dignity and respect.
Transparency:	Processes are fair, impartial, and accountable to Members and to the public.
Communication & Consultation:	input from Members and other stakeholders is continually sought, valued, incorporated and reflected

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1.0 Executive Summary

This paper has been prepared to assist APEGGA Council, APEGGA members, Alberta Universities and the Alberta Government to understand the supply/demand situation for Engineers and Geoscientists for the next 10 years to 2016.

The foundations for the paper are the Alberta Government's labour supply-demand model, a survey of APEGGA Permit Holders and APEGGA's registration statistics.

According to the Alberta Government's labour supply-demand model, total demand will increase from 38,000 to 47,500 for engineers and geoscientists and that there will be a shortage of 6200 engineers and 345 geoscientists in ten years. By comparing its forecasts with Stats Canada information the government has learned that its forecasts of demand are accurate to a 95% confidence level. Unfortunately, the government has less confidence in being able to predict labour supply due to its much more complex nature.

APEGGA's information suggests that 23,600 to 28,000 engineers and geologists will need to be hired over the same period – about 50 to 60 percent of the total demand in 10 years. The numbers vary a bit depending on whether you extrapolate the actual demand numbers in the APEGGA survey or you calculate them based on present membership; the forecast retiree rate; those who leave Alberta or the profession as determined by APEGGA's cancellation rates; and the need to meet the increase in demand forecast by the Government. Supply as determined by the number of applicants has risen dramatically over the past three years from 3100 to a projected 5100 in 2007. Over ten years this represents a new supply of 31 – 51,000 practitioners, apparently more than enough to meet the demand.

There are some natural discrepancies in the Government and APEGGA numbers because all practitioners are not licensed with APEGGA, some members don't live in Alberta and we are unable to identify all engineers & geoscientists from the Government categories. A possible explanation for the big difference in the Government's and APEGGA's forecast of the gap is the dramatic increase in applicants experienced by APEGGA over the past few years, which the Government may not have taken into account.

This paper also provides us with a glimpse at some statistics on compliance rates. APEGGA geoscience practitioners living in Alberta represent 56.7% of Albertans that declare themselves to be geoscientists. The picture is quite different for engineers. APEGGA engineering practitioners living in Alberta represent 87.2% of the Albertans that declare themselves to be engineers. The geoscience percentage has been confirmed by a survey of APEGGA Permitholders completed in 2007 which indicates that 53% of geophysicists and 65% of geologists are licensed.

2.0 The Current Economic Environment

2.1 General

Although particularly acute in Alberta, there are several factors impacting the workforce climate across the North America continent:

- **The age of the workforce** – as the first of the baby boomers reach average retirement age (62) in 2008, 20-50% of the current workforce may retire, leaving significant job vacancies and skills shortages
- **Skills shortage** – many industries and occupations are already facing skills shortages which, coupled with continued economic growth in the province mean that the shortage will worsen before it gets better. “Hot skills” in industries and occupations must be addressed more creatively than they have in the past.
- **Labour market information gaps** - information is difficult to find and even more difficult to predict.
- **Widening skills gaps** – composition and competency requirements will change in response to changes in business, the regulatory environment and technology. The National Commission on Mathematics and Science Teaching for the 21st Century estimate that 60% of all new jobs in the future will require skills possessed by only 20% of the workforce. Firms with few or no designated training personnel are particularly challenged to support their employees in making those transitions.

2.2 Alberta

Alberta's economy has been the subject of scrutiny throughout 2006. Feverish economic activity, record-breaking employment growth and the resulting tight labour market were reported by the year end. Even with a slowdown in momentum, Alberta's economic environment will still easily surpass all other provinces.

In 2006 Alberta held the highest employment rate in the country at 70.8% compared to the national average of 63.0%. The number of newly-employed Albertans was 86,240, compared to 26,975 the previous year. This year-to-year increase to Alberta's employment was more than double the national average and was the biggest year-to-year increase in the province in the last 5 years. Correspondingly, the provincial unemployment rate of 3.4% was the lowest and also a new 30-year low for the country, whose national unemployment average was 6.3%. (Annual Alberta Labour Market Review 2006.)

The growth in Alberta continues to be driven by the energy sector, which, judging by the inventory of major projects and the billions of dollars in spending, shows little signs of slowing down. As of March 2007, there were over 800 major (valued

at \$5 million or greater) projects that were either completed, under construction, or proposed for construction within the next 10 years. The estimated cost for these major projects alone was in excess of \$150 billion. (Alberta Immigration, Employment and Industry.)

Despite a fourth-quarter slowdown in net gains from inter-provincial migration (net inflow to Alberta was 11,800, down from 17,100 for the same period last year), Alberta's population growth rate was still four times the overall national increase in the fourth quarter in 2006. (Statistics Canada, March 2007).

More than half of the occupational groups in the province recorded unemployment rates below 3%, indicative of a skill shortage. The estimates of the shortage have ranged from 109,000 over the next decade to 332,000 by the year 2025 (Conference Board of Canada).

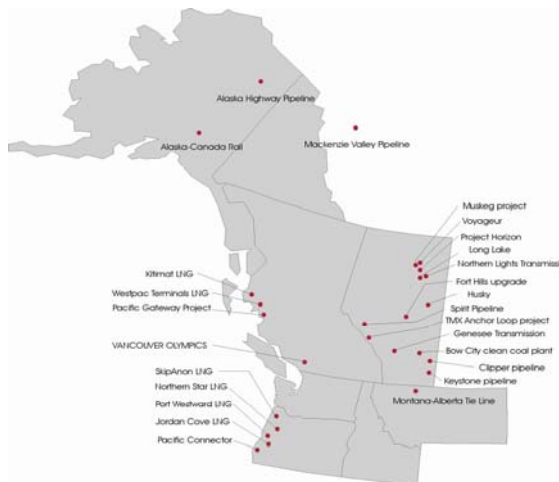
2.3 Pacific North West Economic Region (PNWER)

The Pacific NorthWest Economic Region is a public-private partnership between BC, Alberta, the Yukon, Alaska, Idaho, Montana, Oregon, and Washington. If it were a nation, PNWER would rank 11th among the world's leading industrial economies, with a combined population of 18 million and an annual gross regional product of over \$350 billion US.

Major infrastructure projects are planned in the region over the next 10 years. Northern gas pipelines, oilsands development, the Pacific Gateway Project, Liquefied Natural Gas facilities on the West Coast, and the upcoming 2010 Vancouver Olympics are all happening within or just beyond Alberta's borders and run the risk of sharing the same labour pool.

The benefits of such projects are shared between the PNWER states and provinces, so a sustainable economy and a healthy labour market are in the interests of the entire region.

Figure 1: Major projects in the PNWER region (2006):



2.4 Canada

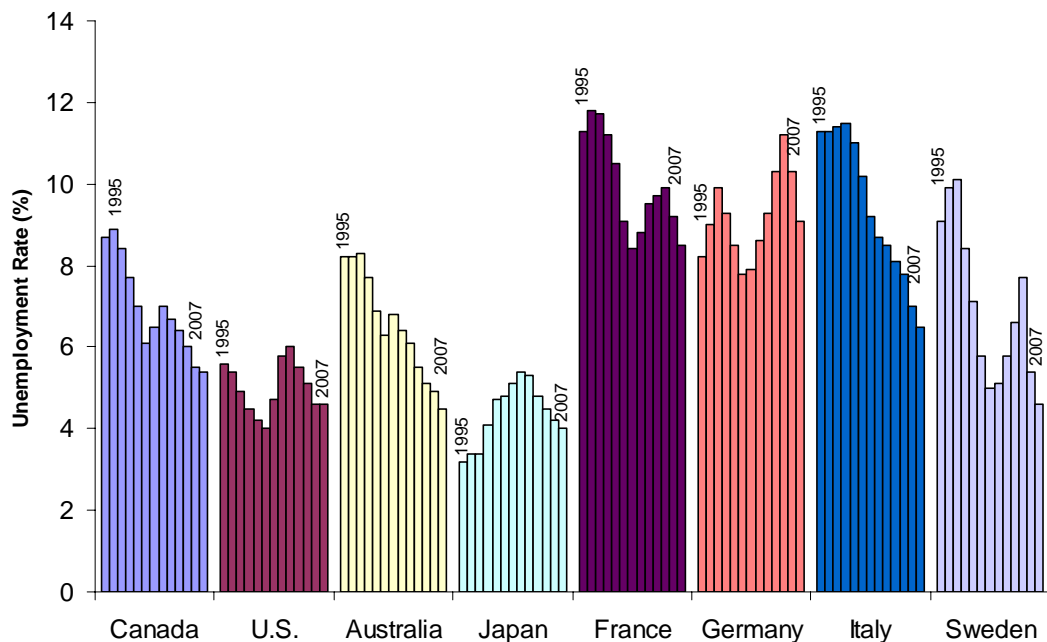
The Canadian economy remains strong, with Alberta as a key driver. In terms of employment growth, a continuing long-term trend in Canada has been robust employment growth in the three westernmost provinces. Since February 2006, growth in British Columbia, Alberta and Saskatchewan have exceeded the national growth rate.

The Canadian economy faces a major problem in that its workforce is aging. The retirement of the baby boomer generation is a major component of the labour crunch, with the proportion of Canadians over 65 doubling in the next decade (Statistics Canada.) Within the APEGGA Membership alone, 17,500 Members are age 50 or older and will begin to consider retirement in the next 10 to 15 years.

2.5 International

Economic output and unemployment rates in the rest of the world are contributing to increased labour mobility as international work becomes increasingly enticing. Unemployment in most countries has decreased in the past few years, after seeing a marginal increase in the years 2001-2003. With a surplus of work available internationally, skilled labour is more likely to pursue opportunities in other countries in order to find the best work at the best pay, in appealing locations. To sum up, there is fierce competition for labour around the globe due to the increased labour mobility and the aging population phenomena.

Chart 1: International Unemployment Rates 1995 to 2007 (by country)



3.0 Demand for Engineers and Geoscientists

3.1 Alberta Government's Occupational Demand and Supply Outlook Model

Alberta Employment, Immigration and Industry has developed a forecasting model for 140 occupational groups based on National Occupation Code (NOC) classification. Factors like demographics, replacement demand (retirements), education and graduation rates, and the Inventory of Major Alberta Projects have been considered in this model. They are confident in their demand forecasts to the 95% confidence level.

Total demand for engineers and geoscientists will reach nearly 50,000 in the next decade. The largest increases are expected in civil engineering, petroleum engineering and the geosciences. The year-over-year increases will not be uniform in all disciplines. This is a reflection of the economic environment and the shift in demand for certain professional services. This is particularly evident in Petroleum Engineering and the Geosciences which are projected to increase more than the other disciplines in year 5 and thereafter. (Chart 2 and Table 1)

Chart 2: Demand for Engineers and Geoscientists 2006-2016

Source: Alberta Employment, Immigration and Industry, Nov 2006

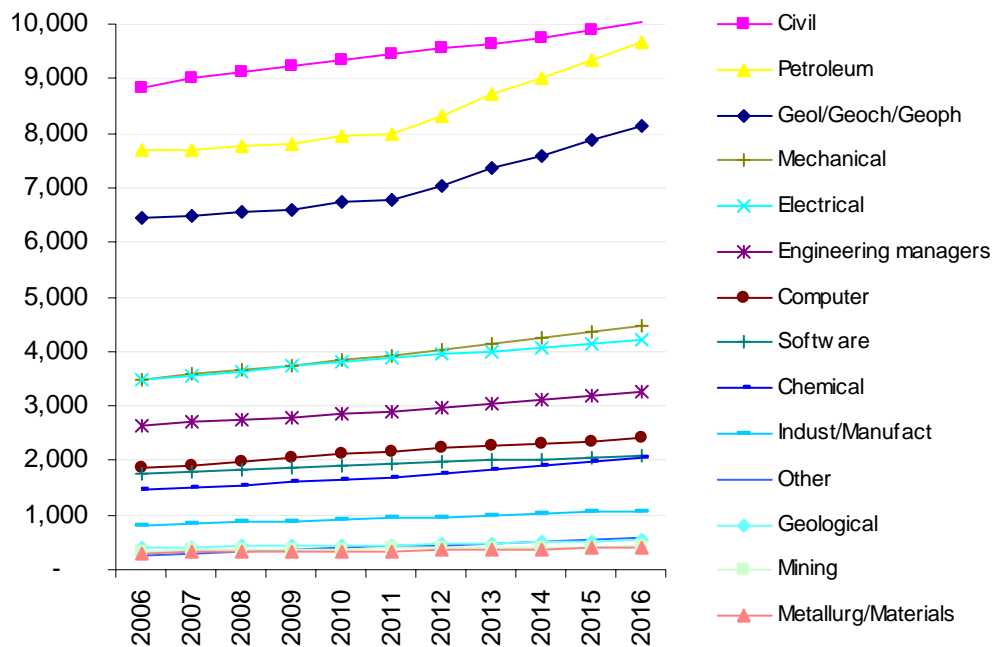


Table 1: Projected Total Demand – Alberta Government Model*Source: Occupational Demand Outlook Model, AEII*

	2007 projected demand	<i>Increase between 2006-2011</i>	2011 projected demand	<i>Increase between 2011-2016</i>	2016 projected demand
Aeronautical	141	12.1%	158	10.1%	174
Chemical	1,449	17.5%	1,702	20.2%	2,046
Civil	8,830	6.9%	9,442	6.2%	10,025
Computer	1,854	17.4%	2,176	10.5%	2,405
Electrical	3,473	11.5%	3,874	9.0%	4,224
Eng Manager	2,649	9.2%	2,894	13.0%	3,271
Geological	408	10.5%	451	19.5%	539
Ind/Manuf	822	14.4%	940	14.8%	1,079
Mechanical	3,489	12.4%	3,920	14.2%	4,475
Metallurg	307	12.7%	346	17.9%	408
Mining	332	19.0%	395	7.6%	425
Other n.e.c.*	408	29.9%	530	23.6%	655
Petroleum	<u>7,676</u>	<u>4.3%</u>	<u>8,003</u>	<u>20.7%</u>	<u>9,660</u>
Subtotal Eng	31,838	9.4%	34,831	13.1%	39,386
Geoscience	6,464	4.9%	6,779	20.0%	8,137
TOTAL	38,302	8.6%	41,610	14.2%	47,523

**n.e.c. = not elsewhere classified*

3.2 APEGGA Workforce Survey

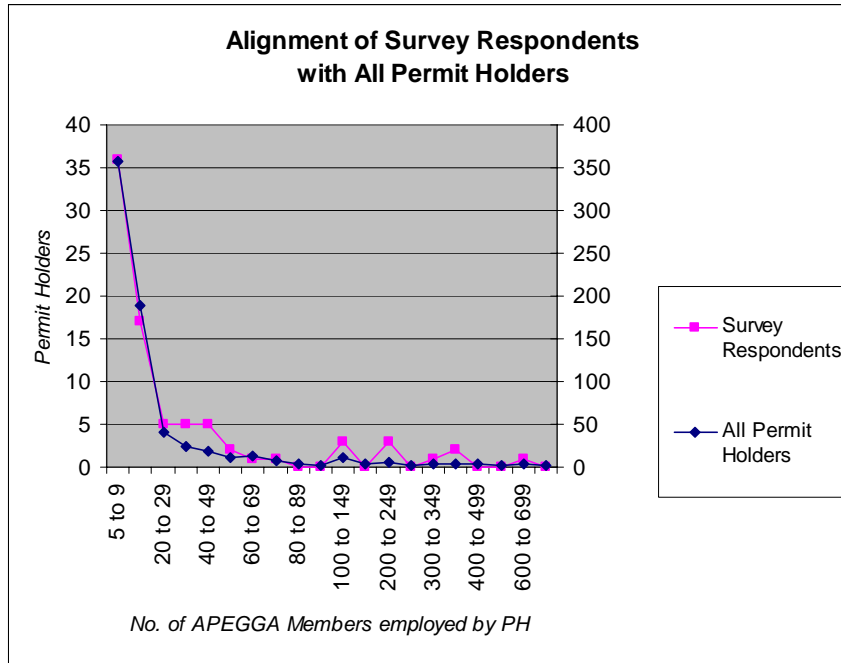
APEGGA conducted a survey of Permit Holders (PHs) on their human resource policies and procedures, and their forecasts for new hires within 1, 5 and 10 years. The survey was limited to Permit Holders who have five or more engineers and geoscientists. 84 responded representing some 4600 members or 11.1% of APEGGA's Professional Members (excluding Life Members) and Members-in-training. One Permit Holder was deleted because its numbers reflected their global operations. The distribution of the firms by size bears a remarkable resemblance to the distribution of all Permit Holders.

The percentages of engineers, geologists and geophysicists employed by the survey respondents is also close to the percentages in APEGGA's total population, although engineers are slightly overrepresented in the survey.

Table 2: Comparison of Survey Size to Full APEGGA Membership

	Engineers	Geologists	Geophysicists	Total
# of APEGGA Members represented by survey	3,978 (86.0%)	449 (9.7%)	200 (4.3%)	4,627 (99.9%)
Total # of APEGGA Members (Practicing Members + MITs)	33,582 (88.7%)	3,200 (8.4%)	1,061 (2.8%)	37,843 (99.9%)

Chart 3: Alignment of Survey Respondents with All Permit Holders



A high percentage of respondents indicated that they will be hiring additional engineers and geoscientists in the coming years. The majority of new positions would be created in the Mechanical, Civil, Chemical and Electrical engineering occupations, followed closely by positions in Petroleum engineering, petroleum geology, and petroleum geophysics. (See Tables 3 and 4)

Table 3: Additional Hiring of Engineers and Geoscientists

Source: APEGGA Workforce Survey

Timing of Hires	Percentage of Respondents
Hiring within 1 Year	85.7%
Hiring within 5 Years	97.5%
Hiring within 10 Years	94.9%

Table 4: Projected Total New Hires

Source: APEGGA Workforce Survey extended to total membership

	One Year	<i>increase %</i>	Five Year	<i>increase %</i>	Ten Year
Engineering					
Chemical	1039	86.5%	1937	26.6%	2452
Civil	1245	279.7%	4725	54.9%	7317
Computer	122	130.8%	281	70.0%	477
Electrical	936	195.0%	2760	75.6%	4847
Geological	140	247.0%	487	15.2%	561
Industrial/Manufac.	28	299.0%	112	8.9%	122
Mechanical	1057	189.4%	3060	0.6%	3079
Metallurgical/Materials	168	83.3%	309	21.2%	374
Mining	178	152.6%	449	12.5%	505
Petroleum	412	127.3%	936	68.0%	1572
Software	<u>37</u>	<u>325.0%</u>	<u>159</u>	<u>82.4%</u>	<u>290</u>
Subtotal	5,362	183.8%	15,215	41.9%	21,596
Geology					
Environmental	271	105.2%	556	78.2%	991
Hardrock	29	96.6%	57	24.6%	71
Petroleum	<u>185</u>	<u>115.7%</u>	<u>399</u>	<u>37.6%</u>	<u>549</u>
Subtotal	485	108.7%	1,012	59.2%	1,611
Geophysics					
Environmental	53	209.4%	164	9.8%	180
Hardrock	-	-	-	-	64
Petroleum	<u>58</u>	<u>101.7%</u>	<u>117</u>	<u>49.6%</u>	<u>175</u>
Subtotal	111	153.2%	281	49.1%	419
GRAND TOTAL	5,958	177.1%	16,508	43.1%	23,626

3.3 PNWER

Demand is also evident in the neighbouring PNWER jurisdictions. PNWER is comprised of Alaska, the Yukon, BC, AB, Washington, Oregon, Idaho and Montana. In the Yukon, the total unemployment rate dropped to historical lows in December 2006. In BC, total employment is projected to increase by 461,100 new jobs, or 2.0% per year; however, high attrition rates due to retirements or death are expected to cause significant job openings.

In the US, according to the American Government's Labour Market Information statistics, the occupational growth anticipated in the region up to 2012 was especially significant for the engineering professions.

