

**Calgary Economic Development Corporation**

**CALGARY LABOR MARKET DEMAND OUTLOOK 2007-2017**

**EXECUTIVE SUMMARY**

Prepared By



**November 2007**

The full report and over 40 industry and occupational reports are available at  
[www.calgaryeconomicdevelopment.com](http://www.calgaryeconomicdevelopment.com)

About RDA Global

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## ABOUT RDA GLOBAL

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RDA Global is founded and directed by Oxford University Professor, Dr. Raymond Duch and provides ongoing strategic market assessment and planning services based on primary market research, applied economic forecasts, and risk analysis. Over the past 25 years, RDA Global has enjoyed a favorable relationship with public sector and private business clients and provided a wide variety of geographic economic forecasts, economic impact analyses, strategic planning consulting services, labor market analysis, and feasibility studies.

### Key Practice Areas

#### Economic Analysis, Modeling, and Forecasts

- Employment and Business Formation Forecasts
- Labor Market Analysis
- Forecasts of Business Investment
- Price & Demand Models
- Economic Impact Studies
- Industry Analysis

#### Strategic Market Assessment

- Market Forecasts
- Global, National, State & Metro Market-Sizing
- Market Growth & Revenue Opportunity Forecasts
- Local Market Share Analysis
- Performance Metrics

#### Business-to-Business Market Research

- CEO/ CIO/ Business-Owner Surveys
- Research Design
- Statistical Analysis & Models
- Business Behavior Models
- Market & Customer Segmentation
- Demographic Studies

### Global Breadth

We approach each economic analysis assignment with a detailed and comprehensive understanding of how the global economy will impact the near-term and long-term expansion of local markets. We believe that an understanding of the global macro economy is essential to developing reliable projections for state and local economies.

### Professional Service

RDA Global consultants treat each assignment with the highest level of professionalism, rigorous analysis, and personal attention. Our professionals bring to each assignment an innovative and practical approach coupled with state-of-the-art analytical techniques. The findings of each project are accompanied by clear and complete documentation that is easy to understand. Each engagement is considered a joint undertaking between the client and consultant. A dedicated RDA Global project manager serves as a single point of contact throughout the duration of the project.

### Best-in-Class Intelligence

RDA Global has developed the **RDA Global Economic Database**© which is updated on a monthly basis. The RDA Business Economics Database is the only fully integrated global and local forecast of the economy available today. The database contains robust market segmentation of economic data useful for the development of models and forecasts of employment, wages, GDP, business establishments, population, and other economic indicators.

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## OBJECTIVE

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### **Understanding the Problem**

The province of Alberta has witnessed unprecedented economic growth in recent years led by the oil and gas sector. Increasingly, the relative shortage of skilled labour in Alberta and in the Calgary region threatens to limit future growth opportunities. Calgary Economic Development (CED) has recognized the need for detailed employment forecasts in order to develop market strategies aimed at increasing the availability of skilled labour. Through its CalgaryWorks program, CED is collaborating with industry, educational institutions, government and other stakeholders in developing strategies to address current and future labour shortages in key sectors.

The development of targeted initiatives requires a comprehensive understanding of labour market trends and forecasts by industry and occupation. As a result, CED commissioned this project to develop a Calgary Employment Demand Forecast Model. This model will be used to generate detailed employment demand forecasts by industry and major occupation categories over ten years. The model has been developed to not only provide insight on the labour market via demand projections, but to test alternative scenarios of labour demand given a set of key input drivers.

### **The Project Team**

HDR Decision Economics (HDR) in partnership with RDA Global (RDA) formed a team of experienced professionals to address the unique needs of this project. HDR is a consultancy firm that specializes in applied economic analysis offering consulting services to industry and governments across Canada and the United States. RDA Global provides ongoing economic analysis and strategic planning services based on primary market survey research, applied economics, and risk analytics. RDA Global specializes in economic forecasts and industry analysis of employment, business establishments, and gross metro product (GDP) at the local metro level. RDA's current and previous metro studies have covered over 600 metro areas in Canada, the US and Europe. The cornerstone of our consulting engagements is the RDA Global Economics Database which contains 10-year forecasts of real GDP growth, employment, business establishments, firms, revenues, payroll, capital investment, and industry statistics for over 100 countries and over 600 metro areas worldwide.

#### **Principal Forecast Team**

Ray Duch, Professor, Oxford University, Nuffield College  
Fred Kramer, HDR|HLB Decision Economics Calgary  
Adam Legge, Calgary Economic Development  
Chris Seals, RDA Global

## Review Committee

Ali Abdelrahman, Alberta Employment, Immigration and Industry

Mike Alglusk, CBRE

Mark Illing, Bank Of Canada

Adam Legge, Calgary Economic Development

Lai Sing Louie, Canada Mortgage and Housing Corporation

Patrick Walters, City of Calgary

## Objective

Calgary Economic Development commissioned HDR|RDA to develop a 10-year forecast of employment demand. More specifically, a forecast model was to be developed in order to generate a forecast of employment demand for the next ten years, for each major occupation within each industry and key sector in Calgary. The model was to be developed such that CED analysts would be able to run certain scenarios, updating employment demand projections by varying key drivers such as changes in oil prices.

The forecast covers twenty (20) industries included in the 2002 version of the North American Industrial Classification System (NAICS). It also covers nine (9) Key Sectors of the Calgary economy as defined by Calgary Economic Development in its business development activities as the key sectors of sustainable economic growth. The key sectors represent interconnected industry clusters. Within each industry and key sector, we also provide forecasts of occupational demand. These occupations are classified within nine (9) occupational categories defined in the National Occupational Classification for Statistics (NOC-S). There are four levels of NOC classification including the 2-digit, 3-digit, and 4-digit NOC levels. All four levels are included, covering 478 active occupations in Calgary. Finally, we developed forecasts of demand for each of five skill and training levels. Brief definitions for each of classification systems summarized in the tables below.

