World Economy Trends and Their Implications for the City of Calgary

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Research Report F|64
Family Network

December 2006
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By
Tatyana Teplova

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Executive Summary

For centuries, the world economy has affected the life of cities. Under conditions of global integration and spatial dispersal, this trend is becoming even more pronounced. Today, the service- and knowledge-based economy is a major driver of urban growth. The role of cities is being redefined and reshaped as they become concentrated command points in the organization of the world economy, key locations for finance, sites of production and innovation, as well as markets for products and innovations. This new role increasingly requires cities to compete for investments and financial and labour capital with other cities, nationally and internationally, while ensuring a balance between economic growth and sustainable development. In a recent report, the Organisation for Economic Co-operation and Development (OECD) highlighted the central importance of cities as the drivers of national economies (OECD, 2006).

Overall, the world economy is projected to grow over the next decades. This growth will be primarily driven by international trade and capital flows, contributing to increases in world Gross Domestic Product (GDP) and making countries deeply dependent on international trade and financial markets. This trend will be further intensified by the development of a global supply chain, which offers investors not only low labour costs, but also a growing technical workforce and improving infrastructure. Moreover, continuing development and diffusion of information technology will accelerate the speed of change and create ongoing challenges for cities to increase innovation, reduce costs and work more flexibly in the next few decades. Shifts towards knowledge economies combined with demographic changes worldwide will in turn increase competition for highly-skilled labour (“talent”) and increase international mobility of labour.

In addition, worldwide energy demand is projected to grow by nearly 50 percent over the next 30 years, driven by sustained global economic growth and population increases. The projected growth in world consumption will drive oil sands production, which is expected to significantly increase in the next decades. With Alberta being the second largest reserve of oil sands in the world, energy production is likely to continue providing a solid stream of revenue for municipal, provincial and national governments. At the same time, Alberta will be challenged to address issues associated with global energy supplies. These include the volatility of energy prices, the negative environmental effects of oil sands production, the growing challenge of attracting and retaining skilled labour as well as the non-renewable nature of oil and gas as sources of energy.

In general, these global trends will provide strong development potential for Calgary, including population growth, employment and a strong economy. The dynamics of economic growth will bring opportunities for a higher standard of living and prosperity. Calgary has already outpaced all Canadian cities in economic growth by a wide margin in the past few years. The oil and gas sector and soaring energy prices are clearly responsible for much of Calgary and Alberta’s fast economic growth. Investments in the energy sector have also contributed to the growth of other industries, such as manufacturing, construction, transportation and warehousing, and information, culture and recreation. This trend is expected to continue over the next decades, though to a lesser degree.
Economic growth over the next 30 years is expected to generate an increase in employment in Calgary from 498,000 in 2001 to 705,000 in 2033. The rate of employment growth however is expected to decline through the forecast period from a rate of 3.6 percent in 2001 to 0.5 percent in 2033. The decline will be largely driven by the aging population of North America. The Calgary labour market has currently reached nearly full employment (with the unemployment rate at 3.5 percent) and, according to some estimates, is likely to become even tighter (2.9 percent) over the next decades, driven by growing energy demand.

Yet, future economic trends may also pose new challenges for Calgary which, if left unattended, may affect such areas as the quality of life, the natural environment, services and infrastructure, governance, and social development. Thus despite strong economic growth, poverty and social exclusion remain important issues for Calgary. In 2003, poverty rates in Calgary increased for the second consecutive year, following five years of decline, rising to 17 percent (compared to 13.7 percent in 2002 and 13.1 percent in 2001). The emergence of new financial districts and luxurious residential areas is accompanied by an increasing socio-economic separation of citizens living in highly segregated neighborhoods. In addition, unsustainable growth may involve noticeable health costs, which can arise from a number of factors such as sprawl, poor environmental conditions, and growing poverty.

In order to respond to growing labour market demand over the next decades, Calgary will depend mainly on its ability to attract and retain skilled economic labour, including immigrants and foreign workers. Adaptation and integration of newcomers will continue being an important policy issue as the share of immigrants, visible minorities and Aboriginal persons is projected to increase. In addition, the city will need to accommodate this population growth in the next decades, by the development of extensive and costly infrastructure, effective transportation systems (such as enhancing Calgary’s transit system), as well as addressing the shortage of affordable housing.