Table 6: US Occupation Growth up to 2012

Source: US Labour Market Information

Occupation	Alaska	Idaho	Montana	Oregon	Washington	National
Chemical Engineer	-	5.3%	-	15.8%	23.0%	0.4%
Civil Engineer	10.6%	15.3%	14.8%	13.3%	21.5%	8.0%
Computer Engineer	19.0%	46.1%	50.0%	19.3%	31.8%	42.1%
Electrical Engineer	-	7.1%	-	14.4%	23.8%	2.5%
Electronics Engineer	-	19.0%	-	13.8%	26.9%	9.4%
Engineering Manager	12.8%	16.1%	-	14.2%	18.0%	9.2%
Environmental Engineer	25.0%	40.0%	31.4%	15.8%	20.6%	25.2%
Geoscientists	13.2%	25.0%	-	11.8%	26.8%	11.5%
Industrial Engineer	12.5%	19.8%	-7.1%	13.0%	19.3%	10.6%
Mechanical Engineer	2.9%	14.1%	-2.6%	9.3%	14.1%	4.8%
Mining Engineer	-	-	-14.3%	-	11.1%	-2.7%
Petroleum Engineer	-	-	10.0%	-	-	-9.8%
All Other Engineers	4.8%	38.1%	30.9%	11.1%	20.8%	34.4%

3.4 International

In the international market, the engineers are among the fastest growing occupations. The demand for skilled labour is rising dramatically worldwide to meet the needs of a global economy driven by high-technology goods and services. Advanced industrial societies – the United States, Japan, the countries of Western Europe – are becoming more dependent on foreign scientists, engineers, and computer programmers to propel their economic growth. As well, emerging countries such as India, China, and South Africa are increasing recognizing the need to stem the outflow of their own domestic professionals.

According to the Canadian Citizenship & Immigration Resource Centre, *mechanical, electrical & electronics, chemical, industrial/manufacturing, and computer engineers* are among the most internationally sought after occupations.

3.5 Non-engineering and non-geoscience Careers

An engineering degree has become the foundation degree for many careers. Either intentionally upon graduation or as opportunities arise engineers move into other careers. The 2001 census points to the fact that, although 350,000 Canadians have engineering degrees, only 190,000 claim to be practicing engineering. 46% have been lost to other careers.

4.0 Supply of Engineers and Geoscientists

Historically the province has been a net importer of engineers and geoscientists, having to rely on other parts of Canada and the world, so this section addresses those who graduate in Alberta, those who graduate from elsewhere in Canada, and those who are Internationally-Educated Graduates (IEGs.) It also discusses the importance of women and Aboriginals, the potential for practitioners to work past their normal retirement and the importance of outsourcing work to other parts of Canada or the world.

4.1 Graduates from Alberta

The University of Alberta and the University of Calgary, until a few years ago, produced one-third of the total number of engineering and geoscience applications to APEGGA. Projections for 2007 suggest that this will drop to 20 percent.

a) Engineering

For the past three years, Alberta universities have awarded just over 1,000 engineering undergraduate degrees each year. In 2005, the top three disciplines in which degrees were awarded were the same at both universities: Mechanical (141 U of A, 110 U of C); Electrical (138, 65); and Civil (96, 64).

Alberta's totals were a distant third in the total number of undergraduate engineering degrees awarded, behind Ontario (4,678) and Quebec (2,920).

Table 7: Total undergraduate engineering degrees awarded by province

Source: Canadian Engineers for Tomorrow, CCPE, Nov 2006

Province	2001	2002	2003	2004	2005
Alberta	829	918	1,078	1,063	1,049
BC	670	635	683	711	696
Manitoba	221	216	216	185	154
New Brunswick	201	230	214	263	175
Newfoundland	133	157	153	163	118
Nova Scotia	226	201	252	232	297
Ontario	3,644	4,097	4,479	4,559	4,678
Quebec	2,467	2,510	2,606	2,794	2,920
Saskatchewan	342	331	350	336	331
TOTAL	8,733	9,295	10,031	10,306	10,418

Table 8: Alberta Enrolment and Degrees Awarded by Discipline 2005*Source: Canadian Engineers for Tomorrow, CCPE, Nov 2006*

Discipline	Enrollment		Degrees Awarded	
	Alberta (total)	Females	Alberta (total)	Females
Biosystems	0	0	0	-
Chemical	633	216	127	48
Civil	802	231	160	46
Computer	349	32	120	7
Electrical	782	114	203	42
Engineering Science	68	3	21	1
Environmental	-	-	-	-
Geological	-	-	-	-
Ind/Manufact	136	13	33	1
Metallurg/Mater	107	25	17	4
Mechanical	1,011	149	251	40
Mining/Mineral	76	16	9	1
Software	91	14	26	6
Other	367	72	82	14
Year One/Two Common Year	1,382	284	-	-
TOTAL	5,804	1,169	1,049	210

University of Alberta

The Engineering faculty admitted 300 more first year students in 2007 than they anticipated pushing the facilities to the limit. Currently, there are plans for expansion in the chemical and materials areas that will add more flexibility and capacity as these extra students work through the system.

University of Calgary

The new Institute for Sustainable Energy, Environment and Economy (ISEEE) at the U of C is a multi-disciplinary facility intended for energy and environmental engineering-related students. The facility can support approximately 1000 full time graduate and undergraduate students from several professions, including approximately 85 undergraduate and 40 graduate students in engineering

While 84% of the APEGGA Survey respondents said they hire Members-in-Training and actively support their development, only half said that they have a co-op or internship program in place for university students. This is an area that could use some development in terms of integrating junior engineers and geoscientists into the workforce.

b) Geology and Geophysics

About 140 to 150 students graduates from geoscience programs per year from Alberta universities. In 2006, 96 geology degrees and about 50

geophysics degrees were awarded between the two universities; in addition, graduates from Environmental Earth Science, Geography or other closely related disciplines might have also qualified for APEGGA licensure.

University of Alberta

The geoscience industry has asked for a 1-year Masters program that would integrate geology, geophysics and, to an extent, engineering so that recent graduates can better integrate into resource companies where they have to work together. The petroleum companies are very concerned that a significant percentage of their professional engineers and geoscientist will retire over the next 5 to 10 years and that there is a lack of mid-career employees to mentor the younger ones. This 1 year integration program would hopefully provide the training necessary to make the younger employees more productive sooner. What it will do is delay the entry into industry by one year if the grads are encouraged to attend for a fifth year. Projections by the University of starting with 13 students in 2008 and growing to 35 in three years, industry believes to be too conservative. This project will not contribute to supply but has the potential to improve productivity.

The new Science Building at the University of Alberta, the Centennial Centre for Interdisciplinary Science, will be completed by 2010. The Department of Earth & Atmospheric Sciences (EAS) will have to prove itself through the above masters program in order to earn more undergraduate space. So, at this point, there are no concrete plans to increase enrolment.

The new Institute for Sustainable Development, which will house undergrad and grad students from many professions and disciplines, is believed will increase geoscience enrolment. But, to date, EAS has been unable to quantify the impact.

University of Calgary

In Calgary, the undergraduate enrollment into first year geology was increased from 48 to 88 in 2006. Over four years, this will add about 150 undergraduate places and bump up the number of grads to about 140 per year in Calgary alone. However, feedback from the Department of Geology and Geophysics suggests that there have been some challenges in filling the new seats.

The Institute for Sustainable Energy, Environment and Economy (ISEEE) at the U of C will support approximately 30 undergraduate and 20 graduate students in geoscience.

4.2 Graduates from Elsewhere in Canada

The number of engineers moving to Alberta from other parts of Canada has always been greater than those moving from Alberta to other province. Despite a slowdown in net gains from inter-provincial migration, professional engineers are

transferring to Alberta twice as often as to BC and three times as often as to Ontario. (CCPE IAMA report, March 2007). Moreover, the majority of respondents to APEGGA's survey (70%) said they recruit engineers and geoscientists from other parts of Canada, mainly, British Columbia, Saskatchewan and Ontario. With the strong economies in both Saskatchewan and British Columbia, the weakening economy in Ontario due to the high value of the Canadian dollar and the number of graduates that Ontario produces, recruiters may be better to focus on Ontario in the future.

Table 9: Number of Transfers to Alberta, 2000 to 2006

Source: Inter Association Mobility Agreement Report, CCPE, March 2007

Year	Number of Transfers Coming to APEGGA																																																																						
2000	381 transfers																																																																						
2001	366 transfers																																																																						
2002	494 transfers																																																																						
2003	374 transfers																																																																						
2004	366 transfers																																																																						
2005	524 transfers																																																																						
2006	755 transfers* (breakdown by province shown below)																																																																						
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APEGGA is working on several levels to continue improving the mobility of our professionals within Canada. A task force of APEGGA, the Alberta Association of Architects, APEGBC, and the Architectural Institute of British Columbia has been formed to address the BC/Alberta Trade, Investment and Labour Mobility Agreement, or TILMA. The four bodies are committed to improving the seamless mobility of professionals between the two provinces.

Although designed to improve mobility, the current regulatory regime is not a barrier to mobility. As such, these enhancements will not increase the number of professionals moving to Alberta nor facilitate additional professionals working in other provinces on Alberta initiatives.

The issue is one of attracting professionals to Alberta as a great place to live and a great place for career opportunity. This job is best handled by the government who already has initiatives to attract Canadians and foreign trained people to

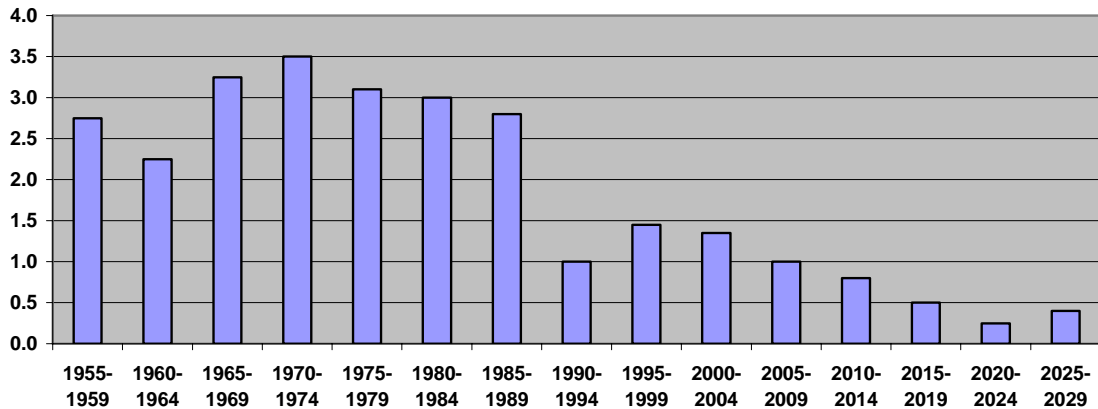
Alberta. Other provinces are countering these advances because of the loss of some of their best people. They have initiated counter-promotions to stay at home to take advantage of their own prosperous business climate and, if necessary, to partner with companies on Alberta projects. The Government can continue to promote Alberta as an attractive place to live and work.

4.3 Internationally-Educated Graduates

Historically, immigration has made a significant contribution to the growth and composition of both the Canadian population and its labour force. In recent years, immigration has become the main source of population growth in Canada. In fact, during the last decade, almost 60% of population growth was due to net migration, and this proportion is expected to reach 75% by 2016. With the domestic labour force growth in Canada falling, the annual number of births is no longer sufficient to offset the number of deaths in Canada. Immigration serves as the only source of population growth.

Chart 4: Average Annual Growth Rate of the Domestic Labour Force

Source: University of Alberta



However, to avoid compounding the problem with the retiring baby-boomers, efforts to attract foreign trained people should focus on those who are between 30 and 45 years of age. Immigration Canada and companies who are recruiting overseas should factor this into their recruitment programs.

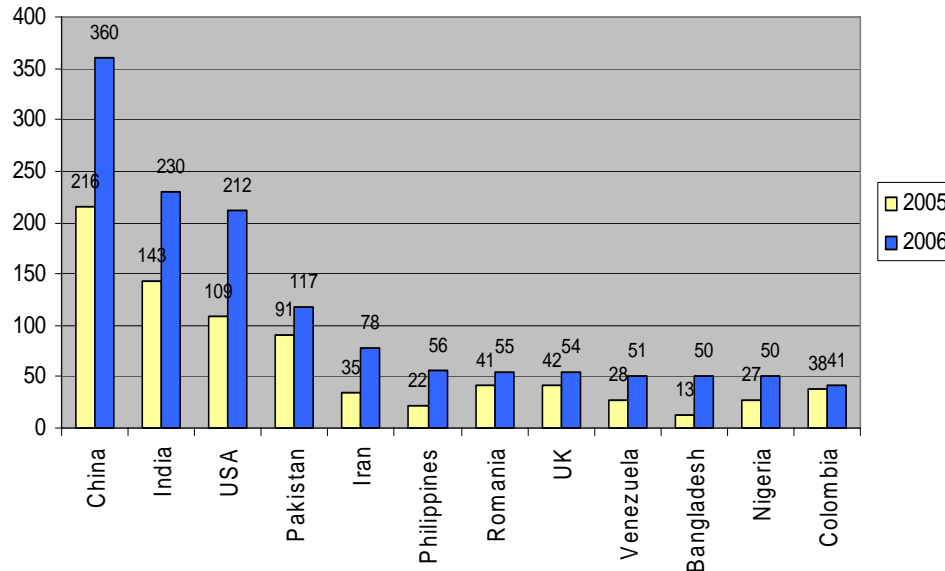
In 2006 APEGGA receive one-third of its new membership applications from internationally-educated graduates. 1,751 applications were received, a year-over-year increase of 58% from 2005 (1,108). This will increase to about 45% in 2007. The top 12 countries of China, India, USA, Pakistan, Iran, Philippines, Romania, UK, Venezuela, Bangladesh, Nigeria, and Colombia provided 58.8% of the foreign applicants. Respondents to the APEGGA survey also cited South Africa, France, Germany, Italy, the Netherlands, Argentina, and Mexico as additional source countries. 69% of the respondents from the APEGGA survey said they have recruited engineers and geoscientists from other countries.

The success of a joint recruitment drive in the UK in 2007, has encouraged the Consulting Engineers of Alberta to repeat the visit in 2008. After initial interviews

in the UK, 45 were offered the opportunity to come to Canada for a second interview and 25 accepted positions.

Chart 5: Number of Applications from IEGs (Top 12 countries)

Source: APEGGA Registration Statistics



APEGGA continues to recognize Mutual Recognition Agreements (MRA) with the following countries to acknowledge their engineering accreditation systems: the US; UK, Ireland, Australia, New Zealand, Hong Kong, South Africa, France, Japan, and Singapore. Applicants with degrees from these countries are usually exempt from examinations, therefore streamlining their registration process. Applicants whose degrees are not from any of the MRA countries are usually asked to take examinations before they can be registered, a process that may take up to 2 years to complete. The APEGGA website has an excellent reference section for IEGs which generally discusses how foreign credentials are evaluated.

4.4 Women

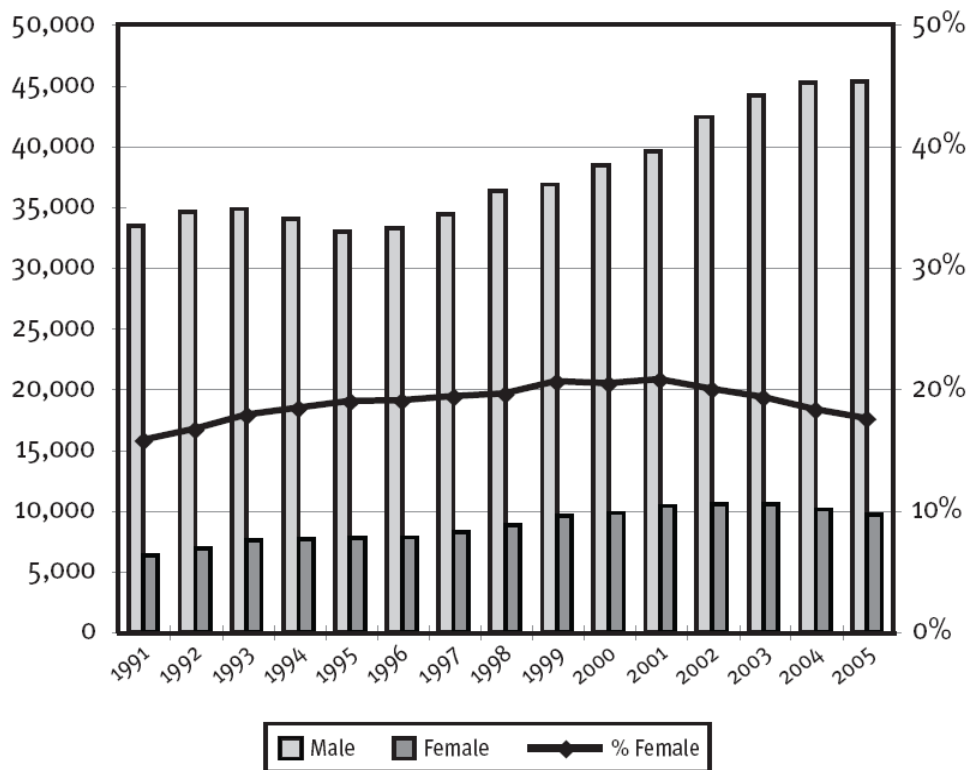
Women comprise 10% of the APEGGA Membership. The greatest proportion of women is in the GIT (Geologist- and Geophysicist-in-Training) category: 42.4% of GITs are women, compared to 22.1% in the EIT (Engineer-in-Training) category. At the Professional level, only 2,300 (8.6%) of P.Engs and 12.1% (433) of P.Geols and P.Geophs are women.

A recent article in the Edmonton Journal cited that the current percentage of women in Alberta's undergraduate engineering programs (20.1%) is exactly the same as it was a decade ago. Administrators suggest that a shift in attitude in the current generation has led many women to seek a better family/work balance, and a profession like engineering has been perceived as "too time-consuming." Other professional opportunities are also cited as being potential reasons for the

plateauing of enrolment. (*Engineering struggles to boost number of female students*, Edmonton Journal, Jan 2007)

The CCPE confirms that this trend of declining female enrolment is occurring in schools all across Canada. The proportion of female undergraduate students in engineering has been declining continually since 2002. The National Committee of Deans of Engineering and Applied Science is closely monitoring this troubling trend. It is worth noting, though, that Alberta's 20.1% female enrolment rate is the highest of all provinces. (*Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2001 to 2005.*)

Chart 6: Undergraduate Engineering Enrolment in Canada by Gender
 Source: CCPE



When asked what was being done to attract and retain female engineers and geoscientists to their companies, three-quarters of the respondents to the APEGGA survey said they do nothing special. Hiring is based on skills, not gender; policies for attraction or retention are intended to attract the best candidate for the role. The fact that fewer women than men were applying for key technical positions was considered a reflection of the marketplace and not as a selective recruiting process.

Several respondents mentioned a comprehensive maternity program as part of their efforts to retain female professionals. Day-care access, emergency child care through corporate sponsorship, topping unemployment benefits to full salary, and part-time work opportunities were aimed at women; however, several respondents said they promote family friendly work-life balance programs to both

men and women equally in response to both genders seeking parental leave. Anecdotal information from female members no longer working in the profession suggests that if more part-time work was available there is a significant pool of women who would be interested.

4.5 Aboriginals

Aboriginals representation is extremely low within the EGG professions, let alone at the college or university levels. However, government statistics continually show that the Aboriginal population in Alberta is a hugely untapped resource, being the fastest growing sector of the Alberta population, with a birth rate 1.5 times greater than Canada overall, and a younger average working age than the non-Aboriginal population. Numerous programs, such as the Canadian Aboriginal Science and Technology Society, The Engineering Access Program (ENGAP) at the University of Manitoba, and the Native Access Program in Quebec, have been developed in order to address this inequity of representation in the Engineering and physical sciences occupations. More information on these and other Aboriginal programs can be found in the appendix.

In Alberta, aboriginals represent 6.7% (199,015) of the total population.