**Table 1.1: CED Key Sectors**

<b>Calgary Economic Development Key Sectors</b>
Creative Industries
Energy
Film
Financial Services
Health & Wellness
ICT
Manufacturing
Professional Services
Transportation & Logistics

**Table 1.2: NAICS Industries covered**

Industry (NAICS 2002)
11 Agriculture, forestry, fishing and hunting
21 Mining and oil and gas extraction
22 Utilities
23 Construction
31-33 Manufacturing
41 Wholesale trade
44-45 Retail trade
48-49 Transportation and warehousing
51 Information and cultural industries
52 Finance and insurance
53 Real estate and rental and leasing
54 Professional, scientific and technical services
55 Management of companies and enterprises
56 Administrative and support, waste management and remediation services
61 Educational services
62 Health care and social assistance
71 Arts, entertainment and recreation
72 Accommodation and food services
81 Other services (except public administration)
91 Public administration

**Table 1.3: National Occupational Classifications Covered**

Occupational Categories (1 Digit NOC)
A Management occupations
B Business, finance and administration occupations
C Natural and applied sciences and related occupations
D Health occupations
E Occupations in social science, education, government service and religion
F Occupations in art, culture, recreation and sport
G Sales and service occupations
H Trades, transport and equipment operators and related occupations
I Occupations unique to primary industry
J Occupations unique to processing, manufacturing and utilities

**Table 1.4: Skill Levels**

Skill Levels (based NOC)
College Education or Apprenticeship Training
Secondary School or Occupation-Specific Training
University Education
Management Occupation
On the job training

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## METHODOLOGY

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### **The Economic Theory**

The forecasting process begins with a thorough review of all the economic data currently available on the labour market in Calgary and the collection of statistics on key drivers of industrial segments of the Calgary economy. This includes a review of historical time-series employment data which is segmented by both industry and occupation. Our experience in modelling and forecasting labor demand in different industry segments has produced one particularly salient conclusion: employment in each industry responds in very diverse fashions to a set of economic conditions. For example in developed economies the manufacturing industry generally has a negative temporal trend – job creation in this segment is declining. But there are other industry segments, such as health, that typically have positive trends because of demographic trends in most developed countries. This diversity becomes even more pronounced when we model employment trends in more micro-jurisdictions such as metro areas as opposed to provinces or countries.

Since each labour market has quite distinct dynamics we develop separate forecast models for each industry segment. Incorporating this dynamic into our models of the Calgary labour market represents one of the principal building blocks for our forecast. In many employment markets this represents the most important component of the trajectory of a jurisdiction's employment growth, at least in the medium term. We model this as an auto-regressive dynamic effect which simply means that the employment levels at period  $t+1$ , i.e., the next quarter or the next year, will be strongly determined by the level we observed at period  $t$ . The auto-regressive coefficient informs us of how strongly related the observation at  $t+1$  is to its value at time  $t$ . We believe that getting this core part of the dynamic correct provides the most important building block for our forecasts of employment in each industry sector. The advantage of modelling each industry separately is that we get a unique estimate of the auto-regressive dynamic for employment in each industry segment.

Employment in these different industry segments responds, by a greater or lesser extent, to macro-economic conditions. Hence we incorporate these responses along with the auto-regressive dynamic noted above. This simply means that employment levels in the health industry in 2008 are strongly related to employment levels in 2007 but in addition its levels in 2008 may be determined to some extent by variations in overall economic conditions such as changes in the metro GDP. In selecting other variables that might affect employment levels we look to the local conditions in a particular geographic jurisdiction plus economic theory to inform our choice of the variables to add to the auto-regressive specification. In Calgary, we obviously look to energy prices as an important factor that might have an independent effect on employment levels in a particular industry sector. And here basic labour market theories direct us to which sectors should be more or less impacted by energy prices. So, we would expect the professional services industry, an industry that tends to have jobs directly tied to servicing the energy

sector, would be highly impacted by fluctuations in energy prices. By contrast, health employment is not in the least directly linked to energy and hence should be less affected by fluctuations in energy prices.

More generally, we have a set of theoretical and empirical based expectations as to how employment should be affected by other macro-economic conditions. We draw on basic labour market theories and empirical findings suggesting, for example, that demographic and income trends should impact employment in the health sector; that currency fluctuations affect the trade sector; that changes in real disposable income should impact retail and wholesale particularly significantly. And we should see construction employment positively associated with both population trends and real disposable income per capita. In addition to those theoretical insights, our decisions in identifying the key macro-economic conditions that affect employment in specific industry segments are guided by our experience in estimating employment models for hundreds of metro jurisdictions world-wide. This ensures that we have considerable insight into which industry segments are most likely to be affected by which macro-economic conditions.

Using the Labor Force Survey and Census of Population we estimate the changing incidence of occupations within each industry. This incidence is simply the demand for certain types of jobs in each industry. Building on the industry forecast, we consider both the long-run change in labour demand based on industry growth and the changing needs for workers in particular occupations. Differences in industry growth are used to determine the changing demand for occupations. For instance, as the professional services industry expands, there will be growing demand for engineers. Conversely, as the agricultural industry slowly declines, there will be less demand for farmers.