Moreover, unimpeded and resource-rich growth has a strong potential to threaten Calgary’s natural resources, environmental sustainability and biological diversity. Thus, Calgary will face the need to address environmental threats arising from oil and gas production as well as automobile-dependent geographic expansion. Finally, the governance implications of global economy trends range from the need for greater transparency, efficiency and flexibility on the part of local policy-makers to pressures for increased participation of a multiplicity of stakeholders in the local decision-making process and the need to address increasingly complex issues faced by cities in coherent, inclusive and sustainable ways.
World Economy Trends and Their Implications for Calgary

Key Findings

• The global economy is predicted to achieve a sustained period of dynamism through 2015 returning to the levels of the 1960s and early 1970s and is predicted to slow down between 2015 and 2030.

• Canada is predicted to maintain overall growth in productivity and to improve its standard of living. The rate of economic growth is however likely to decline from the current 2.9 percent to 2.6 percent by 2015 and to 1.8 percent per year by 2030.

• Worldwide energy demand is projected to grow by nearly 50 percent over the next 30 years, driven by sustained global economic growth and population increases. By 2015, non-OECD countries will account for three-quarters of the increase in world energy use. Non-OECD energy use will surpass OECD energy use by 2015, and will exceed it by 34 percent in 2030.

• The projected growth in world consumption will drive oil sands production, which is expected to significantly increase in the next decades. With Alberta being the second largest reserve of oil sands in the world, energy production is likely to continue providing a solid stream of revenue for municipal, provincial and national governments.

• There are a number of challenges associated with global energy supplies. These include volatility of energy prices, negative environmental effects of oil sands production, the growing challenge of attracting and retaining skilled labour as well as the non-renewable nature of oil and gas as sources of energy.

• International trade flows are projected to continue growing in the next decade, contributing to increases in world GDP and making countries deeply dependent on international trade and financial markets. In Alberta, predicted growing energy demands and overall global economic growth are also likely to contribute to further expansion of international trade.

• The development of global products is increasingly distributed through a global supply chain, which offers investors not only low labour costs, but also a growing technical workforce and improving infrastructure. Emerging markets, such as China and India, are increasingly competing with developed countries in terms of attracting foreign investments and being a major player in the global supply chain.

• Shifts towards a knowledge economy combined with demographic changes worldwide will increase competition for highly skilled labour and increase the international mobility of labour. This trend creates significant challenges for Calgary in attracting and retaining skilled workers and is expected to become even more important in the next decades.

• Continuing development and diffusion of information technology will accelerate the speed of change and create ongoing challenges for cities to increase innovation, reduce costs and work more flexibly.

• The growing international mobility of production, goods, financial flows and labour will have important implications for Calgary. The city will face increasing competition for attracting international capital, production and skilled workers with other Canadian cities, such as Vancouver or Toronto, and increasingly internationally, with such cities as Houston and Shanghai.
1. Introduction

For centuries, the world economy has affected the life of cities. Under conditions of global integration and spatial dispersal, this trend is becoming even more pronounced. Today, the service- and knowledge-based economy is a major driver of urban growth. The role of cities is being redefined and reshaped as they become concentrated command points in the organization of the world economy, key locations for finance, sites of production and innovation, as well as markets for products and innovations (Sassen, 2001: 3; Bradford, 2005). This new role requires cities to increasingly compete for investments and financial and labour capital with other cities, nationally and internationally, while ensuring a balance between economic growth and sustainable development. In its report, released in November 2006, Competitive Cities in the Global Economy, the Organisation for Economic Co-operation and Development (OECD) emphasizes that “successful cities attract talented young highly-skilled workers, are centres of innovation and entrepreneurship and are competitive locations for global and regional headquarters.”

Calgary, as other cities, has been and will continue to be affected by world economic trends. These global trends will provide strong development potential for Calgary, including population growth, employment and a strong economy. The dynamics of economic growth will bring opportunities for a higher standard of living and prosperity. Yet, future economic trends may also pose new challenges for the city which, if left unattended, may affect such areas as the quality of life, the natural environment, services and infrastructure, governance, and social development.