Table 10: Number of Aboriginal Albertans

Source: Statistics Canada

<u>Identity</u>	<u>Number (2001 census)</u>	<u>Canadian % growth since 1996</u>
Aboriginal Identity	156,220	22.2%
North American Indian	84,900	15.1%
Metis	66,060	43.2%
Inuit	1,090	12.1%
Other	4,080	17.3%

Table 11: Average Working Age in Edmonton, 2006

Source: AHRE Labour Market News, August 2006

	Average Working Age
Edmonton – overall	35.4 years
Edmonton – Aboriginal	24.2 years

While the focus of many employment efforts are aimed at careers in building and construction or trades, APEGGA's Aboriginal Affairs Committee believes it has a role to play in increasing the Aboriginal representation in the universities and eventually into the EGG professions. The Committee estimates that less than 100 members of the Association are Aboriginal or have Aboriginal status, while the provincial demographics suggest it could be closer to 3,000.

The Committee acknowledges that many issues are beyond their expertise and influence; however, they have identified four areas where they could provide leadership.

1. Encourage young aboriginals in grades K to 12 in the maths and sciences in the hope that they will aspire to be engineers and geoscientists;
2. Mentor aboriginals of all ages (but particularly those in school);
3. Increase funding for aboriginals by encouraging corporations to donate to the Education Foundation specifically for aboriginal grants/scholarships;
4. Make members aware of aboriginal issues.

Members are generally not aware of aboriginal issues within the professions. The APEGGA Workforce survey showed that employers are not doing anything specific to attract and retain Aboriginal engineers and geoscientists. Permit holders find it critical to run hiring campaigns that do not discriminate against race or gender; instead they hire based on skill, experience and availability.

Three respondents mentioned that they use existing services, such as Aboriginal job boards or the Building Environmental Aboriginal Human Resources (BEAHR) program, and one respondent said they work and support Aboriginal people at the field level. Despite these few comments, there is still a long way to go to get Aboriginals into the professions.

The above suggests that APEGGA has a role in increasing the pool of Aboriginals in the profession, but, with a target of only 200 in 10 years, Aboriginals will have a minor effect on supply.

4.6 Mature Workers

The aging population is a concern in all industries, and the EGG professions are no exception. More than 60% of survey respondents anticipate workforce retirements to range between 10-39% of their current workforce. The weighted average of the estimates suggests that 27.3% of our practicing members will retire in the next 10 years.

Table 12: Anticipated Retirements in the next 10 years

Source: APEGGA Workforce Survey

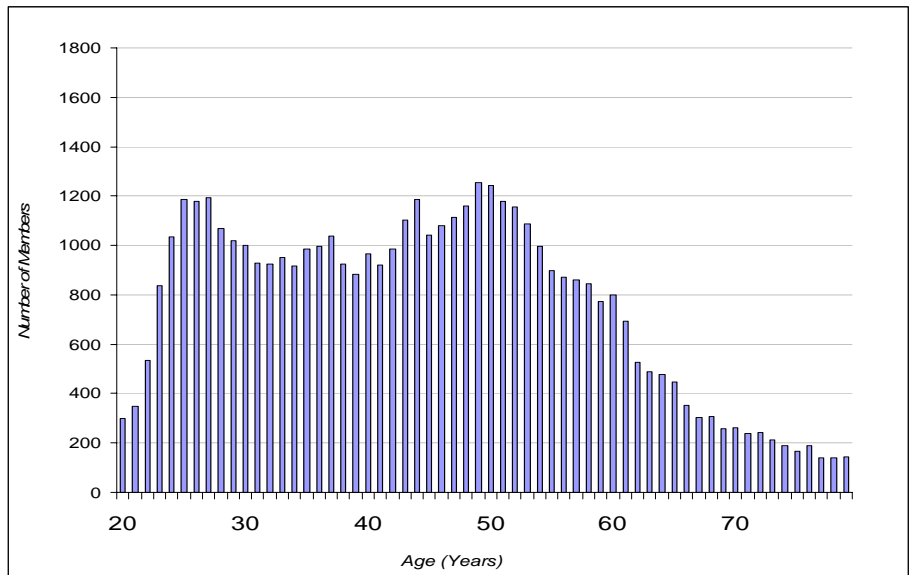
<u>% of Respondents</u>	<u>% of Workforce Retiring</u>
12.3%	1-9%
27.7%	10-19%
20.0%	20-29%
16.9%	30-39%
7.7%	40-49%
4.6%	50-59%
1.5%	60-69%
6.2%	70-79%

Survey respondents explained their strategies for keeping their Professional Members involved after retirement or when they are nearing retirement. The easiest strategy was to have flex-time or a reduced work week. Other options include working from home; rehiring retirees as independent consultants or part-time contractors; and encouraging semi-retirement instead of full retirement.

The Conference Board of Canada also made recommendations for encouraging the retention of older people and professionals in the workforce; they include ending age-discriminating policies such as mandatory retirement; pension reform to promote later retirement; implementing human resource policies that are friendly to older workers; and eliminating the abrupt retirement separation in favour of a more gradual transition to retirement. (*Alberta's Labour Shortage: Just the Tip of the Iceberg*, June 2006)

Chart 7: Age Distribution of APEGGA Members

Source: APEGGA Membership Database, April 30, 2007



4.7 Outsourcing

18 of 80 respondents to the APEGGA survey indicated that they outsource work. 12 of the 18 indicated that 80 man-years had been contracted over the past year. Extrapolating this to APEGGA's total membership suggests that about 700 man-years were outsourced in 2006.

The only comparative data is that which was estimated by APEGGA in its 2006 research into the quality of outsourced work. In that report it was estimated that about \$400 M, or about 14% of engineering revenue, was outsourced in 2004. At the time of writing we have been unable to translate the dollar value into man-years.

13 of the 18 indicated that the level of outsourcing will increase.

5.0 The Gap – Shortages/Surpluses

5.1 Alberta Government Forecast

Conservative figures estimate that by 2025, Alberta will face a labour shortage of 332,000 workers if current trends continue. In 10 years, for the APEGGA professions, the shortage is estimated to be about 6,200 engineers and 345 geoscientists.

Table 13

Alberta's Projected Demand and Supply for 2006 and 2016 (Alberta Employment, Immigration and Industry)	2006	2016	Year Shortage Begins
Engineering Managers			
Demand Projection	2,649	3271	
Supply Projection	2,700	2950	2007
Shortage	-51	321	
Civil Engineers			
Demand Projection	8,830	10,025	
Supply Projection	8,800	9,231	2007
Shortage	30	794	
Mechanical Engineers			
Demand Projection	3,489	4,475	
Supply Projection	3,400	4,066	2014
Shortage	89	409	
Chemical Engineers			
Demand Projection	1,449	2,046	
Supply Projection	1,993	1,980	2015
Shortage	-554	66	
Petroleum Engineers			
Demand Projection	7,676	9,660	
Supply Projection	7,600	7,658	2007
Shortage	76	2,002	
Electrical Engineers *			
Demand Projection	3,473	4,224	
Supply Projection	3,133	2,837	N/A
Shortage	340	1,387	
Other Engineers (includes industrial and manufacturing, metallurgical and materials, mining, geological, aerospace, computer (excl. software) and other engineers not elsewhere classified)			
Demand Projection	4,272	5,685	
Supply Projection	3,719	4,407	2007
Shortage	553	1,278	
PROJECTED ENGINEERING SHORTAGE	483	6,257	
Geologists, Geochemists and Geophysicists			
Demand Projection	6,464	8,137	
Supply Projection	6,600	7,792	2008
Shortage	-136	345	
PROJECTED GEOSCIENCE SHORTAGE	-136	345	

* The projection for electrical engineers was calculated by difference from a grouping of four disciplines. The predicted shortage appears high in relation to most of the other disciplines. Although the other three disciplines in the group had concrete numbers, we were cautioned about determining the supply of electrical engineers by subtracting from the total.

This forecast for Alberta has been prepared by Alberta Employment, Immigration and Industry which projects the demand and supply for 140 occupations through to 2016. The model considers low, medium and high economic growth scenarios, and we've been encouraged to focus on the implications of medium economic growth. Alberta's labour market is projected to grow by at least 400,000 workers in the 10 year period equivalent to an annual growth rate of 2% per year. Unfortunately, the occupational supply rate is expected to grow at only 1.5% per year, meaning that the demand for workers in Alberta is expected to greatly exceed the supply.

At the present time the model suggests that the supply of geoscientists, mechanical engineers and electrical engineers are in reasonable balance with demand but that they too go into shortages through the forecast period. Permit Holders confirmed that mechanical engineers will require the most replacing. The Petroleum Human Resource Council, with its focus on oilsands, predicts that all disciplines will be in shortage with the process, chemical and mechanical engineers in most demand.

5.2 APEGGA Forecast

a) Supply-Demand

It may be illustrative to provide some broad estimates of the 10 year demand - how many new engineers and geoscientists will have to be hired to replace those who will retire, to replace those who will leave Alberta or drop out of the profession and to fill the new positions created by growth.

Table 14

	Practicing Members	Expected to Retire in 10 years	Lost due to Cancellation	Growth (as per AEII model)	New Hires (columns 3+4+5)
Engineers	33,582	9,168	8,073	7,548	24,789
Geologists	3,200	874	246	1,254	2,374
Geophysicists	1,061	290	28	418	736
Total	37,843	10,332	8,347	9,220	27,899

APEGGA's Permit Holders forecast a need to hire the following engineers, geologists and geophysicists over the same period.

Table 15

Engineers	21,596
Geologists	1,611
Geophysicists	419
Total	23,626

The sources of new applicants are as follows from APEGGA's registration statistics:

Table 16

	AB	CAN	Int'l	Total	10 yr Forecast
All E,G&Gs 2007 (<i>est</i>)	1,000	1,700	2,200	4,900	~49,000
All E,G&Gs 2006	833	1,637	1,751	4,221	~42,000
All E,G&Gs 2005	2,013		1,108	3,121	~31,000

Forecasts of supply are well above the forecast demand and don't support the AB Government model that is predicting a 6200 shortfall in engineering and a 400 shortfall in the geosciences. The Government admits that it is much more difficult to reliably predict supply and is probably not aware of the more than doubling in applications that APEGGA has experienced since 2004. The question is whether this rate will be maintained through the forecast period.

1. Alberta schools are graduating just over 1000 engineers, 150 geologists and 50 geophysicists annually. Recent increases in geology at the U of C (40 more), the new sustainable development institute at the U of C (85 more engineers 30 more geoscientists) and as yet unidentified increases for the sustainable development institute at the U of A will all serve to increase the Alberta totals.
2. Although the transfers from other parts of Canada (a subset of the Canada numbers) showed a 44% increase in 2006, 2007 increase in total applicants from other parts of Canada has dropped to just 4%. We forecast that the trend will be down through the forecast period because the other provincial economies of size are performing pretty well. The smaller provinces whose economies are not performing as well, who could be a potential source of members, just don't produce enough graduates to make a significant difference.
3. IEG applications in 2006, at 1751, showed a 58% increase over the previous year. The forecast for 2007 is 2350, a 34% increase over 2006. The Federal & Provincial Governments appear intent on increasing those numbers further. It is beyond our ability to predict whether the hot economies from which we get most of our IEGs will slow down the number of immigrants.

There is little question that the supply of engineers and geoscientists is presently very tight. Based on the recent increases in application rates and forecasts for demand this tight supply should ease up in the near future.

b) Compliance

In comparing APEGGA's numbers with the Alberta Government numbers, to determine how well APEGGA is doing in licensing all practitioners, a few things need to be taken into consideration.

1. Some APEGGA Members may have identified their occupation as one that is not clearly identifiable with our professions. (Actual compliance rates are lower)
2. A percentage of our members do not reside in Alberta and would not be included in the Alberta Government numbers (Actual compliance rates are lower)

The 4,260 practicing geoscientists licensed with APEGGA as of Dec 31, 2006 represent 64.5% of the 6,600 geoscientists identified in the Alberta Government model. The 33,582 practicing engineers licensed with APEGGA as of Dec 31, 2006 represent 107% of the 31,345 engineers identified in the Alberta Government model. Correcting for the 81.5% of engineers and 88% of geoscientists who live in Alberta, the actual compliance rates are more accurately reported as 56.7% and 87.2% respectively.

An August 2007 survey of permit holding companies employing geoscientists confirms that 53% of geophysicists and 65% of geologists who practice in Alberta are licensed with APEGGA.

6.0 Recommendations

Many of the recommendations involve continuing on the path that has already been undertaken to encourage a fresh supply of engineers and geoscientists. Although some input has been received from other stakeholders, much more collaboration is required to confirm the support for these recommendations. APEGGA is in a strong position to organize a forum of stakeholders to that end.

1. On the face of it, the gap analysis does not support further increasing the number of **Alberta graduates** in Engineering. However, the Deans emphasize and StatsCanada supports the fact that as many as 46% of engineering graduates go on to non-engineering careers. In addition, it should be a concern to Albertans that the province is only training 20% of the people who apply to APEGGA to be licensed.
2. Continue to improve the attraction and integration of **IEGs** into the professions. Focus on the immigration of practitioners in their 30s and early 40s to avoid compounding the pending demographic problem with the retiring baby-boomers.
3. Enhance initiatives to increase the attraction and retention of Alberta **women**. Enhance attraction through stronger partnerships with other groups. Enhance retention through part-time employment opportunities.
4. Encourage employees to **work longer**, where appropriate.
5. Continue efforts to increase attraction and retention of Alberta **Aboriginals**. Enhance attraction through stronger partnerships with other groups.
6. Continue to improve the **mobility** of our professionals within Canada.

The following are specific actions that key stakeholders can begin or continue to undertake to stimulate the provincial, national, and international labour supply markets.

6.1 Recommendations for the Alberta Government

Alberta

- Partner in encouraging both women and Aboriginals to enter our Professions. Most encouragement, to date, for Aboriginals has been focused on starting their own business or entering the trades.
- Continue to remove legislative barriers to people working longer. A recent move to increase the age from 69 to 71 for retirees having to withdraw retirement savings or convert to RIFs is welcomed.

Canada

- Negotiate more inter-provincial agreements like TILMA, but encourage Quality Based Selection as the basis for awarding service contracts

International

- Facilitate/encourage immigration of engineers in their 30s and early 40s.
- Promote Alberta as a great place to live and work.
- Approve operating expenditures for new programs to integrate/upgrade IEGs at Alberta Universities as per pilot at University of Manitoba, pending agreement from APEGGA's Board of Examiners that they will recognize this upgrading as a way to eliminate confirmatory examinations.

6.2 Recommendations for the Alberta Universities

Alberta

- Partner in encouragement of women and aboriginals.

Canada

- Promote Alberta Universities as institutions of choice for post-grad work.

International

- Promote Alberta Universities as institutions of choice.
- Consider programs to integrate/upgrade IEGs more effectively as per pilot at the University of Manitoba, pending approval by APEGGA's Board of Examiners that this program would replace the need for confirmatory examinations.

6.3 Recommendations for APEGGA

Alberta

- Increase the pool of women and Aboriginals by partnering with others with similar interest – AWSN, EWB, Discover-E, Minds in Motion, Science Alberta Foundation.
- Evaluate refocusing of Outreach Program as part of new partnerships and review of old Council policy on Alberta Education.
- Evaluate refocusing of Education Foundation as part of new partnerships.

Canada

- Encourage uniformity of standards across Canada to facilitate mobility within Canada.
- Move to eliminate "notwithstanding" clause in IAMA.
- Support development of national database
- If requested by sister Associations, consider the licensure of all Geoscientists in Canada through service provided by APEGGA. In such a case, reconsider the need for a national database for Geoscientists.

International

- Support development of International Institution and Degree Database to facilitate integration/licensure of IEGs.
- Continue to work with Immigrant Servicing Agencies to integrate IEGs.
- Develop IEG support by filling IEG Coordinator position in 2007.
- Enhance mentoring program for IEGs.
- Consider whether IEGs with upgrade from AB Universities meet the academic qualifications for licensure.

6.4 Recommendations for Permit Holders

Alberta

- Develop a Strategic Workforce Plan. The Alberta Government's *Building and Developing Tomorrow's Workforce: the Inform, Attract, Develop, Retain Strategy* is an excellent resource for developing the strategy to tackle the gaps. Their toolkit is aimed at helping employers understand their workforce profile, their industry and future workforce demands, and how to analyze the shortages and surpluses.
- Review compensation and benefits packages for competitiveness. More and more companies are listing stock options, ownership opportunities, share purchase to high potential employees, RRSP matching, and signing and performance bonuses in addition to a competitive salary as tools to attract and retain employees. Other perks such as overtime pay, downtown parking, health and related lifestyle memberships, and increased starting vacation make for a good social environment and a healthy work/life balance.
- Develop employees through enhanced professional development and by offering challenging projects. Continuing education is important to an employee's career development, so company-sponsored training programs and educational allowances are common ways to be supportive. Also, exciting and prestigious work projects, international job opportunities for those who like to travel, and varied work experience will keep the job interesting and employees challenged.
- Encourage mature employees to work longer by increasing flexibility. Possible options for flexibility include part-time work, reduced hours, relaxing/eliminating pension penalties, finding ways to work from home, or keeping employees as independent consultants after retirement. With 17,500 Members eligible for retirement in the next 15 years, companies open to flexible working opportunities can encourage semi-retirement instead of full retirement among mature employees.
- Consider part-time employment for women with families. A healthy work/life balance is highly valued by the current generation, especially for women with families. Flex-time, reduced hours or finding ways for women to work from home are options for women currently on or just returning from maternity leave.

- Develop welcoming working environment for Aboriginals. Edmonton Economic Development Corporation's Best Practices Toolkit, *Strategies and Tools for Employing Aboriginal People* is a good resource for managing all employees, not just Aboriginals.

Canada

Ontario, British Columbia and Saskatchewan are the provinces of choice to recruit but they are currently experiencing strong growth and it may become harder to attract people from there. Aplin Recruiting says that the three western-most provinces will hire 68% of the new hires, suggesting that recruiters may want to focus on the potential in Ontario, particularly in light of the large number of graduates and the problems the manufacturing sector is having with the strong Canadian dollar. Manitoba and the Maritimes may provide some recruitment opportunities. The provincial economies are smaller and generally the slowest growing sectors of the Canadian economy; the number of professionals is smaller and the governments are encouraging their citizens to stay home and partner with Alberta firms.

International

If Permit Holders can afford to recruit abroad they should consider the countries who are signatories to the Mutual Recognition Agreement or the countries listed by APEGGA as the top producers of immigrants. The Consulting Engineers of Alberta conducted a multi-party recruitment drive in the UK; 45 were invited to Canada for second interviews; and 25 have accepted positions to date. Permit Holders also indicate success in recruiting people from several countries but it is unclear whether these immigrants were already in Canada.

Appendix A

Alberta's Occupational Demand and Supply Outlook 2006-2016

Prepared By Data Development and Evaluation,
Alberta Employment, Immigration and Industry, November 2006

Alberta Employment, Immigration and Industry (AEII) provides labour market information to assist both the government and the public in decision-making. AEII has developed the Alberta Occupational Demand Outlook model and the Alberta Occupational Supply Outlook model. These models project the demand and supply for 140 different occupations in Alberta between 2006 and 2016. Once occupational demand and supply have been projected, a simple ratio of demand/supply is calculated to measure imbalances. In an ideal or balanced labor market the ratio is one, whereas a ratio of greater than one indicates a potential shortage, as demand is greater than supply. AEII continues to enhance this model's precision and encourages readers to provide advice and feedback on its usefulness and opportunities for improvements.

The demand and supply outlook for selected occupations relevant APEGGA has been copied on the next page. To view the entire Occupational Demand and Supply Outlook model, please visit the Alberta Employment, Immigration and Industry website at: www.employment.alberta.ca and click on "Business and Industry".