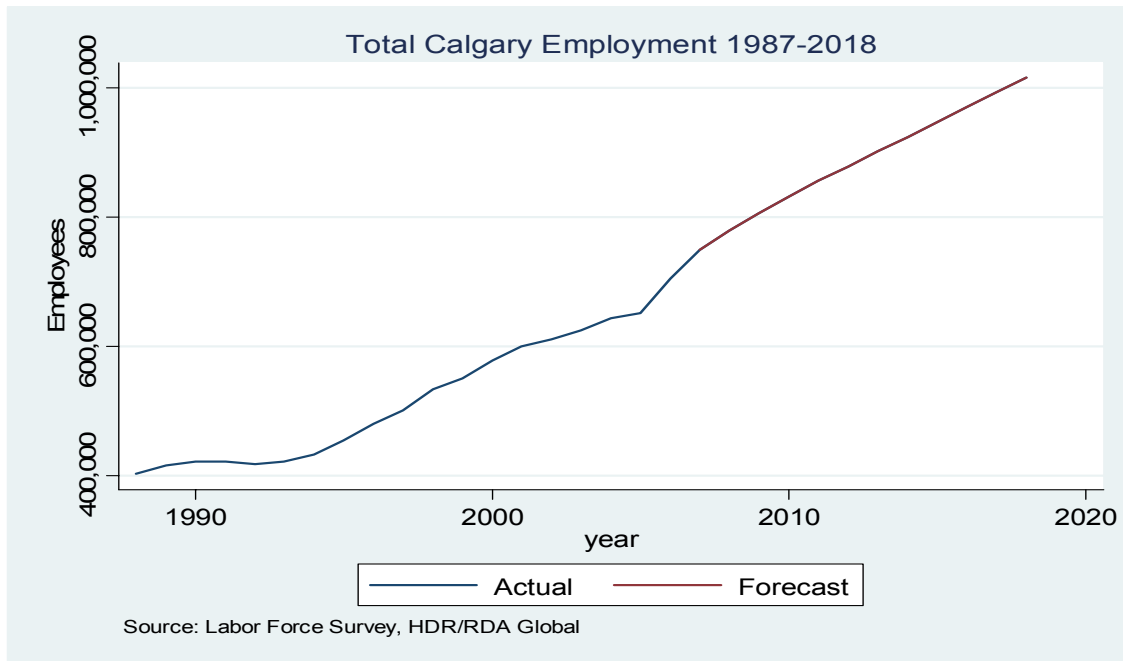
We also develop a simple naïve forecast of changing demand for occupations, generally felt throughout the economy and generally present in all industries. There are a number of social, technical, and organizational forces which shape the demand for certain occupations. For instance, it is well documented that management occupations have been generally in decline in North America for the past seven years. The gradual declines in management occupations have been offset by growth in specialized business and financial roles. This represents a gradual trend toward workforce specialization and less need for managerial oversight. These trends tend to occur at a gradual rate and the effect of these changes is marginal in comparison to changes in occupational demand which are driven by industrial expansion. However, take into consideration these trends in developing the forecast model. At the end of the forecast process, the employment forecasts are combined into a scenario tool which allows for additional further analysis of the employment forecast. The scenario tool allows forecast analysts at Calgary Economic Development to make changes to the external economic drivers which affect local labour demand and see in real time how demand for workers changes in response to these drivers. For instance, the analyst can see what the forecast demand for workers will be if oil prices go to \$120 per barrel.

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## CALGARY LABOR MARKET

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**Figure 1: Total Calgary Employment Forecast (All Industries)**



The Calgary economy has seen tremendous growth in labour demand over the previous decade with employment growth reaching an all-time high of 8.1%<sup>1</sup> in 2006. The recent strong growth in the Calgary economy has been driven by a combination of economic factors spurring growth in specific sectors and generally throughout the Calgary economy. Energy prices are a significant driver with West Texas Intermediate oil price rising 17%<sup>2</sup> in 2006. Investment levels in major construction projects have risen significantly compared to historical levels. Housing starts have risen from 13,700<sup>3</sup> starts in 2005 to 17,000 starts in 2006, an increase of 25%. Calgary GDP grew at 7.7% in 2006.

Recent increases in employment levels have been highest in sectors of the Calgary economy which are related to energy, in particular in the professional services sector. However, overall growth has been relatively balanced among industries with significant growth in most sectors of the economy.

As Figure 1 shows, labour demand in the Calgary Economic Region is expected to continue to grow at a healthy rate throughout the forecast, albeit at a lower, more sustainable level. The overall growth in employment in Calgary is expected to decline over the next several years settling at a more sustainable long-term employment growth rate of 2.4%, in line with historical average growth. However, this lower growth rate will continue to result in strong job creation. Over the previous ten years (1996-2006)

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<sup>1</sup> Source: Labor Force Survey

<sup>2</sup> Source: US Energy Information Administration

<sup>3</sup> Source for housing starts statistics and Metro GDP at basic prices was the Conference Board of Canada

Calgary employment increased adding 224,000 new jobs. Over the ten year forecast period (2007-2017) Calgary employment growth will result in the creation of an additional 244,000 new jobs. This growth in the Calgary economy will be driven by a number of factors including expectations that oil prices will remain at or near historically high levels. Energy prices are expected to be volatile in the near term, with possible spikes in prices, partially due to the declining value of the US dollar. However, for the long-term forecast, an average annual 1.7% growth rate in oil prices has been forecasted, which is consistent with conservative expectations of energy analysts<sup>4</sup>. Calgary GDP growth will moderate to a strong long term compound annual real growth rate of 3.8%.