Furthermore, while oil and gas extraction has been very good to Calgarians (and Albertans) and will likely continue providing for a growing standard of living in the city over the next decades, it has also been responsible for a boom and bust economy, and for the economic and social problems generated by the cyclical nature of the economy. Such volatility of energy prices and growing energy sustainability concerns will continue generating pressures on the municipal and provincial governments to come up with a sustainable development strategy.

This report aims to outline major future trends in the world economy and identify the potential implications for Calgary. The report assumes a 30-year outlook and consists of two main sections. The first section provides an analysis of key future global economic megatrends and answers a larger question: how will dominant future global economic trends affect Calgary in general terms? The trends analyzed in this section include international trade and investments, growing energy demand, technological advancement and innovation, as well as the trend towards metropolization or “global localization” of the world economy. The second section of the report describes potential implications of future economic trends for Calgary within the framework of basic human needs, such as social needs, natural environment, built environment, economic needs and governance.
2. The World Economy – Long-Term Trends

Over the past century, the world economy has undergone a number of major shifts, moving from an agricultural to an industrial economy, and then to a service-oriented economy. In the past few years, we have witnessed another global shift – towards a knowledge-based economy. This shift is accompanied by high oil prices, financial imbalances in major countries and increasing economic globalization, expressed by the formation of global production, global markets and global finance, and transfer of labour-intensive production to lower-wage regions of the world. These trends present both challenges and opportunities for countries and cities across the globe and are elaborated upon below.

2.1 Global Economic Growth

The global economy is predicted to achieve a sustained period of dynamism through 2015 returning to the levels of the 1960s and early 1970s and is predicted to slow down between 2015 and 2030 (Energy Information Administration, 2006). Dynamism will be the strongest among so-called “emerging markets” – especially in China and India – but will also be broadly based worldwide.¹ According to the International Energy Outlook 2006, world real GDP growth will average 3.8 percent annually (Table 1) over the next three decades (Energy Information Administration, 2006). Canada is also predicted to maintain overall growth in productivity and to improve its standard of living. This growth will largely be due to an increase in labour force participation achieved through immigration, education and innovation, as well as through a reduction of structural unemployment. In the next few decades, however, labour force growth is likely to slow down thus affecting Canada’s overall economic growth, which is predicted to decline from the current 2.9 percent to 2.6 percent by 2015 and to 1.8 percent per year by 2030 (Energy Information Administration, 2006).

¹ Note: The projections of global economic growth can be undone by potential brakes on the global economy, such as a sustained financial crisis or prolonged disruption of energy supplies. For more information, refer to the National Intelligence Council (2000).
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Total World

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| Market Exchange Rates         | 2.8 | 3.5 | 4.1 | 3.1 | 3.1 | 2.6 | 3.0 |

2.2 Growing Energy Demand

According to *International Energy Outlook 2006* (IEO2006), worldwide energy demand is projected to grow by nearly 50 percent over the next 30 years, driven by sustained global economic growth and population increases (Figure 1). By 2015, non-OECD countries will account for three-quarters of the increase in world energy use. Non-OECD energy use will surpass OECD energy use by 2015, and will exceed it by 34 percent in 2030. Overall, total world consumption of marketed energy is expected to grow from 421 quadrillion British thermal units (Btu) in 2003 to 563 quadrillion Btu in 2015 and then to 722 quadrillion Btu in 2030, or a 71 percent increase over the 2003 to 2030 period.

![Figure 1. World Marketed Energy Consumption, 1980-2030](image)


Projected world marketed energy consumption by fuel type over the next two-and-a-half decades will look as follows (Figure 2):

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Box 1. Greater Energy Efficiency

The global economy is also expected to become more energy efficient. The efficiency gains will come from:

- Both traditional industries and transportation
- Growth of knowledge and service fields, which are less energy intensive
- More efficient energy production as a result of technological applications (particularly in deep-water exploration and production).

Oil sands production is expected to reach about 2.8 million barrels per day by 2017 (or approximately 1 billion barrels per year), providing revenue in the order of US$40 billion per year. The value of net crude exports, mainly to the United States, is expected to more than double by 2020.

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For more information on world energy trends, refer to *International Energy Outlook 2006*. 

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1. For more information on world energy trends, refer to *International Energy Outlook 2006*. 