Sample page from the AEII website:

Appendix D												
Occupations with the Fastest Growing Shortages and Surpluses												
Occupational Demand/Supply Ratio* and Growth Rates for Occupations with the Fastest Growing Shortages, 2006-2016												
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average Annual Growth Rate (%), 2006-2016
J15 - Machine operators and related workers in textile processing	1.24	1.75	2.32	3.13	3.53	3.86	4.20	4.04	4.05	4.10	4.13	
Demand/Supply Growth Rate (%)	24.0	41.2	32.6	34.9	12.8	9.2	9.0	-3.9	0.2	1.1	0.8	14.7
A34 - Managers in art, culture, recreation and sport	2.3	2.4	2.6	2.5	2.5	2.5	2.3	2.5	2.4	2.4	2.3	
Demand/Supply Growth Rate (%)	139.8	3.8	11.4	-6.5	1.5	-0.7	-5.5	5.7	-1.9	-1.5	-2.9	13.0
A14 - Facility operation and maintenance managers	1.31	1.55	1.75	1.91	2.03	2.20	2.20	2.19	2.19	2.20	2.20	
Demand/Supply Growth Rate (%)	30.5	19.9	12.8	9.0	6.5	8.1	0.2	-0.5	0.1	0.3	-0.1	7.8
C02 - Life science professionals	1.24	1.47	1.69	1.87	2.07	2.08	2.12	2.11	2.11	2.10	2.10	
Demand/Supply Growth Rate (%)	23.9	18.7	15.1	10.2	10.8	0.7	2.0	-0.5	-0.2	-0.1	-0.2	7.3
G72 - Tour and recreational guides and casino occupations	1.12	1.32	1.45	1.56	1.63	1.72	1.83	1.83	1.85	1.88	1.88	
Demand/Supply Growth Rate (%)	17.1	17.5	9.9	7.6	4.7	5.3	6.4	0.2	0.9	2.0	-0.4	6.5
A33 - Managers in public administration	1.14	1.25	1.36	1.46	1.56	1.55	1.54	1.54	1.54	1.54	1.55	
Demand/Supply Growth Rate (%)	13.9	9.9	8.4	7.4	6.9	-0.1	-1.1	0.1	0.1	0.1	0.1	4.2
G98 - Other elemental service occupations	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	
Demand/Supply Growth Rate (%)	9.6	9.5	5.2	4.2	2.8	2.3	3.3	1.0	1.2	1.2	1.0	3.8
D01 - Physicians, dentists and veterinarians	1.08	1.18	1.24	1.29	1.33	1.36	1.40	1.42	1.43	1.45	1.46	
Demand/Supply Growth Rate (%)	9.6	9.5	5.2	4.2	2.8	2.3	3.3	1.0	1.2	1.2	1.0	3.8
D02 - Optometrists, chiropractors and other health diagnosing	1.05	1.10	1.14	1.19	1.22	1.26	1.29	1.33	1.37	1.41	1.45	
Demand/Supply Growth Rate (%)	4.8	5.2	3.6	3.9	3.0	2.9	2.8	3.1	2.8	2.8	2.9	3.4
D03 - Pharmacists, dietitians and nutritionists	1.05	1.10	1.14	1.17	1.21	1.25	1.29	1.32	1.36	1.40	1.44	
Demand/Supply Growth Rate (%)	5.4	4.5	3.1	3.1	3.5	3.3	2.8	2.8	2.8	2.7	2.7	3.4
F11 - Technical occupation in libraries, archives, museums and art galleries	1.10	1.20	1.29	1.33	1.37	1.35	1.36	1.34	1.33	1.33	1.32	
Demand/Supply Growth Rate (%)	10.3	9.0	7.2	3.6	2.3	-0.9	0.1	-1.0	-0.6	-0.4	-0.8	2.6
C04 - Other engineers	1.06	1.10	1.14	1.15	1.17	1.19	1.20	1.22	1.23	1.25	1.27	
Demand/Supply Growth Rate (%)	6.5	4.1	3.3	1.7	1.3	1.9	0.8	1.1	1.4	1.6	1.6	2.3
A35 - Managers in protective service	0.74	0.83	0.93	0.99	1.05	1.09	1.12	1.15	1.16	1.16	1.17	
Demand/Supply Growth Rate (%)	-25.1	13.1	11.3	7.1	5.9	4.2	2.5	2.4	0.7	0.6	0.5	2.1
J11 - Central control and process operators in manufacturing and processing	1.02	1.05	1.07	1.09	1.09	1.10	1.12	1.14	1.17	1.20	1.24	
Demand/Supply Growth Rate (%)	3.6	2.7	2.2	1.4	0.8	0.8	1.1	1.9	2.7	2.9	2.9	2.1
A38 - Managers in primary production (except agriculture)	1.03	1.08	1.11	1.13	1.13	1.13	1.14	1.15	1.17	1.20	1.22	
Demand/Supply Growth Rate (%)	5.5	4.3	3.5	1.3	0.0	0.5	0.2	1.0	2.0	2.3	2.4	2.1

*Supply Shortage if Greater Than 1
Supply Surplus if Less Than 1

Alberta's Occupational Demand and Supply for Selected NOC 4 Digit Occupations, 2006-2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
A121 - Engineering Managers											
Demand Projection	2,649	2,697	2,746	2,790	2,849	2,894	2,967	3,044	3,119	3,198	3,271
Supply Projection	2,700	2,617	2,612	2,629	2,653	2,693	2,736	2,775	2,837	2,895	2,950
Demand/Supply	0.981	1.031	1.051	1.061	1.074	1.075	1.084	1.097	1.099	1.105	1.109
C013 Geologists, Geochemists, and Geophysicists											
Demand Projection	6,464	6,495	6,570	6,595	6,736	6,779	7,031	7,351	7,596	7,870	8,137
Supply Projection	6,600	6,089	6,246	6,420	6,578	6,771	6,917	7,167	7,418	7,607	7,792
Demand/Supply	0.979	1.067	1.052	1.027	1.024	1.001	1.016	1.026	1.024	1.035	1.044
C031 - Civil Engineers											
Demand Projection	8,830	8,997	9,116	9,219	9,324	9,442	9,562	9,637	9,759	9,904	10,025
Supply Projection	8,800	8,148	8,334	8,484	8,629	8,756	8,875	8,987	9,078	9,161	9,231
Demand/Supply	1.003	1.104	1.094	1.087	1.081	1.078	1.077	1.072	1.075	1.081	1.086
C032 - Mechanical Engineers											
Demand Projection	3,489	3,575	3,663	3,748	3,842	3,920	4,027	4,143	4,254	4,369	4,475
Supply Projection	3,400	4,516	4,502	4,468	4,430	4,383	4,329	4,274	4,208	4,140	4,066
Demand/Supply	1.026	0.792	0.814	0.839	0.867	0.894	0.930	0.969	1.011	1.055	1.101
C033 - Electrical and Electronics Engineers *											
Demand Projection	3,473	3,561	3,641	3,723	3,802	3,874	3,943	4,011	4,084	4,157	4,224
Supply Projection	3,133	3,000	2,961	2,973	2,959	2,950	2,962	2,919	2,906	2,890	2,837
Demand/Supply	1.109	1.187	1.230	1.252	1.285	1.313	1.336	1.374	1.405	1.443	1.489
C034 - Chemical Engineers											
Demand Projection	1,449	1,495	1,546	1,597	1,656	1,702	1,768	1,844	1,913	1,982	2,046
Supply Projection	1,993	1,897	1,922	1,939	1,955	1,966	1,974	1,981	1,983	1,983	1,980
Demand/Supply	0.727	0.788	0.804	0.824	0.847	0.866	0.896	0.931	0.965	0.999	1.033
C04 Other Engineers **											
Demand Projection	4,272	4,428	4,573	4,726	4,873	5,003	5,135	5,292	5,415	5,552	5,685
Supply Projection	3,719	3,848	3,869	3,916	4,053	3,906	4,210	4,333	4,321	4,376	4,407
Demand/Supply	1.149	1.151	1.182	1.207	1.202	1.281	1.220	1.221	1.253	1.269	1.290
C045 - Petroleum Engineers											
Demand Projection	7,676	7,693	7,776	7,794	7,958	8,003	8,312	8,705	9,002	9,335	9,660
Supply Projection	7,600	7,181	7,009	6,924	6,911	7,002	6,977	7,167	7,379	7,520	7,658
Demand/Supply	1.010	1.071	1.109	1.126	1.151	1.143	1.191	1.215	1.220	1.241	1.261

* The projection for electrical engineers was calculated by difference from a grouping of four disciplines. The predicted shortage appears high in relation to most of the other disciplines. Although the other three disciplines in the group had concrete numbers we were cautioned about determining the electricals by subtracting from the total.

** Other Engineers includes: Industrial and Manufacturing Engineers; Metallurgical and Materials Engineers; Mining Engineers; Geological Engineers; Aerospace Engineers; Computer Engineers (except software engineers); and other Professional Engineers not elsewhere classified.

Appendix B

Inventory of Major Alberta Projects

Government of Alberta

Effective January 1, 2007, the Inventory lists major projects in Alberta valued at \$5 million or greater (an increase from the previous minimum of \$2 million) that are planned, underway, or have recently been completed. Project data is obtained from public information sources. Where possible, this data has been verified with the project proponent/developer. However, users of the Inventory may wish to *confirm* project data with the proponent/developer.

While efforts have been made to obtain the most recent information, it should be noted that projects are constantly being re-evaluated by industry. Although the Inventory attempts to be as comprehensive as possible, some information may not be available at the time of printing, or not published due to reasons of confidentiality.

For a complete list of details on all Major Projects, please visit the Alberta Government's website www.alberta-canada.com and click on "Statistics and Publications".

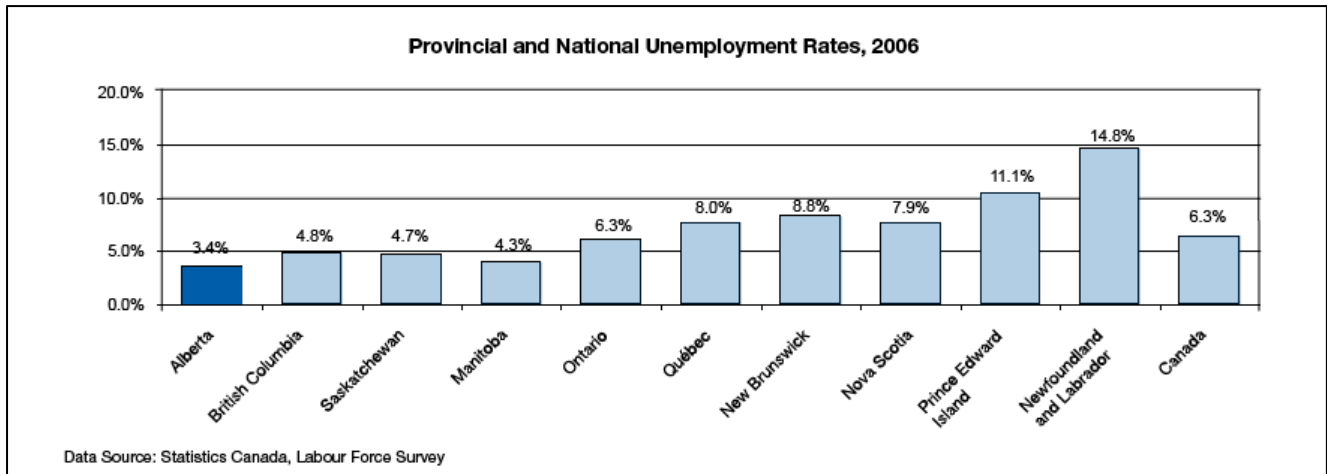
Inventory of Major Alberta Projects Summary, March 2007		
Sector	# Total Projects	Value of Projects(\$millions)
Agriculture & Related	10	\$ 183.5
Chemicals & Petrochemicals	7	\$ 1,095.0
Commercial/Retail	85	\$ 6,093.7
Commercial/Retail and Residential	12	\$ 3,261.9
Forestry & Related	7	\$ 830.0
Infrastructure	212	\$ 13,626.1
Institutional	174	\$ 10,990.5
Manufacturing	6	\$ 169.0
Mining	5	\$ 1,795.4
Oil & Gas	11	\$ 1,905.0
Oil Sands	54	\$104,806.0
Other Industrial	18	\$ 414.7
Pipelines	30	\$ 6,973.4
Power	22	\$ 5,871.8
Residential	92	\$ 3,563.6
Tourism/Recreation	112	\$ 7,455.8
Total	857	\$169,035.4

Appendix C

Provincial and National Unemployment Rates, 2006

Data Source: Statistics Canada, Labour Force Survey

Province	Unemployment Rate (%)
Alberta	3.4%
British Columbia	4.8%
Saskatchewan	4.7%
Manitoba	4.3%
Ontario	6.3%
Quebec	8.0%
New Brunswick	8.8%
Nova Scotia	7.9%
Prince Edward Island	11.1%
Newfoundland & Labrador	14.8
CANADA	6.3%



Appendix D

Building and Educating Tomorrow's Workforce (BETW)

Alberta Employment, Immigration and Industry

Building and Educating Tomorrow's Workforce is the Alberta government's 10-year labour force strategy. Priority actions and sub-strategies were created after extensive consultations with business and industry, professional and labour organizations, education and training providers and Aboriginal groups.

BETW is aimed at achieving three key outcomes: an improved supply of appropriately skilled and motivated workers in the province; highly skilled, educated and innovative people; and high performance work environments that can make maximum use of innovation and technology. These outcomes will be met through a strategic framework with four themes: **Inform, Attract, Develop, and Retain**. These four themes aims for more workers, educated and trained people, and innovative and safe work places.

To view the four themes of BETW strategic framework in further detail, as well as view the Government's priority actions, please visit the Alberta Employment, Immigration and Industry website at: www.employment.alberta.ca and click on "Business and Industry".

Inform

Individual Albertans require information to make informed career, learning, and employment choices. The Alberta government and its partners also need timely and reliable information about labour market issues to create effective plans for developing Albertans, and to attract and retain workers.

Attract

It is essential to raise the overall skill levels of Albertans and to increase the labour force participation levels of First Nations, Métis, Inuit, persons with disabilities, Albertans with literacy challenges and immigrants. However, this will not be sufficient to meet all of our short- and long-term labour force requirements. Alberta will also need to attract interprovincial migrants and immigrants to meet some of our labour market demands.

Develop

Developing the knowledge and skills of Albertans is necessary to create and sustain the high performance workforce needed for the continued prosperity of our province. The needs of people and the economy will evolve over the next 10 years and it is expected that higher levels of education will become increasingly important in the labour market. Albertans need access to a wide spectrum of educational opportunities such as literacy skills, trades, college and university. An appropriate, flexible and accessible range of education and training opportunities is needed at all levels to provide Albertans with opportunities to achieve their potential.

In addition to a high performance workforce, Alberta needs high performance work environments. Good workplaces and working arrangements, and the development and application of innovative processes, practices, and state-of-the-art technologies all contribute to high performance work environments.

Retain

With more people retiring and fewer workers entering the labour market, more attention needs to be paid to retaining people in Alberta's labour force. Action is needed to encourage more mature workers to remain engaged in Alberta's labour force, retain knowledgeable workers in the province, and ensure Alberta's communities and workplaces are attractive and vibrant places to live and work.

Along with steering the overall implementation of the priority actions under this strategy, the Alberta government is working together with stakeholders to develop and implement sub-strategies to address sector-specific labour force development needs. The success of this strategy in developing Albertans, improving the supply of knowledgeable and skilled workers in Alberta, and fostering high performance work environments is dependent on stakeholders working together and forming partnerships. Various provincial government ministries will lead work on the priority actions and industry will lead some actions under the sub-strategies. Many stakeholders, including employers, industry and professional associations, labour groups, community agencies, education and training providers and, where appropriate, other orders of government, will also have important roles to play in the journey of learning. Together, we can ensure the success of *Building and Educating Tomorrow's Workforce* and contribute to ensuring Alberta remains the best place to live, work and do business.

- from *Building and Educating Tomorrow's Workforce: Alberta's 10 Year Strategy*
(available at http://employment.alberta.ca/documents/WIA/WIA-BETW_strategy.pdf)

Appendix E

List of Government Workforce Initiatives

- **Aboriginal Policy Initiative** – provides a mechanism for cross-ministry coordination to address the commitments in the Government of Alberta’s Aboriginal Policy Framework (APF). The APF sets out the basic structure for Alberta government policies to address the needs of First Nations, Métis and other Aboriginal people in Alberta. (www.aand.gov.ab.ca)
- **Raising Awareness about Planning for Post-Secondary Studies** – employs strategies to promote the benefits of advanced education and the importance of early planning to students and parents. There is a particular focus on groups that are under-represented within Alberta’s advanced education system. (Adult Learning Division, AAE (780) 427-5607)
- **Foreign Worker Readiness Information Seminars** – provides information to Alberta employers about the process for hiring foreign workers. Other issues covered in the seminar include information on the Provincial Nominee Program, retention of foreign workers, and immigration promotion activities. (www.alberta-canada.com/immigration)
- **Oil Sands Occupational Supply Demand Database** – provides detailed information and analysis on the oil sands industry occupational demand and supply needs for the next decade (2006 - 2015) and then identifies and/or develops supply strategies to meet the demand needs. (Oil Sands Development, Energy, (780) 415-2487)
- **Economic Forecasting and Population Reports:**
 - Employment forecasts
 - Canadian interest rate, US dollar exchange prices forecasts
 - Alberta GDP forecast
 - Projection of specific impact analysis on labour demand
 - Labour mobility statistics – Alberta Population Report
 - Alberta Population Projections (www.finance.gov.ab.ca)
- **CAREERS: The Next Generation** – encourages students to consider all career options, promotes the Registered Apprenticeship Program (RAP), and assists with internships. (www.nextgen.org)
- **Career Development Strategy** – a comprehensive career development strategy for Alberta, resulting in a coordinated, connected learning system for learners of all ages. (Career Services, AHRE, (780) 422-6756)
- **First Nations Labour Force Planning Initiative** – designed to increase the employment of First Nations people at regional and community levels (www.aand.gov.ab.ca)

- **Education, Career, Workplace and Labour Market Information** – provides career, education and employment information through the ALIS website, Labour Market Information Centres and the Career Information Hotline:
 - *Alberta Careers Update* – provides Alberta industrial trends and forecasts, plus occupation growth projections. (www.alis.gov.ab.ca)
 - *Aboriginal Labour Force Survey* – supplies monthly labour statistics for Aboriginal people living off-reserve in Alberta (partners with AAND and AED) (www.hre.gov.ab.ca/fstats)
 - *Annual Labour Market Review* – provides a report on Alberta’s labour market activity for the year (www.hre.gov.ab.ca/lmi)
 - *Alberta Occupational Demand and Supply Outlook* – provides demand and supply information for 140 different occupations in Alberta. It is meant to assist in decision making by providing projections considering multiple sources of information. (www.hr.gov.ab.ca/lmi)
 - *Alberta Modified Canadian Occupational Projection System Forecast* – provides Alberta industry employment outlook. (www.hre.gov.ab.ca/lmi)
 - *Alberta Profiles* – provides information on the changing profile of Alberta’s labour force so that ways can be found to develop and fully utilize the skills of all Albertans:
 - Youth
 - Older Workers
 - Aboriginal People
 - Immigrants
 - Disabled Persons
 (www.hr.gov.ab.ca/lmi)
 - *Alberta Occupational Forecast (2005 – 2010)* – provides employment projections for 140 different occupations across Alberta for eight economic regions. This forecast summarizes expected employment by industry, occupation and economic region. (www.hre.gov.ab.ca/lmi)
 - *Alberta Regional Population Outlook, 2006 – 2011* – provides regional population demographic information to assist employers with planning their future needs. (www.hre.gov.ab.ca/lmi)
 - *Construction Industry Forecast* – led by the Construction Owners’ Association of Alberta, this forecast provides an annual outlook for selected construction-related trades in Alberta. (<http://workforcedev.coaa.ab.ca/forecasting/library.asp>)
 - *HR Strategies for Employers* – Human resource publications for employee recruitment and retention, work-life balance and employee development:
 - Diversity – a strategy to meet the need for skilled workers
 - Finders + Keepers – recruitment and retention strategies
 - Better Balance; Better Business – options for work-life balance
 - Skills by Design – strategies for employee development

www.alis.gov.ab.ca)