**Figure 2 Calgary Job Creation in Each Industry**

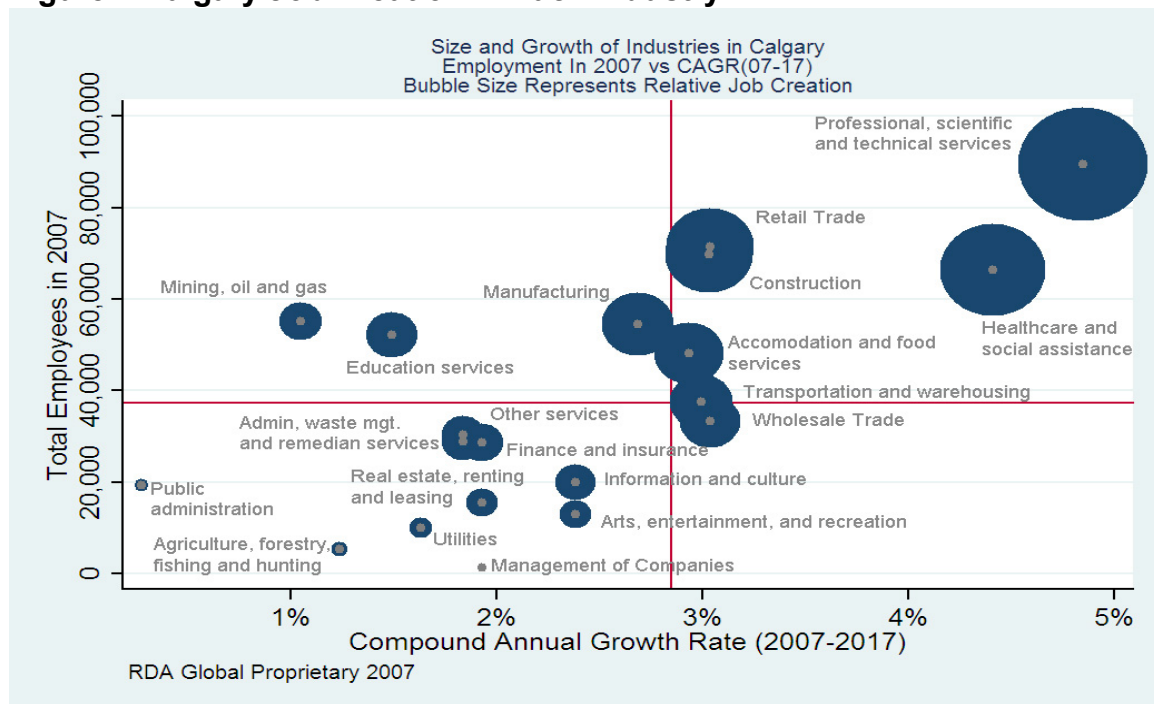


Figure 2 highlights the differences in job creation across industries in Calgary, with the larger circles representing industries with more job creations. Significant gains in employment will be somewhat distributed among economic sectors. However, there will be particularly strong expansion in the professional services sector, which is tied to continued demand for technical and engineering services in the energy sector. There will also be strong job growth in healthcare, driven by overall population growth and growth in the older segments of the population. Job expansion will also continue to be robust in retail, construction, accommodation & food services, transportation, manufacturing, and wholesale. Population growth is expected to drive up demand for education services. Most segments of the economy are expected to continue to see positive growth with employment growth rates in the 1% to 2.5% long-term growth range. However, total job creation in niche industries will be constrained by the relatively smaller size of these segments.

<sup>4</sup> In development of this forecast, oil price forecasts of the Energy Information Administration and Sproule and Associates were consulted, however, final assumptions in the forecast model were based on a nominal annual growth rate of 1.7%.

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## HIGH GROWTH OCCUPATIONS

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The occupational mix in Calgary will see some significant changes over the next ten years. In the near term three-year period of 2007-2010, the top five high-growth occupations<sup>5</sup> will be construction estimators, architects, civil engineers, drafting technologists and technicians, residential home builders and renovators. These five job categories will grow due to near term growth in the construction industry and the professional services industry. However, together these top five occupations will add about 2,200 of the 84,100 jobs that will be created by 2010, or about 2.6% of all new jobs by 2010. The next five high-growth occupations will be software engineers, web designers and developers, mechanical engineers, electrical and electronics engineers, and programmers. These five jobs will add 2,600, or about 3.1% of all new jobs by 2010.

In the 2007-2010 period, the top ten occupations with the highest total number of new jobs created will be (in order) retail sales persons, financial auditors and accountants, retail trade managers, information systems analysts & consultants, general office clerks, petroleum engineers, geologists geophysicists and geochemists, computer programmers, restaurant and food managers, and administrative officers. Retail salespersons is the largest occupation in total workers and as the population grows, there will be growing demand for retail workers. Growth in the oil and gas sector and in the professional services industry will drive demand for petroleum engineers, geologists geophysicists and geochemists. Information systems analysts and computer programmers will grow partially because they are both large occupational categories and also because they are in high demand in the rapidly expanding professional services industry. Together these top ten occupations for new job creation will represent about 15,000 new jobs by 2010 or about 18% of all new jobs by 2010.

In the long term the demand for workers will be somewhat different. The most notable difference will be strong growth in demand for health workers of all sorts. The top twelve high-growth occupations<sup>6</sup> in Calgary in the ten year outlook of 2007-2017 will be entirely health workers. Historically, health workers have never been in the top ten occupations in Calgary, but by 2017, registered nurses will be the ninth largest job occupation in Calgary. Over the long term, nurse aids, dentists, dental assistants, licensed practical nurses, and general practitioners/family physicians will be the top five growth occupations in Calgary. The growth in these occupations will be strong both in the near term and in the later years of the forecast as both population growth and aging population results in increased demand for these workers. These top five growth occupations will represent a total of about 6,100 of the 243,900 new jobs created in Calgary, or about 2.5% of all new jobs. Specialist physicians, medical radiation technologists, health assistants, medical laboratory assistants and technicians and pharmacists will together comprise the next seven top growth occupations over the 10-year forecast period. Together these seven occupations will represent about 9,200 new jobs or about 3.8% of all new jobs.

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<sup>5</sup> Near-term high-growth occupations are limited to those generating at least 200 new jobs by 2010.

<sup>6</sup> 10-year long term high-growth occupations are limited to those generating at least 500 new jobs by 2017.

Over the 2007-2017 period, the top ten occupations with the highest total number of new jobs created will be (in order) retail salespersons, retail managers, registered nurses, information systems analysts, financial auditors and accountants, petroleum engineers, elementary school teachers, geologists geochemists and geophysicists, computer programmers and wholesale sales representatives. Together these ten occupations will represent about 42,700 new jobs in Calgary or about 18% of all new jobs by 2017.

As the city grows, retail sales jobs will remain the top occupation and financial auditors and accountants will remain the second largest set of workers. Retail managers will move up one notch to become the third largest occupation and general office clerks will drop a notch to become the fourth largest occupation. Elementary school and kindergarten teachers will remain the fifth largest occupation. Information systems analysts and consultants will move up four slots to become the sixth largest occupation. Non-technical wholesale trade representatives will move up one slot to be the seventh largest occupation. Accounting clerks will drop two notches to be the eighth largest occupation, registered nurses will move up five notches to be the ninth largest occupation and administrative officers will drop three notches to be the tenth largest occupation in Calgary.