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Furthermore, given the dependence of Calgary’s economy on oil and gas, fluctuations in their prices are likely to affect the city’s economic development. While oil prices are difficult to predict, projections for world oil prices by International Energy Outlook were much higher in 2006 than in 2005 (Figure 3), which will serve well for Calgary’s long-term economic development.5

![Figure 3. Comparison of IEO2005 and IEO2006 World Oil Price Projections, 1980-2030](image)


Nevertheless, there are also a few challenges associated with global energy supplies. First, while oil prices are generally predicted to remain high (unless Saudi Arabia builds their buffer capacity or becomes a target of a major terrorist attack), their volatility can affect revenues and profits and thus the sustainability of economic development (Canada West Foundation, 2006). Second, oil sands production can have negative cumulative environmental effects, thus forcing governments to introduce tighter regulations that may limit energy production growth. Third, attracting and retaining skilled labour is a growing challenge that is likely to intensify further over the next decades in light of growing competition for “talent” between companies, cities and even countries. Fourth, there are challenges associated with the extraction of natural gas. According to the Conference Board of Canada (2005), natural gas extraction that is geologically associated with bitumen also affects the extraction of bitumen itself, producing complicated disputes between gas and bitumen owners and making gas extraction more expensive than that of oil. Finally, oil and gas are non-renewable sources of energy, which pose sustainability issues for economies heavily reliant on energy resources as a

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5 For more information, see Canadian Energy Research Institute (2005), Potential Effects of Energy MegaTrends on the City of Calgary: A Long Term View, prepared for the City of Calgary.
main source of revenue. These challenges may require the city and the province to consider a more balanced approach to economic development and growth over the next few decades. For more information on the implications of the growing energy demand and associated opportunities and challenges for Calgary, see Part 3 of this report.

### 2.3 Growth of International Trade, Investment and Labour Mobility

International trade flows, like energy trends, are projected to continue growing in the next decade, contributing to increases in world GDP and making countries deeply dependent on international trade and financial markets (Figure 4). This projection is partially based on the continuing expansion of economic regions around the globe. For instance, in 2005, according to the International Monetary Fund (IMF), the United States economy grew by 3.5 percent; Europe, by 1.7 percent; and Asia (excluding Japan) expanded by 8.2 percent. World trade volumes also grew by 7.3 percent, a rate higher than the 20-year average of 6.3 percent.

![Figure 4. Growth in World GDP and World Trade Volumes, 2000-2005](image)

**Figure 4. Growth in World GDP and World Trade Volumes, 2000-2005**

In Canada, international trade is expected to remain an important component of the economy. In the last fifteen years, the country has already experienced growth in international exports and imports as a fraction of GDP. For instance, international exports have grown from 21 percent of GDP in 1981 to 41 percent in 2002 and international imports have grown from 22 percent to 36 percent.

Alberta has also experienced a rapid rise in international trade. In 2005, Alberta exported $86.9 billion worth of goods and services to 191 countries, marking an increase of 16.7 percent from 2004 (Figure 5). Exports of commodities increased by 18.5 percent to $79.2 billion in 2005 from $66.8 billion in 2004 (Alberta Economic Development, 2006). Alberta’s export boom, according to Alberta Economic Development (2006), was driven mainly by the energy sector, due to historic highs in oil and natural gas prices in 2005. Higher energy prices were a result of the combined effects of hurricanes Katrina and Rita, political uncertainty in key oil-producing countries, and the global economic boom (Alberta Economic Development, 2006).
Consequently, the energy sector accounted for more than 90.9 percent of the 2005 gain in goods exports in Alberta. Overall, the mining and energy sector accounted for the majority of exports at $57.0 billion, followed by the manufacturing sector at $19.5 billion and primary agriculture at $2.0 billion (Figure 6). Growth in manufacturing sector exports was mainly due to energy-related products, such as chemicals, petroleum and coal products, as well as oil and gas field machinery. Hence, predicted growing energy demands and overall global economic growth are likely to contribute to further expansion of international trade in Alberta.