- *Industry and Employer Toolkit* – The Industry and Employer Toolkit bundles together government resources available to assist employers and industry. It organizes them along the four themes of Building and Educating Tomorrow's Workforce: Inform, Attract, Develop and Retain. (www.hre.gov.ab.ca/toolkit)
 - *Labour Force Statistics* – these monthly reports provide Albertans with current labour force statistics and conditions. (www.hre.gov.ab.ca/lmi)
 - *Labour Market and Economic Indicators Dashboard* – identifies labour market imbalances and provides notice for how well labour and skill needs are being met for specific occupational clusters in 12 industry sectors. (Labour Force Development, AHRE, (780) 644-4306)
 - *Persons with Developmental Disabilities – Workforce 2010* – the Workforce 2010 initiative addresses labour market issues and provides foundational information on the community rehabilitation sector. (www.workforce2010.com)
 - *Labour Market Partnerships (LMP)* – is intended to enhance workplace human resource development and labour market adjustment strategies through community partnerships. The LMP program is designed to identify, develop and support projects with industry, organizations and community groups with common labour market needs. (www.gov.ab.ca/hre/ets/req/Display.asp)
- **International Qualifications Assessment Service** – issues certificates indicating how international educational credentials compare to educational standards in Alberta. Assessment certificates are used by immigrants for employment, professional licensing and admission to educational institutions. (www.advanceeducation.gov.ab.ca/iqas)
- **Information Repository on International Credentials** – the objective of the project is to develop an information repository on international credentials that can be accessed online by employers, professional licensing bodies and educational institutions to compare educational credentials from other countries to educational standards in Alberta. (www.advanceeducation.gov.ab.ca/iqas)
- **Off-Campus Work Permits for International Students** – allows international students at participating publicly funded post-secondary educational institutions to work off campus while completing their studies. The work permit allows international students to work up to 20 hours a week during regular academic sessions and up to 40 hours a week during regular breaks. (www.alis.gov.ab.ca/studyinalberta/ps/workstudy.asp)
- **Economic Immigrant Attraction Initiative** – primary role is in marketing Alberta as a prime location in which to live, work and do business. (www.alberta-canada.com/immigration)
- **Euro-Mission** – promotes Alberta in Europe as a 'destination of choice' to foreign nationals and helps Alberta employers recruit workers by posting jobs on Alberta Economic Development's website. (www.alberta-canada.com/jobs)

- **Provincial Nominee Program** – is an immigration program that allows the Province of Alberta to choose immigrants to meet critical skill shortages being experienced by Alberta employers. (www.alberta-canada.com/pnp/faqNominees.cfm)
- **Agreement on Internal Trade** – provides advice to self-regulating occupations and trades to enhance the movement of qualified workers throughout Canada. (www.iir.gov.ab.ca/trade_policy/international_trade_agreements.asp)
- **Immigration Programs and Services** – coordinates immigration services with the federal government and across ministries and also provides settlement and language services to immigrants. (www.hre.gov.ab.ca/immigration)
- **Inter-departmental Immigration Working Group** – ensures coordination and alignment of policies and programs across government for immigrants and immigration. (www.hre.gov.ab.ca/immigration)
- **Aboriginal Workforce Participation Initiative** – a program to increase Aboriginal employment, Aboriginal Affairs and Northern Development works with the federal government to provide support to the initiative. (www.ainc-inac.gc.ca/ai/awpi/index_e.html)
- **First Nations Economic Partnerships Initiative** – develops First Nations, industry and government partnerships to strengthen First Nations' economic capacity, increase participation in the economy, and assist in the development of a viable and competitive First Nations' private sector. (www.aand.gov.ab.ca)
- **Northern Alberta Development Council Bursaries** – provides bursaries for approximately 860 Alberta students each year. Four of the five programs have a work commitment in northern Alberta. (www.gov.ab.ca/nadc)
- **Rural Incentive Bursary** – aims to increase participation of rural residents in advanced learning opportunities by offering a financial benefit for the first two years of post-secondary education. (Adult Learning Division, AAE, (780) 427-5607)
- **Community Consortia Program** – provides almost \$5 million to support program delivery in rural areas not served by post-secondary institutions. Programs offered address critical skill shortages identified in the local communities. (Adult Learning Division, AAE, (780) 427-507)
- **Enrolment Planning Envelope** – over the next three years, 11800 student spaces will be added to post-secondary institutions in Alberta; by 2020, a total of 60,000 new spaces are projected to be in place. (Adult Learning Division, AAE, (780) 427-5607)
- **Future Endowment Fund** – a \$3 billion fund to support innovation and excellence and expand opportunities for Albertans. Adult Learning Division, AAE (780) 427-5607)
- **Ingenuity Fund** – to develop internationally competitive science and engineering expertise in the province. It supports researchers and graduate student in science and engineering as well as encourages youth to pursue careers in science and engineering. (www.albertaingenuity.ca)

- **Bridging Programs** – help internationally trained and qualified individuals gain the skills and credential recognition they need to access the labour market in their field of expertise. (Skills Investment Programs, AHRE, (780) 422-6756)
- **Labour Market Agreement for Persons with Disabilities** – integrated employment supports for persons with disabilities that includes an evaluation of nine demonstration projects. (Skills Investment Programs, AHRE, (780) 422-6756)
- **Language Assessment and Referral Agencies** – two centres that assess language proficiency and provide up-to-date information on English as a Second Language programs running in Edmonton and Calgary.
(www.hre.gov.ab.ca/immigration)
- **Alberta Science and Research Investments Program** – contributes to the attraction, retention and development of researchers and graduate students in Alberta, through support for selected science and research infrastructure initiatives of strategic importance to Alberta. The objectives are to support quality and research excellence; build the capacity for innovation; and promote initiatives of strategic benefit to Alberta. (www.innovation.gov.ab.ca/inv/sec/ursi/pro/asrip_001_1.cfm)

Appendix F

BC/Alberta Trade, Investment and Labour Mobility Agreement (TILMA)

Article from The PEGG, March 2007

Alberta/B.C. Trade Agreement

APEGGA already complies with and strongly endorses the gist of a new regional trade agreement that comes into effect April 1. However, APEGGA and three other associations in the two western-most provinces do have issues they want to see their governments address.

The B.C./Alberta Trade, Investment and Labour Mobility Agreement begins a transition phase on April 1. The two provincial governments inked the deal a year ago. TILMA removes barriers to trade between Alberta and B.C.

A task force of APEGGA, the Alberta Association of Architects, the Association of Professional Engineers and Geoscientists of British Columbia, and the Architectural Institute of British Columbia have discussed how TILMA affects them and their members. The four self-regulatory bodies are concerned that areas of the agreement addressing procurement of professional services will increase bureaucracy, and work against public safety and the public interest.

The four bodies are firmly committed to improving the seamless mobility of professionals in architecture and geoscience between the two provinces. In fact, the task force says, current mobility agreements for engineers and geoscientists result in prompt registration by the hosting associations in 99 per cent of the applications — with no additional requirements imposed. Over 90 per cent of the architectural firms applying for registration between the two provinces are accepted with no further requirements imposed.

The task force also favours the agreement's requirement of more harmonization. The task force thinks, for example, that continuing professional development legislation might be harmonized.

Appendix G

Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded, 2001 to 2005

Source: Canadian Council of Professional Engineers (CCPE) www.ccpe.ca

Foreword

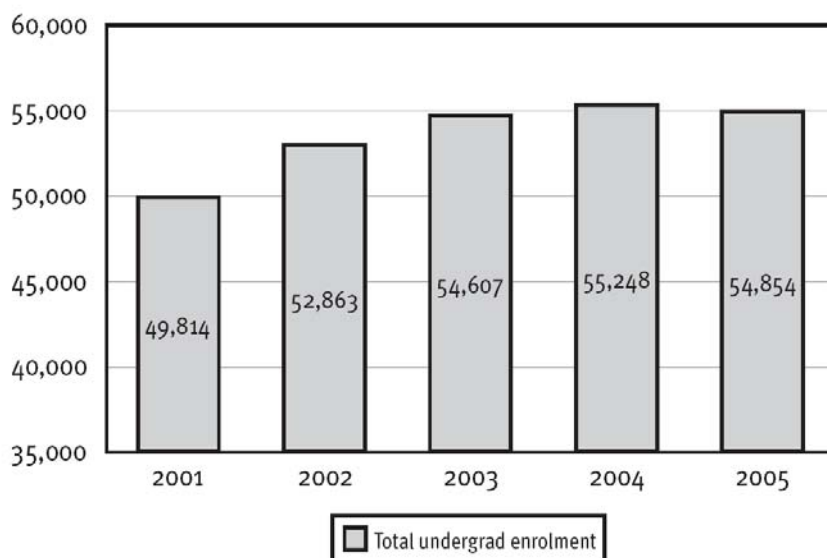
Each year the Canadian Council of Professional Engineers (CCPE) asks Canadian universities to provide data on their engineering programs. In 2005, 43 universities reported enrolment, staffing, program and graduation information. Over the five-year period from 2001 to 2005 undergraduate enrolment in engineering increased a modest 10.1 percent.

A period of substantial expansion in undergraduate engineering enrolment during the first part of this decade was followed by slower growth in 2004 and 2005. While base enrolment actually showed a year-over-year decline in 2005, an accumulation of students in yet-to-be accredited programs suggests that enrolment continues to grow gradually. Enrolment in some traditional disciplines like electrical engineering has been trending downward as students are attracted to new, more specialized programs.

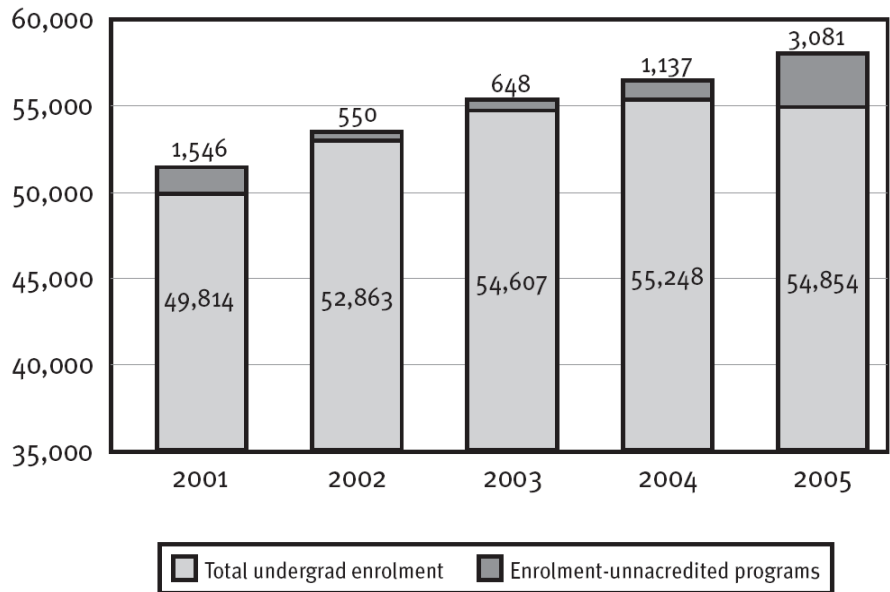
Enrolment of women in engineering continued to weaken at the undergraduate level. The proportion of female engineering students peaked in 2001 at 20.6 percent, but stood at 17.5 percent in 2005. University administrators in Canada and the U.S. watch this trend without evidence of a clear cause. While female undergraduate enrolment has dropped, the number of international students has increased by 70 percent over the five-year period to 2005. International students now represent 9.5 percent of the undergraduate student body.

To view the full publication, please visit the Programs and Services section of CCPE's website: www.ccpe.ca

CHART 1.1 FULL-TIME UNDERGRADUATE



**CHART 1.2 FULL-TIME UNDERGRADUATE ENROLMENT
(WITH UNACCREDITED PROGRAMS)**



**CHART 1.3 UNDERGRADUATE ENROLMENT
BY PROGRAM**

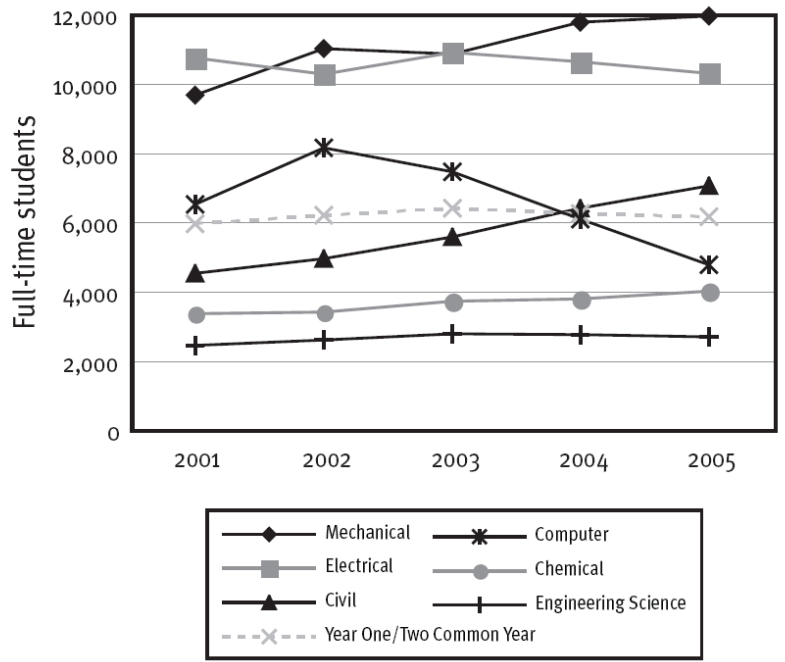


CHART 1.4 UNDERGRADUATE ENROLMENT BY PROGRAM (2)

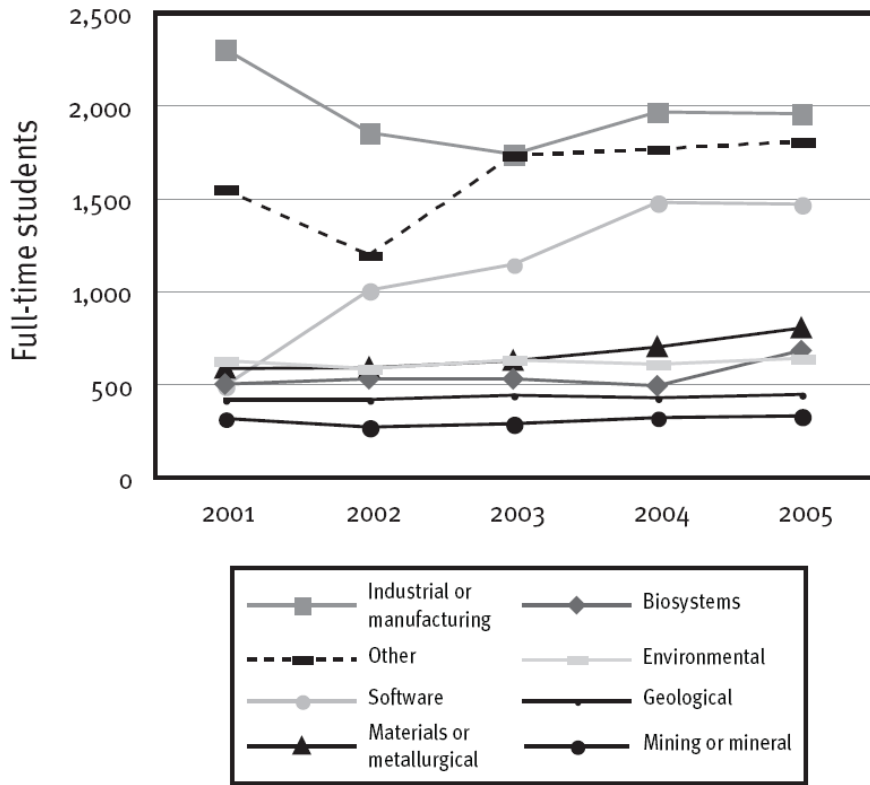
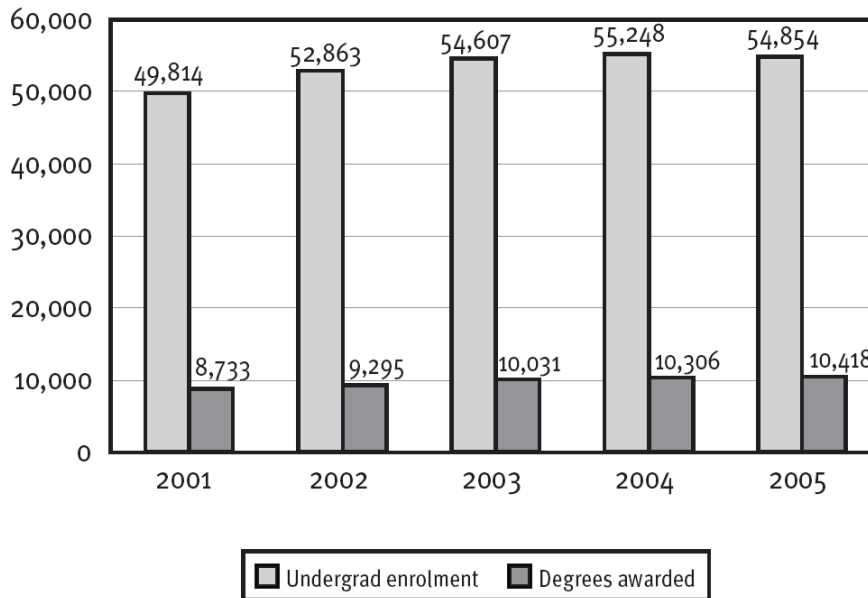


CHART 1.6 FULL-TIME UNDERGRADUATE ENROLMENT AND DEGREES AWARDED



Appendix H

Mutual Recognition Agreements

In order to satisfy the academic requirements for licensure in Alberta you must have the equivalent of a Canadian undergraduate degree in engineering, geology, or geophysics. In some cases, APEGGA requires you to write technical examinations to demonstrate this equivalency.

In Canada, the Canadian engineering education system is carefully monitored to ensure that Canadian undergraduate engineering programs meet the academic requirements necessary for the practice of the profession of engineering. The Canadian Engineering Accreditation Board (CEAB) carefully and rigorously reviews undergraduate engineering programs in Canada. As part of this review process the CEAB sends visiting teams to Canadian engineering university to thoroughly review every engineering programs in depth. If the program meets the high standards that have been set for accreditation, the program becomes CEAB accredited. For you to become licensed as a Professional Engineer or Foreign Licensee, your academic background must be equivalent to a CEAB accredited degree in engineering.

There are some countries in the world that have developed engineering education accreditation systems similar, but not identical, to the Canadian accreditation system. Canada has entered into **mutual recognition agreements** with ten countries:

- United States
- United Kingdom (1989)
- Ireland (1989)
- Australia (1989)
- New Zealand (1989)
- Hong Kong (1995)
- South Africa (1999)
- France
- Japan (2005)
- Singapore

If you have an undergraduate degree in engineering from one of these eight countries after the dates shown and if your degree is listed on the list of approved programs from that country, you will likely not be assigned any technical engineering exams by APEGGA, with the possible exception of **engineering economics**.

For complete information on how to become a Professional Member or Foreign Licensee with APEGGA, please visit the Applicants section of the APEGGA website: www.apegga.org

Appendix I

From Consideration to Integration

Canadian Council of Professional Engineers

From Consideration to Integration (FC2I) is an initiative of the Canadian Council of Professional Engineers and its constituent members, the provincial and territorial licensing bodies. The licensing bodies are responsible for the protection of the public through the regulation of the engineering profession.

The goal of FC2I is to develop new processes and/or improve current processes by which international engineering graduates (IEGs) are able to obtain an engineering license without compromising public safety or lowering professional standards, and to find meaningful engineering employment. Doing this successfully means that the initiative is also looking at activities that take place prior to immigration. The project is fully funded by Human Resources and Skills Development Canada

The Issue

The issue of international engineering graduates (IEGs) having difficulty both obtaining their professional engineering licence (a P.Eng. in English or an ing. in French) and engineering employment, is one the engineering profession takes very seriously.

In 2001, Citizenship and Immigration Canada recorded that 44 percent of skilled workers entering Canada indicated an intention to work in a regulated occupation, and of those, 63 percent self-identified as engineers". That translates into thousands of IEGs coming to Canada every year.

To tackle this issue, CCPE and its members – the provincial and territorial engineering regulatory bodies – established FC2I with funding from Human Resources and Skills Development Canada (HRSDC).