**Table 3.1: Top 10 Job Occupations in Calgary in 2017**

Rank in 2017	Occupation (4 Digit NOC)	Employees in 2017	Rank in 2007	Change in Rank	CAGR 2007-2017
1	G211 Retail salespersons and sales clerks	35,250	1	Unchanged	2.7%
2	B011 Financial auditors and accountants	25,883	2	Unchanged	1.9%
3	A211 Retail trade managers	19,234	4	+1	3.0%
4	B511 General office clerks	17,188	3	-1	1.8%
5	E132 Elementary school and kindergarten teachers	15,654	5	Unchanged	2.3%
6	C071 Information systems analysts and consultants	13,637	10	+4	4.0%
7	G111 Sales representatives, wholesale trade (non-technical)	13,578	8	+1	2.6%
8	B531 Accounting and related clerks	13,425	6	-2	1.9%
9	D112 Registered nurses	13,321	14	+5	4.5%
10	B311 Administrative officers	13,059	7	-3	1.9%

The following tables contain additional detail on the high-growth and high job creation occupations in Calgary in the near term and the long term.

**Table 3.2: Near-Term Top 40 Growth Jobs in Calgary<sup>7</sup> Ranked by 3-Year Compound Annual Growth Rate (CAGR)**

3-Year Growth Ranking	Occupation (4 Digit NOC)	Employees					CAGR	CAGR	Jobs Added	Jobs Added
		2007	2008	2009	2010	2017	2007-2010	2007-2017	2007-2010	2007-2017
1	C134 Construction estimators	1,074	1,193	1,283	1,332	1,632	7.4%	4.3%	258	558
2	C051 Architects	1,091	1,172	1,252	1,306	1,647	6.2%	4.2%	216	556
3	C031 Civil engineers	4,308	4,639	4,954	5,155	6,448	6.2%	4.1%	847	2,141
4	C153 Drafting technologists and technicians	3,359	3,608	3,851	4,010	5,038	6.1%	4.1%	651	1,679
5	A372 Residential home builders and renovators	1,262	1,379	1,445	1,502	1,703	6.0%	3.0%	240	441
6	C073 Software engineers	1,532	1,639	1,747	1,821	2,302	5.9%	4.2%	289	770
7	C075 Web designers and developers	1,244	1,331	1,416	1,477	1,859	5.9%	4.1%	233	616
8	C032 Mechanical engineers	2,295	2,458	2,621	2,723	3,407	5.9%	4.0%	427	1,111
9	C033 Electrical and electronics engineers	2,888	3,091	3,294	3,423	4,287	5.8%	4.0%	535	1,398
10	C074 Computer programmers and interactive media developers	6,280	6,707	7,145	7,436	9,370	5.8%	4.1%	1,155	3,090
11	A371 Construction managers	4,893	5,316	5,566	5,782	6,570	5.7%	3.0%	889	1,677
12	C071 Information systems analysts and consultants	9,194	9,807	10,446	10,856	13,637	5.7%	4.0%	1,661	4,442
13	C034 Chemical engineers	1,473	1,572	1,673	1,739	2,177	5.7%	4.0%	265	704
14	C047 Computer engineers (except software engineers)	2,090	2,230	2,372	2,466	3,110	5.7%	4.1%	376	1,020
15	C142 Electronic service technicians (household and business equipment)	2,695	2,878	3,074	3,179	4,001	5.7%	4.0%	484	1,306
16	C072 Database analysts and data administrators	1,413	1,506	1,601	1,662	2,080	5.6%	3.9%	249	668
17	C141 Electrical and electronics engineering technologists and technicians	2,098	2,238	2,381	2,467	3,091	5.6%	4.0%	369	994
18	C182 User support technicians	2,982	3,172	3,377	3,503	4,402	5.5%	4.0%	521	1,420
19	H134 Plasterers, drywall installers, finishers and lathers	2,151	2,341	2,442	2,525	2,847	5.5%	2.8%	374	695
20	C181 Computer and network operators and web technicians	4,405	4,685	4,985	5,167	6,483	5.5%	3.9%	763	2,078
21	H144 Painters and decorators	3,303	3,589	3,743	3,869	4,362	5.4%	2.8%	566	1,059
22	H019 Contractors and supervisors, other construction trades, installers, repairers and servicers	2,797	3,036	3,166	3,272	3,692	5.4%	2.8%	475	895
23	C112 Geological and mineral technologists and technicians	3,791	4,027	4,276	4,428	5,502	5.3%	3.8%	637	1,711
24	H145 Floor covering installers	1,259	1,363	1,422	1,470	1,665	5.3%	2.8%	211	407
25	C111 Chemical technologists and technicians	1,210	1,284	1,364	1,412	1,760	5.3%	3.8%	202	549
26	H211 Electricians (except industrial and power system)	5,212	5,642	5,880	6,075	6,860	5.2%	2.8%	864	1,648
27	C013 Geologists, geochemists and geophysicists	7,082	7,513	7,975	8,254	10,236	5.2%	3.8%	1,172	3,154
28	H111 Plumbers	3,303	3,575	3,726	3,849	4,342	5.2%	2.8%	546	1,039
29	C045 Petroleum engineers	7,458	7,906	8,383	8,657	10,661	5.1%	3.6%	1,199	3,202
30	H015 Contractors and supervisors, carpentry trades	2,214	2,385	2,483	2,567	2,916	5.1%	2.8%	353	702
31	H121 Carpenters	7,087	7,622	7,933	8,195	9,292	5.0%	2.7%	1,108	2,205
32	H821 Construction trades helpers and labourers	5,189	5,574	5,803	5,995	6,811	4.9%	2.8%	806	1,623
33	H531 Residential and commercial installers and servicers	1,878	2,016	2,099	2,166	2,460	4.9%	2.7%	289	582
34	E023 Family, marriage and other related counsellors	1,387	1,461	1,536	1,600	2,051	4.9%	4.0%	213	664
35	H321 Sheet metal workers	1,546	1,661	1,728	1,783	2,021	4.9%	2.7%	237	475
36	H012 Contractors and supervisors, electrical trades and telecommunications occupations	1,482	1,588	1,651	1,706	1,935	4.8%	2.7%	224	454
37	E022 Social workers	1,781	1,874	1,969	2,050	2,620	4.8%	3.9%	269	839
38	E212 Community and social service workers	2,424	2,549	2,679	2,789	3,576	4.8%	4.0%	366	1,152
39	E217 Early childhood educators and assistants	5,359	5,621	5,907	6,149	8,026	4.7%	4.1%	790	2,667
40	E211 Paralegal and related occupations	3,538	3,696	3,862	4,053	5,129	4.6%	3.8%	514	1,591

<sup>7</sup> Includes only occupations adding over 200 jobs by 2017.

**Table 3.3: Long-Term Top 40 Growth Jobs in Calgary<sup>8</sup> Ranked by 10-Year Compound Annual Growth Rate**

10-Year Growth Ranking	Occupation (4 Digit NOC)	Employees					CAGR	CAGR	Jobs Added	Jobs Added
		2007	2008	2009	2010	2017	2007-2010	2007-2017	2007-2010	2007-2017
1	D312 Nurse aides, orderlies and patient service associates	4,471	4,631	4,830	5,026	7,008	4.0%	4.6%	554	2,537
2	D013 Dentists	973	1,013	1,055	1,099	1,521	4.2%	4.6%	127	549
3	D311 Dental assistants	1,750	1,823	1,897	1,978	2,737	4.2%	4.6%	228	987
4	D233 Licensed practical nurses	1,523	1,582	1,649	1,717	2,382	4.1%	4.6%	193	859
5	D012 General practitioners and family physicians	2,120	2,208	2,297	2,395	3,314	4.1%	4.6%	275	1,194
6	D011 Specialist physicians	1,199	1,248	1,299	1,354	1,874	4.1%	4.6%	154	674
7	D215 Medical radiation technologists	1,002	1,042	1,085	1,130	1,564	4.1%	4.6%	128	562
8	D112 Registered nurses	8,553	8,872	9,232	9,613	13,321	4.0%	4.5%	1,060	4,768
9	D313 Other assisting occupations in support of health services	2,208	2,280	2,375	2,468	3,429	3.8%	4.5%	260	1,221
10	D211 Medical laboratory technologists and pathologists' assistants	1,432	1,482	1,538	1,602	2,216	3.8%	4.5%	170	784
11	D212 Medical laboratory technicians	1,599	1,652	1,714	1,783	2,466	3.7%	4.4%	185	867
12	D031 Pharmacists	1,237	1,271	1,324	1,370	1,881	3.5%	4.3%	133	644
13	C134 Construction estimators	1,074	1,193	1,283	1,332	1,632	7.4%	4.3%	258	558
14	C051 Architects	1,091	1,172	1,252	1,306	1,647	6.2%	4.2%	216	556
15	C073 Software engineers	1,532	1,639	1,747	1,821	2,302	5.9%	4.2%	289	770
16	C153 Drafting technologists and technicians	3,359	3,608	3,851	4,010	5,038	6.1%	4.1%	651	1,679
17	E217 Early childhood educators and assistants	5,359	5,621	5,907	6,149	8,026	4.7%	4.1%	790	2,667
18	C031 Civil engineers	4,308	4,639	4,954	5,155	6,448	6.2%	4.1%	847	2,141
19	C075 Web designers and developers	1,244	1,331	1,416	1,477	1,859	5.9%	4.1%	233	616
20	C074 Computer programmers and interactive media developers	6,280	6,707	7,145	7,436	9,370	5.8%	4.1%	1,155	3,090
21	C047 Computer engineers (except software engineers)	2,090	2,230	2,372	2,466	3,110	5.7%	4.1%	376	1,020
22	C142 Electronic service technicians (household and business equipment)	2,695	2,878	3,074	3,179	4,001	5.7%	4.0%	484	1,306
23	C032 Mechanical engineers	2,295	2,458	2,621	2,723	3,407	5.9%	4.0%	427	1,111
24	C033 Electrical and electronics engineers	2,888	3,091	3,294	3,423	4,287	5.8%	4.0%	535	1,398
25	C071 Information systems analysts and consultants	9,194	9,807	10,446	10,856	13,637	5.7%	4.0%	1,661	4,442
26	E023 Family, marriage and other related counsellors	1,387	1,461	1,536	1,600	2,051	4.9%	4.0%	213	664
27	C034 Chemical engineers	1,473	1,572	1,673	1,739	2,177	5.7%	4.0%	265	704
28	C182 User support technicians	2,982	3,172	3,377	3,503	4,402	5.5%	4.0%	521	1,420
29	E212 Community and social service workers	2,424	2,549	2,679	2,789	3,576	4.8%	4.0%	366	1,152
30	C141 Electrical and electronics engineering technologists and technicians	2,098	2,238	2,381	2,467	3,091	5.6%	4.0%	369	994
31	C072 Database analysts and data administrators	1,413	1,506	1,601	1,662	2,080	5.6%	3.9%	249	668
32	C181 Computer and network operators and web technicians	4,405	4,685	4,985	5,167	6,483	5.5%	3.9%	763	2,078
33	E022 Social workers	1,781	1,874	1,969	2,050	2,620	4.8%	3.9%	269	839
34	C171 Air pilots, flight engineers and flying instructors	1,179	1,235	1,306	1,347	1,727	4.5%	3.9%	168	548
35	C111 Chemical technologists and technicians	1,210	1,284	1,364	1,412	1,760	5.3%	3.8%	202	549
36	C112 Geological and mineral technologists and technicians	3,791	4,027	4,276	4,428	5,502	5.3%	3.8%	637	1,711
37	E211 Paralegal and related occupations	3,538	3,696	3,862	4,053	5,129	4.6%	3.8%	514	1,591
38	E012 Lawyers and Quebec notaries	5,969	6,231	6,504	6,829	8,641	4.6%	3.8%	860	2,672
39	C013 Geologists, geochemists and geophysicists	7,082	7,513	7,975	8,254	10,236	5.2%	3.8%	1,172	3,154
40	J319 Other labourers in processing, manufacturing and utilities	1,479	1,539	1,617	1,687	2,132	4.5%	3.7%	208	654

<sup>8</sup> Includes only occupations adding over 500 jobs by 2017.