What We're Doing About It

Launched in January 2003, FC2I is a three-phase project. In Phase I, work focused on understanding the IEG experience, examining provincial and territorial engineering licensing procedures, and learning from those who work with and employ IEGs.

In Phase II, the Steering Committee analyzed the information, determined where the process of integration needs improvement and began to build consensus among stakeholders on possible solutions. Seventeen recommendations were presented to the CCPE Board of Directors at their Annual General Meeting in May 2004. All 17 were unanimously passed.

The recommendations fall into four categories: labour market study; employment; communications; and licensing. We are now in Phase III; CCPE and its partners are working with key stakeholders to implement the recommendations and to develop supporting communications materials.

Implementation of Recommendations Include:

Internationally-Educated Engineers Qualification Program: The Internationally-Educated Engineers Qualifications (IEEQ) Pilot Program is a one-year program offered through the University of Manitoba (UofM) to IEGs who have been assigned five exams or fewer after having had their credentials assessed by the Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM), that province's engineering licensing body. The IEGs are enrolled and take courses with UofM engineering students. They also attend one class designed specifically for them – Practising Engineering in Manitoba. Thanks to those elements, IEEQ is addressing five of the 17 FC2I recommendations, specifically: studying the feasibility of alternative systems of evaluating an applicant's professional competency for licensure; creating a seminar on "working in Canada"; promoting the concept that cross-cultural training be taken by regulatory body volunteers and staff, CCPE, IEGs and employers; undertaking a study to determine best practices in the employment area for integrating IEGs into the workplace; and developing a mentoring program.

International Institutions and Degrees Database: CCPE has received HRSDC funding and carried out the first phase of establishing the International Institutions and Degrees Database (IIDD). This phase will result in a set of criteria and protocols from which to operate the database. Funding is now being sought to carry out the second phase of the project which will result in the database being built and operational. Once completed, it will establish an accurate, current database of recognized international engineering degrees and educational institutions to help engineering licensing bodies verify the education of licensing applicants. This database represents one of the key recommendations coming out of the work in Phase II: establishing a database of recognized engineering degrees.

Benchmarking the Language Demands of the Engineering Profession in Alberta: In Alberta, the Edmonton Mennonite Centre for Newcomers is leading the Benchmarking the Language Demands of the Engineering Profession in Alberta Project. This initiative will determine actual benchmarks for language usage in engineering workplaces, courses, and bridging programs, and will help develop and set a language standard to ensure IEGs have the appropriate level of English or French proficiency, one of the 17 recommendations.

Labour Market Study: There is a lack of information relative to engineering labour market supply and demand in Canada. The lack of specific research detailing the regional/local labour market situation for engineers or the situation by discipline produces a clouded reality. To tackle this issue, CCPE is working on a funding proposal to HRSDC to undertake an engineering labour market study that also develops a model to provide current and ongoing labour marketing information, including maintenance and dissemination which will result in an accurate representation of the labour market. This project proposal was a recommendation of FC2I Phase II and, when completed, will provide valuable information on where to seek employment both for those considering immigrating to Canada and IEGs who are in the settlement process.

CCPE is the national organization of the provincial and territorial associations and ordre that regulate the practice of engineering in Canada and license the country's more than 160,000 professional engineers.

Please visit www.ccpe.ca/fc2i for a complete list of the recommendations as well as ongoing project status updates.

Appendix J

Engineering Access Program (ENGAP)

Faculty of Engineering, University of Manitoba

Less than one percent of engineers in Canada are Aboriginal, and there is a strong demand for engineers with an Aboriginal background. ENGAP provides an opportunity for students of Aboriginal ancestry, who may not have had access to the resources to obtain the normal prerequisites required to get into, prepare for, and succeed in engineering. It is not a special degree; there is no difference in the engineering degree of an ENGAP student. However, the program involves a number of custom support mechanisms to help Aboriginal student:

Academic Support - the Undergraduate Coordinator provides assistance with choosing and registering for all courses, free tutoring for all courses.

Personal Supports - the Counsellor provides assistance with personal and family counselling, resume and job search advice, daycares and accommodations.

Financial Supports - the Program Coordinator provides assistance with obtaining financial support through numerous bursaries and scholarships, Canada Student Loan (ACCESS Bursary) and the ENGAP Entrance, Bursary and Scholarship. Social activities help students derive a sense of community within the Faculty of Engineering, in addition to the Faculty spirit that all engineering students enjoy.

All new ENGAP students will attend an Orientation of two (2) weeks in August before the start of the Fall Term in September. During this time, the staff and students will have an opportunity to get to know each other. This Orientation is designed to help students obtain the necessary information and skills to facilitate their entry into the university. During orientation the academic staff will assess students' needs and plan appropriate individual academic programs. Orientation is also a time for students to develop a sense of the rigors of an engineering program and to make final decisions regarding their program of studies and entry into engineering.

For complete information about ENGAP, please visit www.engap.com.

Appendix K

Native Access

Also known as Mount Pleasant Educational Services Inc.

Founder: Corinne Mount Pleasant-Jette, C.M.

The Native Access/Mount Pleasant Educational Services Inc. is a program that addresses the low participation rate of Aboriginal people within the applied sciences in Canada. The program works with the engineering profession and academic institutions, as well as government and businesses to develop programming which will encourage Aboriginal youth to stay in school and pursue post-secondary studies in the pure and applied sciences. More importantly, Native Access works with First Nations communities – students, parents, teachers, elders and leaders – from across Canada to ensure that the programming is relevant and meets the needs and expectations of the community. Current and on-going projects include:

- **Engineering Education in Canada: A Guide for Aboriginal Students:** a great resource for teachers and students who want to know what engineering is all about, where it can be studied, and what undergraduate programs are available in Canada. Also included is information about programs and which provide support for Aboriginal students.
- **Curriculum Materials:** Aimed at the high school level, Native Access curriculum packages (newsletter, worksheet and teacher's guide) are produced four times per academic year. Each set focuses on a different topic, and makes connections to math and science that are relevant to First Nations students.
- **DreamCatching – Professional Development Opportunities:** Teachers need support and resources. NAEP professional opportunities include the DreamCatching conference, a series of hands-on interactive workshops for math and science teachers.

For complete information about the Native Access program, please visit their website at www.nativeaccess.com.

Appendix L

Building Environmental Aboriginal Human Resources Program (BEAHR)

Government of Canada

In 2001, a dynamic new initiative was born. National in scope, BEAHR (Building Environmental Aboriginal Human Resources) took on the important task of increasing Aboriginal employment in the environment sector. Through career awareness programs, training and employment resources, and recognition of environmental excellence, BEAHR has made excellent progress toward this goal.

Over its first few months, for example, BEAHR and its [National Steering Committee](#) developed the "BEAHR Circle to Success." This framework became the foundation for a holistic view of BEAHR's future direction and national strategy.

In order to expand on this view, 2002 saw nine round table discussions held in Vancouver, Calgary, Fort McMurray, Yellowknife, Winnipeg, Iqaluit, Toronto, Montreal, and Moncton. With the help of over 140 Aboriginal individuals and organizations, BEAHR made further progress in developing its strategy and goals.

After a busy and fruitful 2003, these goals—and the strategy behind them—have produced a number of programs and services. The BEAHR Internship Program has already seen great success and the BEAHR Speaker Program is generating interest across the country. As the BEAHR Employer's Guide and the National Occupational Standards for Environmental Monitors near completion, BEAHR is proving its value to the environment industry. Lastly, as new programs are set in motion (such as the BEAHR Learning Institute) and as old programs are repeated (such as the Aboriginal EnviroCareers Calendar Contest), BEAHR continues to head for the future.

As such, BEAHR looks forward to a) increasing Aboriginal participation in the environment sector by 6,000 new positions and b) continuing toward the following goals:

- Create an awareness of environmental careers among Aboriginal communities
- Support Aboriginal peoples' development in the environmental sector
- Become the premier source for environmental employment resources
- Recognize and support environmental excellence in the Aboriginal community, education, and industry

In achieving these goals, BEAHR will remain reliant on the input and support of Aboriginal people, the environment industry, educators, governments, and others. BEAHR will especially rely on the partners responsible for its creation—[ECO Canada](#) (formerly CCHREI) and the [Aboriginal Human Resource Development Council of Canada](#).

These national sector councils are funded by the Government of Canada's Sector Council Program. ECO Canada strives to ensure an adequate supply of people with the demonstrated skills and knowledge required to meet the environmental human resource needs of the public and private sectors. AHRDCC moves to see full participation of Aboriginal people in Canadian labour markets and helps pioneer new

ways to increase skills and training opportunities for Aboriginal people. With their respective purposes, ECO Canada and AHRDCC became the perfect partners to create BEAHR, which has given birth to the first initiative between two sector councils.

For complete information about this program, please visit their website at www.beahr.com .

Appendix M

Institute for Sustainable Energy, Environment and Economy (ISEEE)

University of Calgary

ISEEE builds on considerable strengths in research and academic programs in energy and the environment at the University of Calgary. ISEEE was established in 2003 to provide leadership and coordination for developing and implementing energy- and environment-related initiatives at the University.

ISEEE is also a vehicle for collaboration. The Institute provides an effective collaborative interface within the university and with other research providers and research sponsors - locally, nationally and internationally.

ISEEE provides leadership for engaging world-class, interdisciplinary and mission-based research and education, for advancing sustainable energy, environment and the economy.

Our Education Goals

ISEEE's mission-focused research and educational programs are aligned with the U of C's clearly articulated, strong and achievable education goals. These goals are to:

- Make the U of C the pre-eminent international centre for integrated research and education in the areas of sustainable energy, the environment and the economy
- Strengthen the U of C's academic programs by 2006, by enlarging high-quality graduate programs (especially research-oriented doctoral programs that support the strategic academic priorities)
- Manage undergraduate enrolment to ensure that top students are highly satisfied with the quality of their experience, in a learning environment committed to research, scholarship and creative activity
- Educate the next generation of engineers, scientists, business and public sector leaders and consumers
- Provide the current and next generation with the understanding and awareness needed to make informed and effective decisions, based on sustainable development principles
- Develop and offer outstanding educational programs and experiences that attract the best international students and leading, socially responsible international employers
- Assist working professionals and managers in staying current and expanding their knowledge, awareness and capability to contribute to organizations and society

For complete information about ISEEE, please visit their website at www.iseee.ca .

Appendix N

Centennial Centre for Interdisciplinary Science

University of Alberta

A flagship initiative that will be truly transformative for the Faculty of Science is the Centennial Centre for Interdisciplinary Science (CCIS). This new, state-of-the-art facility on the historic quadrangle of the University of Alberta will bring together students, professors and researchers from a variety of science departments to create a unique approach to scientific discovery. Scheduled to open in 2010, the CCIS will be one of only a few of its kind in the world to house interdisciplinary science research teams in one facility. As a result, it will attract and retain outstanding students and world-class teaching and researching talents— from Alberta, Canada, and across the globe.

CCIS will be a signature building in terms of architecture, functional design and sustainable design. It will provide the space, environmental control, and technological capacities to meet teaching, research and technology transfer needs of the Faculty of Science over the next 10 years. New lecture halls and teaching labs will provide an unprecedented learning experience for students campus wide and open the door of opportunity for 1,100 more undergraduate students and 500 more graduate students to pursue the education in science that they desire.

The Government of Alberta recently committed \$285 million over the next three years towards construction of the CCIS. Demolition of existing facilities is complete and construction of the new facility has begun.

Information on the CCIS will be available on the U of A's Faculty of Science website: www.science.ualberta.ca

Appendix O

Engineers Without Borders

University of Alberta and University of Calgary

Who We Are

Poverty is not about weakness. For the 800 million people who go hungry each day and the one billion who lack access to clean water, poverty is an absence of opportunity. Engineers Without Borders is responding to this urgent need, helping people in developing communities gain access to technologies that will improve their lives. We believe that technology, when appropriately incorporated into each community's social, cultural, economic and political context, can drive extraordinary change.

We promote human development through access to technology by:

- Partnering with developing communities to help build the capacity of their technical sector
- Raising awareness among Canadians about how they can make decisions that positively impact communities overseas
- Encouraging the Canadian government to become a model global citizen by taking on a leadership role in poverty alleviation

Our Charter

1. We use a people-first approach.

We understand that development is a people-centric process, and that technology is a means, not an end, to improved quality of life. We listen to and learn from our partners, working with them to understand the change they seek in their lives, whether technology can play a role in enabling that change, and how communities can build on their existing strengths to gain access to that technology.

2. We focus on finding sustainable solutions to root-cause problems.

We seek solutions that address the problems that are at the root of the challenges facing a developing community. Such solutions incorporate the needs, values and capabilities of the communities.

Solutions must also be self-sustaining beyond EWB's intervention—especially regarding the economics and technical challenges of maintenance and repair. They ideally can be replicated and improved upon with minimal EWB involvement.

3. We maximize social returns by running an effective and efficient organisation.

We operate in a disciplined, low-cost manner and strive to provide our members and donors with ever-increasing social returns. These social returns come first and foremost from development impact. While development impact is inherently difficult to quantify, we strive to intelligently measure it. Social returns also result from our role helping Canadian engineers become improved citizens.

4. We seek to partner with existing organisations wherever possible.

We recognize that there are many organisations with decades of experience who are working in similar areas to EWB. Rather than add another organisation with parallel operations, EWB partners with non-governmental organisations, local entrepreneurs,

governments and other groups to complement their existing capacity. We seek to learn from their experiences to minimize our own errors.

5. We operate transparently and openly address lessons learned.

We must constantly seek out our areas of weakness and strive to correct them if we are to improve. While we celebrate our successes, we also publicly debate our failures and discuss means to improve on our work.

6. We maintain our commitment to under-developed communities.

We face the challenge of balancing the expectations of our stakeholders— members, funders, leaders, partners and others. We affirm that one stakeholder matters ahead of all others: the members of the developing communities with whom we work. We constantly ensure that our activities meet their needs.

For complete information on Engineers Without Borders – Canada, please visit the website www.ewb.ca;

Or:

Visit the Calgary Professional Chapter website at : <http://calgary.ewb.ca/>

Visit the University of Calgary Chapter website at: <http://ucalgary.ewb.ca/>

Visit the University of Alberta Chapter website at : <http://ualberta.ewb.ca/>

Appendix P

Pacific NorthWest Economic Region

Regional Statistics:

PNWER POPULATION GROWTH 1990 - 2005			
Jurisdiction	1990	2006	% Change
Alaska	550,043	663,661	20.7%
Idaho	1,006,749	1,429,096	42.0%
Montana	799,065	935,670	17.1%
Oregon	2,842,321	3,641,056	28.1%
Washington	4,866,692	6,287,759	29.2%
Alberta	2,469,069	3,256,816	31.9%
British Columbia	3,290,814	4,254,522	29.3%
Yukon Territory	31,365	30,988	-1.2%

GROWTH OF JURISDICTION'S GDP (BILLIONS OF US\$ AND CN\$)			
Jurisdiction	1990	2005	% Change
Alaska	25.0	34.0	36%
Idaho	17.8	43.6	145%
Montana	13.4	27.5	105%
Oregon	57.3	128.1	124%
Washington	115.7	261.5	126%
Alberta	72.4	187.2	159%
British Columbia	74.1	157.2	112%
Yukon Territory	1.2	1.4	22%

GROWTH OF JURISDICTION'S GDP (BILLIONS OF US\$ AND CN\$)			
Jurisdiction	1990	2005	% Change
<i>PNWER Average</i>	<i>47.11</i>	<i>106.64</i>	<i>104%</i>
<i>Canada</i>	<i>679.9</i>	<i>1,290.2</i>	<i>90%</i>
<i>United States</i>	<i>5,803.1</i>	<i>11,734.3</i>	<i>102%</i>

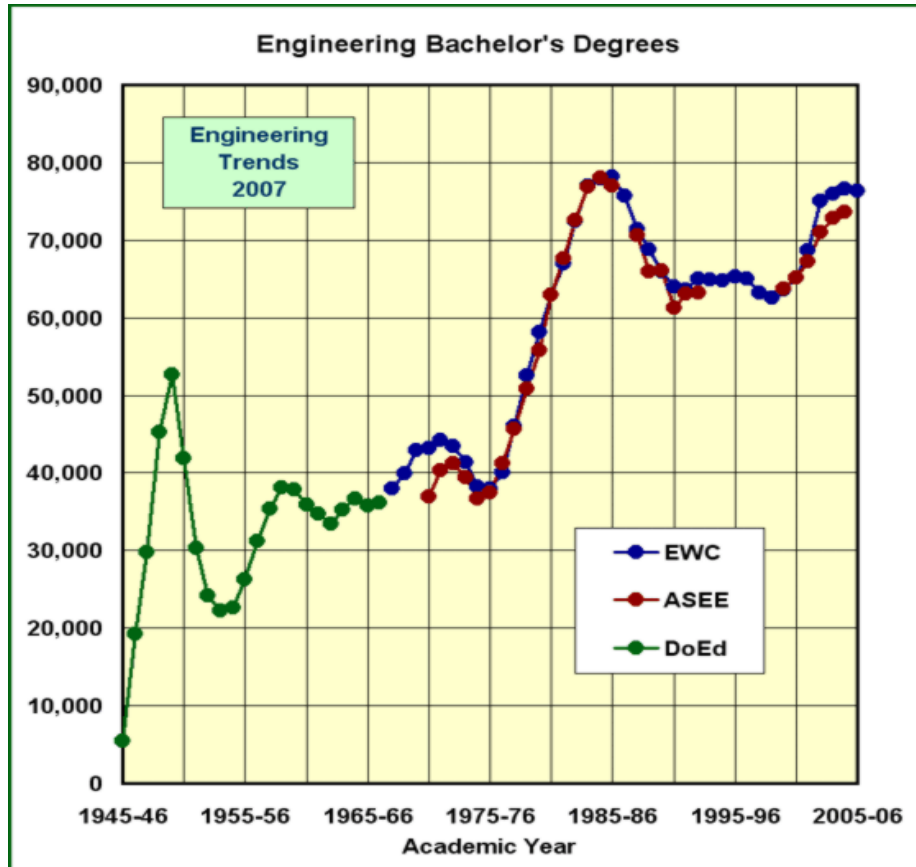
WORKFORCE GROWTH AND DISTRIBUTION BY INDUSTRY					
Industry	Number of Jobs in Sector		Change	Relative Proportion of Jobs in Sector	
	1990	2004		1990	2004
Natural Resources & Mining	380,958	297,345	-22%	6.0%	4.2%
Construction	415,936	522,354	26%	6.6%	7.3%
Manufacturing	894,269	858,767	-4%	14.2%	12.0%
Trade, Transportation & Utilities	1,956,844	1,851,370	-5%	31.0%	25.9%
Information	60,064	219,709	266%	1.0%	3.1%
Financial Activities	375,480	402,020	7%	6.0%	5.6%
Professional & Business Services	653,449	805,796	23%	10.4%	11.3%
Education & Health Services	1,181,580	1,191,607	1%	18.7%	16.7%
Leisure & Hospitality	158,643	662,022	317%	2.5%	9.3%
Other Services	233,088	344,246	48%	3.7%	4.8%
Total	6,310,231	7,155,236	13%	100.0%	100.0%

Appendix Q

United States – Bachelor's Degrees Awarded in Engineering Programs

American Society of Engineering Education

U.S. Department of Education



EWC: data collected from the Engineering Workforce Commission
ASEE: data collected from the American Society of Engineering Education
DoEd: data collected from the U.S. Department of Education