**Table 3.4: Near-Term Top 40 Occupations for New Job Creation Ranked by Total Jobs Added by 2010**

3-Year Job Creation Ranking	Occupation (4 Digit NOC)	Employees					CAGR	CAGR	Jobs Added	Jobs Added
		2007	2008	2009	2010	2017	2007-2010	2007-2017	2007-2010	2007-2017
1	G211 Retail salespersons and sales clerks	26,879	27,829	28,130	29,074	35,250	2.7%	2.7%	2,195	8,371
2	B011 Financial auditors and accountants	21,459	22,275	22,900	23,577	25,883	3.2%	1.9%	2,118	4,424
3	A211 Retail trade managers	14,254	14,954	15,735	16,222	19,234	4.4%	3.0%	1,968	4,980
4	C071 Information systems analysts and consultants	9,194	9,807	10,446	10,856	13,637	5.7%	4.0%	1,661	4,442
5	B511 General office clerks	14,401	14,925	15,342	15,732	17,188	3.0%	1.8%	1,332	2,787
6	C045 Petroleum engineers	7,458	7,906	8,383	8,657	10,661	5.1%	3.6%	1,199	3,202
7	C013 Geologists, geochemists and geophysicists	7,082	7,513	7,975	8,254	10,236	5.2%	3.8%	1,172	3,154
8	C074 Computer programmers and interactive media developers	6,280	6,707	7,145	7,436	9,370	5.8%	4.1%	1,155	3,090
9	A221 Restaurant and food service managers	7,747	8,103	8,611	8,871	10,585	4.6%	3.2%	1,124	2,838
10	B311 Administrative officers	10,809	11,264	11,610	11,923	13,059	3.3%	1.9%	1,113	2,250
11	H121 Carpenters	7,087	7,622	7,933	8,195	9,292	5.0%	2.7%	1,108	2,205
12	B531 Accounting and related clerks	11,121	11,560	11,903	12,221	13,425	3.2%	1.9%	1,100	2,304
13	D112 Registered nurses	8,553	8,872	9,232	9,613	13,321	4.0%	4.5%	1,060	4,768
14	A371 Construction managers	4,893	5,316	5,566	5,782	6,570	5.7%	3.0%	889	1,677
15	A131 Sales, marketing and advertising managers	6,913	7,237	7,534	7,799	9,135	4.1%	2.8%	886	2,222
16	H211 Electricians (except industrial and power system)	5,212	5,642	5,880	6,075	6,860	5.2%	2.8%	864	1,648
17	E012 Lawyers and Quebec notaries	5,969	6,231	6,504	6,829	8,641	4.6%	3.8%	860	2,672
18	C031 Civil engineers	4,308	4,639	4,954	5,155	6,448	6.2%	4.1%	847	2,141
19	B211 Secretaries (except legal and medical)	8,711	9,059	9,317	9,557	10,394	3.1%	1.8%	846	1,683
20	H821 Construction trades helpers and labourers	5,189	5,574	5,803	5,995	6,811	4.9%	2.8%	806	1,623
21	E217 Early childhood educators and assistants	5,359	5,621	5,907	6,149	8,026	4.7%	4.1%	790	2,667
22	G513 Food and beverage servers	8,916	9,195	9,397	9,699	11,831	2.8%	2.9%	782	2,914
23	G412 Cooks	8,774	9,063	9,253	9,555	11,624	2.9%	2.9%	781	2,851
24	G111 Sales representatives, wholesale trade (non-technical)	10,504	10,852	10,891	11,279	13,578	2.4%	2.6%	775	3,075
25	C181 Computer and network operators and web technicians	4,405	4,685	4,985	5,167	6,483	5.5%	3.9%	763	2,078
26	E132 Elementary school and kindergarten teachers	12,461	12,590	12,875	13,210	15,654	2.0%	2.3%	749	3,193
27	B514 Receptionists and switchboard operators	6,505	6,814	7,041	7,239	7,901	3.6%	2.0%	734	1,396
28	B553 Customer service, information and related clerks	7,527	7,795	8,039	8,245	9,141	3.1%	2.0%	718	1,614
29	H812 Material handlers	7,113	7,347	7,615	7,824	9,308	3.2%	2.7%	712	2,195
30	G961 Food counter attendants, kitchen helpers and related occupations	7,441	7,696	7,855	8,113	9,846	2.9%	2.8%	672	2,406
31	H711 Truck drivers	6,656	6,892	7,103	7,316	8,718	3.2%	2.7%	660	2,062
32	C153 Drafting technologists and technicians	3,359	3,608	3,851	4,010	5,038	6.1%	4.1%	651	1,679
33	C112 Geological and mineral technologists and technicians	3,791	4,027	4,276	4,428	5,502	5.3%	3.8%	637	1,711
34	G311 Cashiers	6,899	7,138	7,264	7,495	9,106	2.8%	2.8%	596	2,208
35	H144 Painters and decorators	3,303	3,589	3,743	3,869	4,362	5.4%	2.8%	566	1,059
36	D312 Nurse aides, orderlies and patient service associates	4,471	4,631	4,830	5,026	7,008	4.0%	4.6%	554	2,537
37	H111 Plumbers	3,303	3,575	3,726	3,849	4,342	5.2%	2.8%	546	1,039
38	C033 Electrical and electronics engineers	2,888	3,091	3,294	3,423	4,287	5.8%	4.0%	535	1,398
39	C182 User support technicians	2,982	3,172	3,377	3,503	4,402	5.5%	4.0%	521	1,420
40	H017 Contractors and supervisors, heavy construction equipment crews	3,647	3,882	4,034	4,165	4,767	4.5%	2.7%	519	1,120

**Table 3.5: Long-Term Top 40 Occupations for New Job Creation Ranked by Total Jobs Added by 2017**

Job Creation Ranking	Occupation (4 Digit NOC)	Employees					CAGR	CAGR	Jobs Added	Jobs Added
		2007	2008	2009	2010	2017	2007-2010	2007-2017	2007-2010	2007-2017
1	G211 Retail salespersons and sales clerks	26,879	27,829	28,130	29,074	35,250	2.7%	2.7%	2,195	8,371
2	A211 Retail trade managers	14,254	14,954	15,735	16,222	19,234	4.4%	3.0%	1,968	4,980
3	D112 Registered nurses	8,553	8,872	9,232	9,613	13,321	4.0%	4.5%	1,060	4,768
4	C071 Information systems analysts and consultants	9,194	9,807	10,446	10,856	13,637	5.7%	4.0%	1,661	4,442
5	B011 Financial auditors and accountants	21,459	22,275	22,900	23,577	25,883	3.2%	1.9%	2,118	4,424
6	C045 Petroleum engineers	7,458	7,906	8,383	8,657	10,661	5.1%	3.6%	1,199	3,202
7	E132 Elementary school and kindergarten teachers	12,461	12,590	12,875	13,210	15,654	2.0%	2.3%	749	3,193
8	C013 Geologists, geochemists and geophysicists	7,082	7,513	7,975	8,254	10,236	5.2%	3.8%	1,172	3,154
9	C074 Computer programmers and interactive media developers	6,280	6,707	7,145	7,436	9,370	5.8%	4.1%	1,155	3,090
10	G111 Sales representatives, wholesale trade (non-technical)	10,504	10,852	10,891	11,279	13,578	2.4%	2.6%	775	3,075
11	G513 Food and beverage servers	8,916	9,195	9,397	9,699	11,831	2.8%	2.9%	782	2,914
12	G412 Cooks	8,774	9,063	9,253	9,555	11,624	2.9%	2.9%	781	2,851
13	A221 Restaurant and food service managers	7,747	8,103	8,611	8,871	10,585	4.6%	3.2%	1,124	2,838
14	B511 General office clerks	14,401	14,925	15,342	15,732	17,188	3.0%	1.8%	1,332	2,787
15	E012 Lawyers and Quebec notaries	5,969	6,231	6,504	6,829	8,641	4.6%	3.8%	860	2,672
16	E217 Early childhood educators and assistants	5,359	5,621	5,907	6,149	8,026	4.7%	4.1%	790	2,667
17	D312 Nurse aides, orderlies and patient service associates	4,471	4,631	4,830	5,026	7,008	4.0%	4.6%	554	2,537
18	G961 Food counter attendants, kitchen helpers and related occupations	7,441	7,696	7,855	8,113	9,846	2.9%	2.8%	672	2,406
19	G933 Janitors, caretakers and building superintendents	9,977	10,172	10,168	10,465	12,285	1.6%	2.1%	488	2,308
20	B531 Accounting and related clerks	11,121	11,560	11,903	12,221	13,425	3.2%	1.9%	1,100	2,304
21	B311 Administrative officers	10,809	11,264	11,610	11,923	13,059	3.3%	1.9%	1,113	2,250
22	A131 Sales, marketing and advertising managers	6,913	7,237	7,534	7,799	9,135	4.1%	2.8%	886	2,222
23	G311 Cashiers	6,899	7,138	7,264	7,495	9,106	2.8%	2.8%	596	2,208
24	H121 Carpenters	7,087	7,622	7,933	8,195	9,292	5.0%	2.7%	1,108	2,205
25	H812 Material handlers	7,113	7,347	7,615	7,824	9,308	3.2%	2.7%	712	2,195
26	E131 Secondary school teachers	8,427	8,514	8,706	8,932	10,583	2.0%	2.3%	505	2,156
27	C031 Civil engineers	4,308	4,639	4,954	5,155	6,448	6.2%	4.1%	847	2,141
28	C181 Computer and network operators and web technicians	4,405	4,685	4,985	5,167	6,483	5.5%	3.9%	763	2,078
29	H711 Truck drivers	6,656	6,892	7,103	7,316	8,718	3.2%	2.7%	660	2,062
30	G121 Technical sales specialists, wholesale trade	6,874	7,093	7,105	7,366	8,813	2.3%	2.5%	492	1,940
31	G814 Babysitters, nannies and parents' helpers	5,268	5,436	5,542	5,734	7,082	2.9%	3.0%	466	1,815
32	G931 Light duty cleaners	6,393	6,575	6,654	6,872	8,198	2.4%	2.5%	479	1,805
33	C112 Geological and mineral technologists and technicians	3,791	4,027	4,276	4,428	5,502	5.3%	3.8%	637	1,711
34	B211 Secretaries (except legal and medical)	8,711	9,059	9,317	9,557	10,394	3.1%	1.8%	846	1,683
35	G011 Retail trade supervisors	5,191	5,375	5,463	5,639	6,870	2.8%	2.8%	449	1,679
36	C153 Drafting technologists and technicians	3,359	3,608	3,851	4,010	5,038	6.1%	4.1%	651	1,679
37	A371 Construction managers	4,893	5,316	5,566	5,782	6,570	5.7%	3.0%	889	1,677
38	H211 Electricians (except industrial and power system)	5,212	5,642	5,880	6,075	6,860	5.2%	2.8%	864	1,648
39	H821 Construction trades helpers and labourers	5,189	5,574	5,803	5,995	6,811	4.9%	2.8%	806	1,623
40	B553 Customer service, information and related clerks	7,527	7,795	8,039	8,245	9,141	3.1%	2.0%	718	1,614