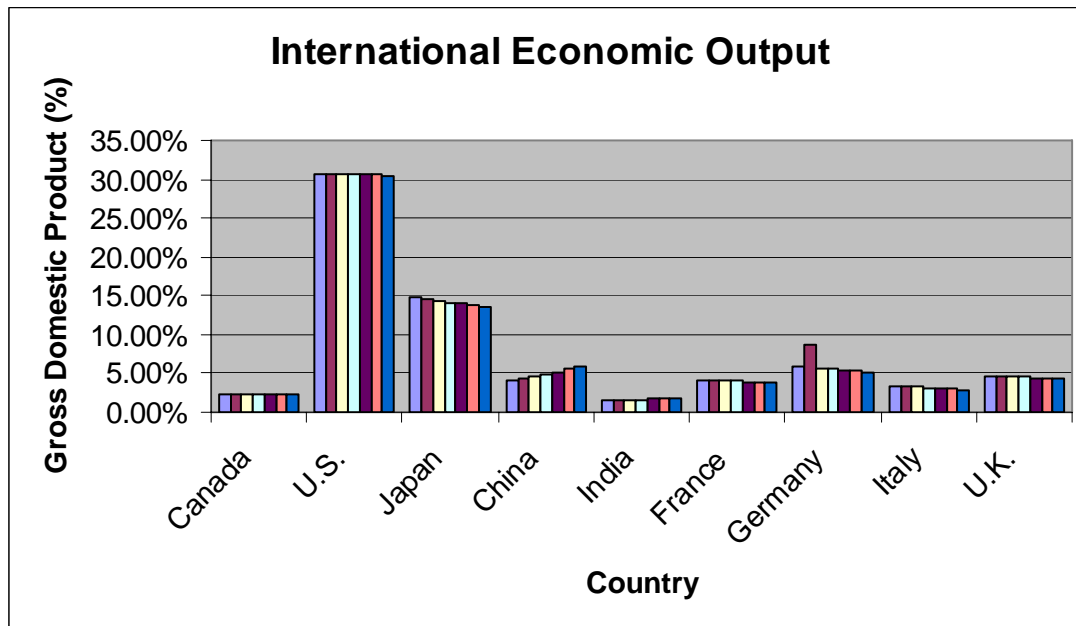
BACHELOR DEGREES AWARDED IN U.S. BY DISCIPLINE (1999-2005)							
Bachelor's Degrees	1999	2000	2001	2002	2003	2004	2005
Aerospace Engineering	1,174	1,296	1,558	1,711	2,011	2,232	2,371
Agricultural Engineering	536	583	549	556	603	601	635
Architectural Engineering	497	559	554	513	627	590	722
Biomedical Engineering	1,016	1,156	1,138	1,315	1,628	2,019	2,410
Chemical Engineering	6,199	6,023	5,740	5,529	5,233	4,801	4,521
Civil Engineering	9,416	8,653	8,027	8,066	8,192	8,142	8,247
Civil/Environmental Engineering ¹	-	-	-	-	-	-	212
Computer Engineering	3,117	3,972	4,519	4,720	5,746	5,838	5,455
Computer Science (Engineering)	4,177	5,510	6,062	6,842	8,649	9,156	8,419
Electrical Engineering	10,955	11,211	11,096	11,402	11,994	12,500	12,459
Electrical/Computer Engineering	2,374	2,126	2,444	2,597	2,782	2,700	2,924
Engineering (General)	814	944	992	1,069	1,105	1,138	1,179
Engineering Management	171	186	187	227	296	302	303
Eng. Science & Eng. Physics	547	535	475	489	451	501	383
Environmental Engineering	604	588	510	465	516	576	522
Industrial/Manufacturing Eng.	3,524	3,555	3,474	3,575	3,769	3,790	3,647
Mechanical Engineering	12,859	12,992	12,921	13,247	13,801	14,182	14,947
Metallurgical & Materials Eng.	875	904	791	838	859	817	840
Mining Engineering	173	164	150	112	96	85	92
Nuclear Engineering	114	134	118	145	135	202	275
Other Engineering Disciplines	2,192	2,478	2,627	3,106	2,422	2,488	2,724
Petroleum Engineering	219	251	268	257	250	233	315
TOTAL	61,553	63,820	64,200	66,781	71,165	72,893	73,602

¹ - New discipline added in 2005.

Appendix R

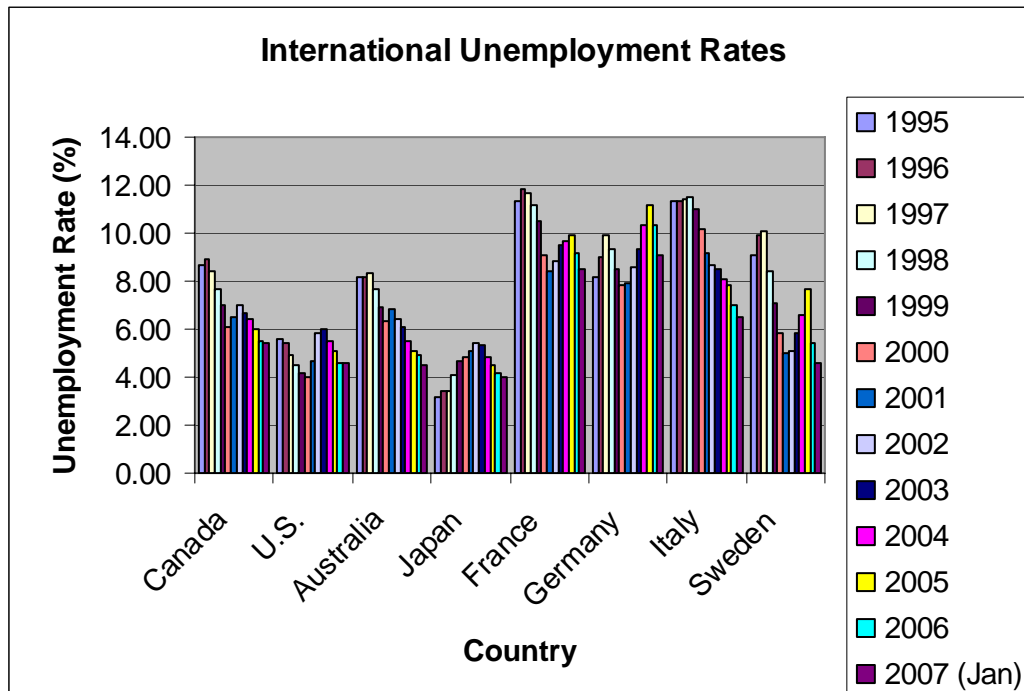
International Economic and Employment Information Bureau of Labour Statistics – United States

International Economic Output (GDP) 2001 - 2007									
Year	Canada	U.S.	Japan	China	India	France	Germany	Italy	U.K.
2001	2.26%	30.69%	14.75%	4.03%	1.49%	4.2%	5.97%	3.39%	4.56%
2002	2.29%	30.64%	14.46%	4.32%	1.53%	4.18%	8.57%	3.35%	4.57%
2003	2.28%	30.66%	14.27%	4.63%	1.62%	4.11%	5.72%	3.27%	4.55%
2004	2.25%	30.69%	14.07%	4.89%	1.66%	4.04%	5.58%	3.18%	4.5%
2005	2.27%	30.65%	13.93%	5.2%	1.73%	3.94%	5.45%	3.07%	4.43%
2006	2.26%	30.58%	13.81%	5.5%	1.8%	3.86%	5.34%	2.99%	4.37%
2007	2.24%	30.49%	13.64%	5.83%	1.87%	3.81%	5.21%	2.92%	4.33%



International Unemployment Rates 1995 - 2007								
Year	Canada	U.S.	Australia	Japan	France	Germany	Italy	Sweden
1995	8.7	5.6	8.2	3.2	11.3	8.2	11.3	9.1
1996	8.9	5.4	8.2	3.4	11.8	9	11.3	9.9
1997	8.4	4.9	8.3	3.4	11.7	9.9	11.4	10.1
1998	7.7	4.5	7.7	4.1	11.2	9.3	11.5	8.4
1999	7	4.2	6.9	4.7	10.5	8.5	11	7.1
2000	6.1	4	6.3	4.8	9.1	7.8	10.2	5.8
2001	6.5	4.7	6.8	5.1	8.4	7.9	9.2	5
2002	7	5.8	6.4	5.4	8.8	8.6	8.7	5.1
2003	6.7	6	6.1	5.3	9.5	9.3	8.5	5.8
2004	6.4	5.5	5.5	4.8	9.7	10.3	8.1	6.6
2005	6	5.1	5.1	4.5	9.9	11.2	7.8	7.7
2006	5.5	4.6	4.9	4.2	9.2	10.3	7	5.4
2007 jan	5.4	4.6	4.5	4	8.5	9.1	6.5	4.6

From the Bureau of Labour Statistics - United States



Appendix S

APEGGA Workforce Survey Participants

Accutech Engineering
Adamant Energy Inc
Advantage Energy Income Fund
Alberta Electric system Operator
Anderson Associates
APA Petroleum Engineering Inc
APEGGA
ATCO ELECTRIC
ATCO Power Canada Ltd
BAR Engineering Co. Ltd.
BCG ENGINEERING
Beaubien Glover Maskell Engineering South Inc.
Beck Engineering (1992) Ltd.
Becker ElZein and Associates Ltd.
Beta Machinery Analysis Ltd.
Bower Damberger Rolseth Engineering Ltd
Brisbin & Sentis Engineering Inc.
BURNCO Concrete Products Ltd.
Burns & McDonnell Engineering Co., Inc.
Canadian Projects Limited
City of Edmonton
Crescent Point Energy Trust
Devon Canada Corporation
Dynatec Metallurgical Technologies
EBA Engineering Consultants Ltd.
Emerson Electric Canada Ltd.
EnCana Corporation
ENMAX Power Corporation
Excelsior Engineering Ltd.
Falcon EDF Ltd.
FDA Engineering Ltd.
G.L.M. Industries L.P.
Grande Cache Coal Corporation
GRB Engineering Ltd.
Great Plains Exploration Inc.
Hexion Specialty Chemicals Canada, Inc.
Imperial Oil - Strathcona Refinery
Imperial Oil Resources
ISL Engineering and Land Services
Kereco Energy Ltd
Klohn Crippen Berger Ltd.
Laricina Energy Ltd.
Levelton Consultants Ltd.
Magna IV Engineering
Marsh Canada Limited
Matrix Solutions Inc.
MEGlobal Canada
Mentor Engineering Inc
Microlynx Systems Ltd
Molson Canada
Niko Resources Limited
Northrock resources
Norwest Corporation
Nova Chemicals Ltd.
OPTI Canada Inc.
Paramount Resources Ltd.
PrimeWest Energy Inc
Progress Energy Ltd
Propak Systems Ltd.
Provident Energy Ltd.
RAE Engineering and Inspection Ltd.
Raytheon Canada Limited
Read Jones Christoffersen Ltd.
Scheffer Andrew Ltd.
Segment Engineering
Shell Canada Limited
Sherritt International Corporation
Sintra Engineering Co.
SNC-Lavalin Inc.
Sound Energy Trust
Stantec Consulting Ltd
Stellarton Technologies Inc.
Stewart, Weir & Co. Ltd.
stream-flo industries ltd
Stylus Energy Inc.
Taiga Consultants Ltd
Tarpon Energy Services Ltd.
Temple Energy
TransAlta
TransCanada Pipelines
TransGas
Trican Well Service
Tuxtla Gas Engineering Ltd.
Walters Chambers & Associates Ltd.
Wild River Resources
WorleyParsons Komex
XXL Oil & Gas Ltd.
Ziff Energy Group

Appendix T

Survey Responses

Responses were received from 84 permit holders. The number of respondents who replied in each category is given. Duplicate comments have been removed.

8. What things are you currently doing or propose to do to attract and retain engineers, geologists and geophysicists?

SALARY AND BONUSES– 68 respondents said they use salary and benefits to attract & retain engineers. This includes stock options, RRSP, potential ownership in the company, OT pay, parking perks, vacation, bonus compensation, recognizing exceptional employees, pay based on performance, long term incentives, etc.

- *Competitive Remuneration and Benefits. Health membership, stock purchase plan, RRSP matching contributions, Profit sharing, opportunities for career advancement.*
- *Competitive compensation and benefits, Long-Term Incentives (stock and bonus plans), external training*
- *total compensation (salary, benefits, bonus, RSP), ownership opportunities, exciting and prestigious projects, strong team-based culture, personal and professional recognition both internally and externally, extensive training and development opportunities.*
- *competitive salaries and benefits, performance bonuses*
- *Ensuring that salary and benefit plans are competitive in the industry. We also offer share purchase to high potential employees. We support the co-op programs at universities in Alberta and BC and offer scholarships in the same schools.*
- *Compensation Review, Employee development, Flexible Workforce measures, Flex benefits, advertising on campus, intern program*
- *Competitive pay and ownership, increased starting vacation, flexible working hours, job sharing (for part time/retirees).*
- *Good compensation, good culture, & good reputation.*
- *Revamp benefit program; increase vacation time available; incorporating team building functions to facilitate a social environment*
- *Positive work environment - competitive compensation - training and development - work life balance*
- *Top Quartile pay Professional development Interesting and diverse work and projects Latest Technology*
- *Aggressive options and share compensation; partnering with consultants (some retired)*
- *Compensation incentives, post retirement contracts, frequent traveler rewards*
- *Competitive salaries and benefits, RRSP / DPSP plan with time element, share purchase structure*
- *Signing bonuses, profit sharing, performance bonuses, competitive salary increases, generous benefits, holidays and training*

MIT AND UNIV. PROGRAMS – 14 respondents said they use mentoring, EIT programs, campus visibility, Co-op participation, and scholarships.

- *Mentoring programs leadership development alternatives to work part-time, contract compensation and benefits*
- *We've canvas the University of Alberta in 2006, getting our name out and explaining what we do and the potential for opportunities. We've also setup competitive salary/benefits/RRSP/Bonus structures.*
- *Attract: Active CO-OP program; Increased visibility at Universities; Referrals from existing employees. Retain: Competitive salaries and benefits, international assignments,*

- *Focus on new grad hiring - provide structured development program. Increased attention to compensation competitiveness and adjust as required*
- *Revised compensation practices, initiated days off, strengthening orientation and mentoring programs*
- *Continue with our EIT program which has given us the advantage in campus recruiting.*
- *Need more mis-career mentors looking overseas. Recently merged with an International company in part to get better access to staff & mentors*
- *Supporting the engineering Coop programs by hiring students for work placements*
- *We have embarked on a proactive engagement campaign with our staff using focus groups to ensure that we meet their career requirements. We have also implemented a strong career path review process over the last five years which is now bearing fruit. Finally, we have a major in-house training program that addresses the needs of engineers and scientists working on our profession.*

FLEX-TIME – 17 respondents said they use flex-time, reduced hours, flexible work environment, option of working from home, rehire retirees/Job Share/PT contracting for retirees

- *Flexible work hours, RRSP contributions, Bonus incentives, offer continual training and pay for courses, provide a variety of projects to allow growth of individual.*
- *compressed work week, flex benefits, reduced work week (for retirees), increase compensation*
- *Flexible work arrangements, accomodating work from home to a certain extent, competitive salary, bonus, field OT pay*
- *interesting work, flexibility (hours, benefits, etc), competitive compensation & benefits, part time work, contract work for retirees*
- *Providing a flexible environment with competitive salaries*
- *Empowerment and Engagement - flex-time; flat hierarchy; encourage new business proposals and projects that will improve our operations; Culture - we provide a less formal atmosphere that appeals to many; Mentorship - everyone within the organization is paired with an internal mentor to encourage career building, relationship-building, and networking; Beyond Normal Retirement – many of our engineers and geologists will stay with us as independent consultants after they retire; in addition, we offer reduced hours that will likely help us retain our mature employees into the future.*
- *Flexable hours and compeditive salaries Partnerships*
- *flexible work hours; encourage semi-retirement rather than full retirement*
- *Retire - rehire as temporary or permanent employees*

FUN - 14 respondents said they have good social culture/ enjoyable environment/fun and friendly atmosphere

- *better working condition, professional developement and training, challenge, extra benefits.*
- *Try to promote us as a good place to work, with good benefits package, parking, etc.*
- *We try to provide a good working environment and competitive pay structure.*
- *Challenging work, good work environment*

LIFESTYLE - 6 respondents said they support lifestyle choices, including family, personal, and/or health choices.

- *Work-life balance programs; alternate work schedules; taking retirees back on as contractors*
- *Family oriented, sound financial company ESOP*

PROFESSIONAL DEVELOPMENT - 25 respondents said they support Professional Development, Educational Allowances, In-house and External Training, Continuing education, etc.

- *Provide wide range of training, allow for growth, reward them for their achievement, and make them feel this one day will be their company in the future.*
- *Training, long term incentives*
- *Training, Mentorship, Bonuses. We will consider making certain exceptional employees shareholders.*
- *Professional development investment, incentive criteria based on life style choices and family. Financial incentives on a bonus/equity basis.*
- *On-going capability development + training Possibility of assignments within Imperial Oil or ExxonMobil*
- *Company sponsored training programs. Company sponsored savings plan and pension benefits. Individual mentoring by senior technical practitioners. Early professional development program for new hires - disciplined training and work experience exposure in early career. Challenging work assignments.*
- *Provide the best training, working environment and competitive salary.*
- *training, compensation, very positive corporate culture*
- *Better career development and training opportunities, fair compensation, interesting opportunities*
- *Career Development and Training*
- *continued ed...*
- *Training and better compensation*
- *Well organized training / mentoring.*

PROJECTS - 13 respondents said they offer prestigious projects, exciting new assignments, attractive office locations, international assignments

- *challenging assignments, pay for performance*
- *We continue to try to offer staff interesting opportunities, of both a technical and a career oriented nature. We also maintain and encourage a mentoring and development program within our organization.*
- *competitive compensation, attractive office location, varied work experience*

9. What things are you currently doing or propose to do to attract and retain female engineers, geologists and geophysicists?

NOTHING – 63 respondents said they do nothing special to attract/retain female engineers/geoscientists.

- *25% of our engineers are female. They have the same opportunity as others.*
- *All of the things we currently do are to attract any (the best) candidate for the role*
- *all personnel are equal - no additional or different items pursued for female staff*
- *Already have female intern students. Young fun company with good reputation.*
- *we are an equal opportunity employer*
- *Female engineers are provided the same opportunities as male engineers*
- *No additional effort expended other than running hiring campaigns that do not discriminate.*
- *No specific program in place. We target family friendly work-life balance programs to men and women equally as we are seeing more men wishing to take parental leave.*
- *nothing - treat genders the same.*
- *Nothing in particular. I receive very few applications from females.*
- *Nothing specific - candidates are considered on their technical skills and work experience regardless of gender*
- *Positive work environment - competitive compensation - training and development - work life balance*

- *We are using the same recruitment and retention methods for female candidates with the addition of emphasising the strengths and opportunities we have for female in the engineering profession.*
- *We do not actively recruit female engineers and geologists. That being said, approximately 30% of our engineers and geologists are women. We offer flex-time and reduced hours to accommodate female employees with families. As to my knowledge, there are not currently any proposed attraction and/or retention methods that are specifically targeted at female employees.*
- *We do not discriminate against any group whether by sex, ethnicity, geographical basis or cultural pressures.*
- *We do not discriminate against nor target gender-based hiring.*
- *We draw no distinction between male and female engineers. While we have 100% male engineers to date we do not see this as selective recruiting but a reflection of the makeup of the marketplace for the skills we require.*
- *We have senior positions with women already in them which goes a long way to recruiting younger women.*
- *We hire based on skills, not gender.*
- *We hire the best people for the job at the time we are looking for staff. We have offered jobs to female professionals but so far it has not worked out that any of them chose to join us.*
- *We hire the most qualified, male or female. Unfortunately our success rate in retaining female engineers is very low, 80% of the EITs who have left have been female.*

MATERNITY PROGRAMS – 6 respondents mentioned some type of maternity program

- *Flexible work schedule*
- *We also have a retention system in place for catering to working mothers.*
- *More flexible arrangements for maternity leaves/part-time work*
- *Provide flexible hours; part time work opportunities; day care access & emergency day care through corporate sponsorship*
- *We have several staff returning to us after maternity leave to whom we have offered flexible work hours and requirements.*
- *We top up UI benefits to full salary while on maternity leave.*

MENTORING PROGRAMS – 6 respondents

- *mentoring, maternity benefits*
- *Female peer group support sessions, female leader mentorship programs, active recruitment and promotion opportunities as they arise.*
- *Our corporate target is to have our demographic reflect available resource pool. Retention programs include: Quarterly Engineering Forums, which offer an opportunity for technical staff to discuss relevant matters with senior management. WPEGS (Women Professional Engineers, Geologists, and Scientists); NAP and SNAP (Network Advisory Program and Senior Network Advisory Program) allow junior/intermediate engineering staff the opportunity to interact with managers at all levels and attend career planning related events. Child care options, part-time work options available, job sharing, flex-time, etc. are all available to encourage a positive work.life balance.*
- *Leadership training*
- *Mentoring and support for career progression*
- *mentoring with senior female engineer hiring summer students and COOP students*

10. What things are you currently doing or propose to do to attract and retain Aboriginal engineers, geologists and geophysicists?

EXISTING SERVICES 3 respondents said they use existing Aboriginal services.

- *Scholarship award program and internship programs for Aboriginal peoples. Native Network Council has been in place at Cold Lake Operations for over 15 years. Company is currently reviewing its policy for relations with Aboriginal groups.*
- *see number 9 above. Company also engaged in several outreach programs with aboriginal community.*
- *We advertise on Aboriginal job boards, we are participating in the BEAHR (Building Environmental Aboriginal Human Resources) program.*

NOTHING – 65 respondents said they do nothing special to attract/retain Aboriginal engineers/geoscientists.

- *Aboriginal engineers are provided the same opportunities as non-aboriginal engineers*
- *All of the things we currently do are to attract any (the best) candidate for the role*
- *As above in #9*
- *No additional effort expended other than running hiring campaigns that do not desicriminate.*
- *No specific program in place*
- *None other than the above.*
- *nothing - treat all the same.*
- *nothing different than males and females*
- *Nothing in particualar. I recieve very few applications from aboriginal.*
- *nothing specific - as a company we speak 16 languages with less than 100 employees - all are treated the same*
- *nothinig as opposed to any other ethnic group*
- *See above, the same applies to any minority group. We are a small company and hire on the basis of skills, experience, fit and availability, none of which has anything to do with race or gender.*
- *Support and development*
- *This is a very tough question. We have a lot of trouble maintaining an aboriginal construction labor pool and have struggled with aboriginal accountants. Frankly, there is a long way to go.*
- *We do not discriminate against any group whether by sex, ethnicity, geographical basis or cultural pressures.*
- *We do not focus on race*
- *We provide a working environment where advancement and remuneration is based upon merit.*
- *We work with aboriginal people at the field level, and we support their training programs.*

UNIVERSITY SERVICES – 1 respondent

- *active aboriginal company employee network, recruiting at university*

11. What things are you currently doing or propose to do to support the competency of your engineers, geologists and geophysicists?

APEGGA - 9 respondents said they require and/or support APEGGA Membership and Services

- *In house and external training programs, sponsored mentorship programs, knowledge centers, APEGGA development, leadership development.*

- *Mentorship is provided by senior engineering staff. All engineers are required to participate in APEGGA Continuing Professional Development. Company provides professional development support and record keeping.*
- *We require APEGGA professional designation as an entry requirement, and have a need-based training program for on-the-job training*
- *Sponsor individual training plans and APEGGA memberships*
- *We actively promote and encourage professional development in engineering areas that lead to more fulfilled personnel, not necessarily in their discipline. This includes short refresher courses, APEGGA courses, and continuing education.*
- *We support their memberships in the association and ongoing training programs.*

MIT PROGRAMS - 6 respondents said they have programs in place to help MITs gain experience required for full professional status.

- *We encourage our junior staff to take whatever courses they want to fill deficiencies in their knowledge base. We also provide lots of opportunity to get feedback, mentoring and advice from senior staff and management*
- *EIT Program, which can last up to 110 weeks. Industry related technical courses and conferences. On the job training.*
- *Extended university training and personal technical development*

MENTORING - 20 respondents have an mentoring or internal training program, annual skills review and/or assessment

- *Mentoring program, ongoing continuing education, EIT training program for first two years of employment.*
- *Formal training program Internal mentorship program External training*
- *in company supervision and development, outside training*
- *We have a good mix of junior, intermediate & senior people; which helps with training. Company encourages & pays for quite a bit of training.*

PROFESSIONAL DEVELOPMENT - 79 respondents support professional development; educational allowances; continuing ed including graduate degrees; publications; in-house, external, on-the-job, or online training; conferences; recognizing candidates for succession and providing enhanced training

- *APEGGA PD, and other PD initiatives - internal and external*
- *continuous mentoring, encourage and pay for formal training, informal 'lunch & learn' sessions*
- *in house seminars, external courses*
- *Provide an educational allowance for professional development; In-house presentations*
- *Support course attendance. In house technical speakers. Lunch and learn.*
- *Early Competency Milestones - Rigorous and scheduled system to progress an EIT towards P.Eng designation. Job family specific training in first 4 years with the company, extends into later career. Formal and informal mentoring programs and policies. Early Professional Development Program – disciplined training and work experience exposure in early career.*
- *Establishment of a formal mentorship program within the engineering section. Establishment of an engineering career path (EIT, Junior, Intermediate, Senior, Principle) with competency levels defined for each. Assessment against competencies are used for career progression. Establishment of individual Career Development and Training plans.*
- *We provide all engineers and geologists an internal mentor. We may consider external mentors for the more senior staff in the future. In addition, we provide employees with a yearly education fund and pay for all relevant association memberships.*
- *Continuous training sessions, in -house and external, participation in conferences, encouragement to publish technical articles.*
- *Have a formal 5 year Competency Development and Assurance Program for EGGs. Also establishing competency profiles for fully qualified EGG's -10 year mark)*

- *Professional designation as a job requirement. Annual skills & capability assessment; development plan updated*
- *Providing yearly reviews that include recommended training that the company will pay for*
- *Support for continuing education both external and internal to the company*
- *cutting edge assignments, conferences, speaking, external training*
- *Encourage ongoing self-study, professional development courses, and constant learning of new technologies*
- *Have a training budget for 1 to 2 courses or conferences per year*
- *In house training, teaming with senior technical staff, industry association seminars & other courses (fully paid).*
- *More training in their field of expertise.*
- *Note answer to question 8 above. In addition, we have established educational awards to send staff back to school for Masters level training.*
- *on line training courses; tuition reimbursement plan*
- *Send people to conferences, seminars and Industry courses*
- *Significant mentoring and industry participation, There is no good formal training available, there is a severe lack of advanced technical training opportunities in renewable engineering in Canada, particularly Hydro and Wind.*
- *support professional development, training, etc.*
- *support training and development of technical and leadership skills*
- *We encourage all of our engineers to have training at the graduate level. In addition we support continuing professional development.*
- *We encourage continuous learning and have an education support program in place, as well as providing mentoring and career development opportunities*
- *We have ongoing training and development goals identified through performance reviews and personal goals. Additionally, recognition of candidates for succession has lead to enhanced training opportunities to ensure they have the skills and abilities to lead the company forward.*
- *offer significant training. We try to run 1 or 2 large company-sponsored training courses each year for about 15 to 20 people, we send a number of people to external training each year, we send 1 - 3 people to conferences each yea, we offer a company-paid allowance for people to take external training of their choice, and we allow people the opportunity to work in a variety of different areas.*
- *We support professional development activities through job-specific technical training, attendance at industry conferences, and financial support for post-secondary courses.*

PRODUCTS and SALARY- 2 comments

- *Provide up-to-date software, computers, mentorship*
- *Competitive salary, benefits and friendly environment*

12. Do you lose engineers, geologists and geophysicists to other organizations?

BETTER OPPORTUNITY - 17 respondents said engineers/geoscientists leave because they find better opportunities with another organization

- *Current 'hot' job market. Different compensation policies favouring higher risk/reward ratio (Some companies offer production bonus and lower base.) Preference of individuals to work a different oil and gas asset mix. Preference of individuals to have different pension plan structure (defined contribution versus defined benefit)*
- *Generally our employee retention is good, however we occasionally lose engineers to other organizations. Often the reasons cited are higher salary and better fit with personal objectives and interests.*
- *Career development opportunities that better fit employee's interests*
- *Competitive marketplace and other career advancement opportunities*

- *same reason we hire some from other orgs...*

SALARY - 32 respondents said engineers/geoscientists leave for salary-related reasons.

- *For a variety of reasons: compensation; promotion opportunities; work-life balance issues*
- *Bigger jobs, roles more related to specific interests, be recognised better for performance, compensation and work arrangements*
- *In the past two years, almost always because of compensation increases or advancement opportunities not available internally.*
- *Primarily to clients. Key issue is remuneration and flexibility of public corporations to offer stock options.*
- *Different scope of work, salary jumps sometimes better moving between companies than vertically within companies*
- *More money or they just want a change.*
- *Perceived differences in compensation, different roles available, ability to do something new and different.*
- *Salary, change of work (i.e. different field of work).*
- *lack of promotion, people feel underutilized, salary*
- *Base salary*
- *Compensation such as stock option*
- *Enticements.*
- *Our turnover is low. However, if we do lose employees it is usually due to wage.*
- *perceived lower work loads, higher base salary with lower variable (performance based)*
- *Present Market. There is always someone willing to pay more money*
- *So far just carrier changes*
- *Some individuals see greater opportunity (and money) in especially smaller companies.*
- *Sometimes due to salary opportunities but more due to interest in career development by having opportunity to work for companies doing significant expansion in the province*

OIL&GAS - 11 comments

- *Mostly inexperienced easily influenced engineers based on market pressures mostly derived from circumstantial unethical means (I.e. - head hunters, cold calls directly during normal business hours, etc...)*
- *Primarily recent trends - significant pay differential in a different industry (ie. oil and gas vs. electricity), significant promotional opportunity due to Alberta growth (ie. new mega projects), or fundamental different technical/depth of focus provided by another employer (ie. detailed EP work vs. owner)*
- *Inflated Oil and Gas Market, Our industry requires the brightest but due to current energy market imbalances can only offer moderate wages, therefore have to be it for more than the money, hard to sell to new engineers*
- *Cannot compete directly on salary with oil based industries*
- *Less stress & better remuneration from oil companies*
- *Lots of opportunities currently in the oil patch.*
- *oil and gas is more lucrative*
- *Oil companies. Because they pay to much and set a bad example. Also, stock options make thing tough for us to compete*

CHANGE OF MIND - 10 respondents said engineers/geoscientists leave because of change of job scope, no longer interested in career path

- *Better development opportunity; not interested in proposed career plan*
- *Change in career goals. Change out of a consulting environment.*
- *desire to try different types of engineering challenges*
- *Our EIT's get their professional designation then find non engineering jobs/holidays and do something else.*

- *Professionals want change in job scope (new area, formations) or business focus (start up exploration versus development) Company has very little turnover*

DID NOT LIKE - 5 respondents said engineers/geoscientists find job environment undesirable

- *not enough training provided*
- *Either money or overworked/burned out*
- *Too much travel, management styles*

LOCATION, ENVIRONMENT - 4 respondents said EGGs leave due to location/environment.

- *One was lost due to health reasons to more humid climate (Vernon). Another lost to oil patch (salary driven). One lost to City of Calgary (wanted to try different work, was not enjoying what she was doing in our organization).*
- *Geographic large centers; salary/benefits in the oilfield*
- *Monetary and close proximity to home.*
- *Generally because of location. We are in Lloydminster and some engineers prefer larger locations such as Edmonton and Calgary. Another factor is job challenge. The nature of our project work can be repetitive and some engineers seek out new positions with different challenges.*

LACK OF WORK - 2 comments

- *Because our business is project dependent. If we get slow we lose our engineers*
- *no losses in last 18 months. previously lost people for lack of work.*
- *More pay available in the non-regulated industries, and they are less diligent about job titles.*

KEEP - 12 respondents commented on how they were able to keep their EGGs.

- *Minimal intervention from a human resource perspective.*
- *Good work atmosphere and competitive wages*
- *New company, aggressive share compensation*
- *Not often... good work environment and compensation packages.*
- *They like it at our company.*
- *We are a small company and have really just started. One of the things that we are finding though is that if we stay smaller and more manageable, we are able to keep the group of people closer. People then feel as though they are not just a number.*
- *We are a small company with only 3 engineers. We are also only 3 years old.*
- *We are small and have a fun team that considers us more of a family than a work place. We also offer good opportunities for everyone to have ownership in the company through stock based compensation (options and performance shares)*
- *We are small and it has not been an issue yet.*
- *We must have the right combination of job satisfaction and compensation.*
- *we provide cutting edge assignments and provide strong compensation*
- *We try to maintain a flat organizational structure.*
- *Not so far but the market is very competitive and our biggest competition is directly across the parking lot. Our retention is largely attributable to the fact that the skill set required to support the business is very narrow and often there is not opportunity for our engineers to apply the skill set elsewhere in the Calgary, Alberta, or Canada marketplace.*

16. Any other comments?

AGING WORKFORCE - 4 comments

- *There has been a recognition that the next generation of engineering leaders need to be developed now. However, the number of people with 10 to 15 years of experience is limited. Attracting these people and ensuring that they stay with the company will be the greatest challenge in the next 5 to 10 years as the senior people begin to seriously consider retirement. Overseas recruitment will take on an increasingly important role in the sourcing of mid-career personnel. This will lead to pressure on APEGGA to ensure that the recognition of credentials occurs in a timely manner.*
- *There is a significant shortage of intermediate and senior engineers. Numerous junior staff are available, but training is difficult due to senior staff having to both find training time and continue with excessive workloads due to continued labour shortage. Individuals who can manage projects quickly upon hiring is required. Our firm consists of approximately 28 people of which 9 are engineers, 13 are technologists, and 6 are administration and field/CAD operators who do not have a designation.*
- *With aging workforce companies need to be more flexible about the work relationship to accommodate life style expectations (seasonal work, reduced hours, working from home etc)*

EDUCATION and PROMOTION - 3 comments

- *In one of the earlier questions the survey asked if we foresee the need for a change in the skills of our engineers and geologists. If it is not already in the curriculum, in my personal opinion, I would like to see more managerial and teamwork training incorporated. Especially in a small, flat organization, we want to utilize our experts, not just for their technical skills, but also for the people skills they can bring to the organization. True, not every technical-minded person can be utilized in a managerial role; however, I believe that leaders are made, not born. If managerial/ teamwork/ people skills are also addressed by educational institutions, it will help our new graduates' transitions into a workplace that is increasingly focused on team-based approaches, entrepreneurship, and flat hierarchies.*
- *Industry focus groups composed of HR professionals and EGG professionals to discuss some ways to increase interest in the EGG professions and also to increase retention once they join an organization. Also, an industry agreement to hire more summer students and co-op students from applicable universities and post secondary degrees. If we all hired more summer students, we'd all be training and staffing for the future.*
- *We're an environmental consulting shop, all our engineers work in the environmental field. Of the five, two have Env Engg undergrad degrees, one is chemical and two are chemical with Env Eng Masters. So you need to add Env Engg to the list of engineering specialities. We anticipate hiring another engineer every one or two years for the foreseeable future.*

GENERAL - 7 comments

- *We've recognised the need for a workforce planning strategy and have taken steps towards implementing a workforce plan*
- *Leadership for technical services and business will be scarce in the next 10 - 20 years. Provident training includes technical and leadership skills.*
- *Our company is a bit specialized so that not just anybody can pickup and start in on the practice. It helps to have experience from other sources before launching into a small consulting practice. Some engineers will just migrate here naturally and if they don't, a sector of the industry will be serviced by lower level practitioners.*
- *Question 15 is poorly phrased. It implies that there is a shortage, something that I may disagree with. In the next 10 years, gas production will have fallen considerably, thereby 'freeing up many engineers and geologists' for other work. In my opinion, it is more important to understand the size of the resource available, then to estimate the people to work in the industry (grass roots forecast) as opposed to a plus/minus adjustment to today.*
- *The definition of engineering is very general. This may lead some people to seek out engineering services and engineered products when 'engineering' is not really necessary*

to protect the safety of the public. A tighter definition of what requires engineering and what the role of the engineer should be for common products and services may ease the demand for engineers.

- *The life cycle of companies like ours can be quite simple. We start with nothing and build it to a size that can be managed by a small dedicated group of staff. Once we exceed a size that requires us to grow beyond a threshold that can be managed by the current directors then it is time to look to sell. Staff are typically re-deployed to new start up and most likely will assume a similar MO. In this way, everyone continues with like-minded business partners, and teams that are effective stay together as long as everyone is having fun. Sometimes you will see the team implode which will lead to a corporate sale and more often than now a new set of teams will form out of the carnage. The goal then is not to grow to a size that gains recognition but more to create a business environment which allows for a beneficial home lifestyle as well.*
- *We are a firm of 20-25 people and try to stay competitive by providing excellent training and good salaries. However the projects are not always available and we lose some of our newly trained engineers. We are trying to get some commitments from our clients.*

GOVERNMENT

- *It would seem to me personally that the pace of development should be managed by the government and by industry such that the skills can be added in a permanent and manageable pace.*

IMMIGRATION – 13 comments

- *If we're importing engineers and other technical staff who are of the same age/vintage as the rest of our oil and gas industry +/- 50 then we are just compounding our collective problems in the next 5 or 10 years.*
- *A senior consulting engineering company such as ours offers expertise based on years of experience in developing complexed projects in Canada. Engineers from outside of Canada do not have the necessary understanding to provide the critical thinking we need in a reasonable timeframe. It would take 5-10 years for them to become reasonably competent with the various regions and intricacy we deal with. As for new students, we have hired 7 EITs over the past 4 years, none have stayed longer than a year, they quickly find out that they need to apply themselves and commit to understanding the basics before they can expect to try to be a project engineer or manager. This is particularly bad with engineers who have some exposure to the Oil and Gas sector who even though quite bright have not been conditioned to think for themselves and derive solutions from basic principles. Lastly there is a significant decline in Water Resources or Hydrotechnical Graduates in a time where demand for this expertise is escalating exponentially, we have no idea where our next Dam Safety, Hydrologist or River Engineer will be coming from, we haven't seen a reasonable candidate for over 2 years despite all of our recruitment efforts.*
- *APEGGA in association with the different areas of market demand need to join forces and come together to actively recruit internationally for job specific personnel. I really feel that the personnel that come are not necessarily the best personnel available because the good ones may not be looking or realize their value or opportunity. Country specific, cultural recruitment could fill the void.*
- *APEGGA needs to cooperate with the hiring of Engineers from other countries - designations*
- *As a result of our recruitment efforts, we have a group of culturally diverse engineers. We would like to see APEGGA continue to streamline the process and timeline of validating foreign credentials.*
- *Encourage engineers from other countries by making the registration process less cumbersome. Encourage short-term contract or immigration from other countries by a quick response to equivalency reviews/verifications*
- *I would like to encourage more recruiting from Quebec and South America.*

- *Immigration Canada needs to place considerably more emphasis on english and french language skills when allowing people to immigrate into Canada and/or before granting them permanent residency.*
- *Outsourcing from other parts of Canada is a very valid means to reduce the shortfall. Canada's immigration policy for engineers needs to concentrate on communication skills / english language to be successful. Countries such as India where higher education is taught in English produce without a doubt more productive engineers as the communication barrier is reduced. Immigrating engineers with poor English language skills are next to useless in the majority of engineering applications in the province. Yes, communication may mean less in highly-skilled, highly educated positions.*
- *Overseas engineers have brought alternative work processes that result in more progressive and effective engineering.*
- *The immigration process needs to be streamlined - how many companies have to prove that they can't find local talent before this happens????*
- *The majority of our work is location-specific, so outsourcing is not relevant. Q13 is not clear enough; we currently recruit across the country, but have not hired from outside Alberta in the last year. We have in the past hired individuals from BC, Atlantic Canada, Manitoba, and Ontario. Our biggest issues currently are with attracting qualified mechanical engineers with experience in the process industries. On the other fronts we are doing reasonably well.*
- *We hire off shore professionals to support projects that we are involved in their home country. ie we hire and employ them outside Canada. We have found this to be an effective way to supplement our Geologists working abroad and allow the foreign Geologists gain Canadian-type work experience.*

OIL&GAS - 2 comments

- *It appears that there is a trend away from consulting engineering. People are being recruited to higher paying companies directly in Construction or in the Oil&Gas Industries.*
- *Oil and gas companies are distorting the salary expectations for employees.*

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