Box 3. Global Competition

According to the IMF’s World Economic Outlooks, the growth rate of developing countries as a group is faster than the OECD economies by two to three percentage points. The economies of breakout candidates, China and India, already comprise roughly one-sixth of global GDP (National Intelligence Council, 2000). By 2010, it is expected that the Asian middle class will embrace 750 million individuals, thus making a shift in the distribution of world markets. This shift is expected to significantly affect OECD countries and their cities in a variety of ways, including increased competition for international funds to develop urban infrastructures in the expanding cities.

Moreover, since the introduction of the Free Trade Agreement (FTA) in 1989, Canada and Alberta have become increasingly dependent on exporting goods and services to the United States. In 2004, 85 percent of Canadian exports went to the United States, marking an increase of 10 percentage points from 1990.6 Similarly, for Alberta, North America (mostly the United States and Mexico) accounted for 90.8 percent of total commodity exports in 2005 (Bradford, 2005; Andrew, Graham and Phillips, 2002).7 Thus, given Alberta’s dependence on the United States markets, the projected United States economic recovery in the next few years (after a possible slowdown this and next year) will bode well for overall economic growth in Alberta and Calgary in the next few decades (TD Economics, Provincial Economic Forecast, 2006).

The traditional model of trade that has generally involved physical goods with high domestic content, sold between buyers and sellers in different countries, is being reshaped by greater international competition for capital, technology and markets (Conference Board of Canada, 2005). Today, different product components are increasingly produced separately from each other, in locations offering better quality and pricing. This has resulted in the development of global products, distributed through a global supply chain, especially in manufacturing, telecommunications, aerospace, ground, transportation and the automotive industry (Conference Board of Canada, 2005). This process has been facilitated by the rise of emerging markets, such as China and India (Figure 7), which offer investors not only low labour costs, but also a growing technical workforce and improving infrastructure (OECD, 2001). Moreover, significantly increasing literacy rates in emerging economies and the growth of global telecommunications will increasingly allow those countries to attract a growing number of labour-intensive data-processing operations (such as credit transactions and airline ticketing) (Lever, 2002). While there are no data available to illustrate the impact of this emerging trend on Calgary, it is most likely to grow over the next decades as Calgary faces increasing competition with other cities and regions, thus posing real labour market challenges for low- and increasingly, higher-skilled workers.

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6 For more information on international trade in Canada and worldwide, see Conference Board of Canada (2005).
7 For more information on international trade in Canada and worldwide, see Conference Board of Canada (2005).
International financial flows have, in turn, grown even more dramatically than trade in the past decades and will remain abundant over the next decades. Companies across the world are increasingly using foreign direct investments (FDI) to build global supply chains. The accumulated stock of global FDI attained a level of US$8.2 trillion by 2003, which is nearly triple the global FDIs in the 1990s (Conference Board of Canada, 2005). There is a growing tendency to see international trade and investment as parts of an integrated system, particularly with the development of global supply chains. In Canada, companies have also become increasingly reliant on both inward and outward FDI. According to the Conference Board of Canada’s 2005 report, *World Economy and Canada*, in 1990, Canada’s inbound FDI stock represented 19 percent of nominal GDP; by 2004, the share had increased to 28 percent. Over the same period, outbound FDI stock grew from 14 to 34 percent of GDP (Conference Board of Canada, 2005).

Alberta, in turn, accounted for a large share of foreign investment in Canada. Of the $40 billion of annual foreign investment during 2000-04, about 61 percent was invested in Ontario and Alberta (Figure 8). Alberta also had a relatively high dependence upon foreign investment during the period 2000-04. Foreign firms accounted for 27 percent of total capital investment, which is slightly higher than the national average of 26 percent. In Alberta, the most notable feature is how much foreign investment is attributable to one sector – the mining, oil and gas industry (almost 70 percent) (Figure 9). Growth of the mining and energy sector in the next few decades is likely to continue attracting an increasing flow of foreign investments to Alberta and Calgary as the engine of Alberta’s economy. At the same time, volatility of energy prices and the non-renewable nature of energy resources in Alberta, combined with growing a “global supply chain,” may pose increasing pressures to rethink Calgary, and Alberta’s, foreign investment strategy and focus on diversifying foreign investment flows. For more information, refer to the next section of the report.
Finally, implicit in the idea of global economic integration is the increasing international mobility of labour and competition for “talent,” which is becoming a particularly pressing issue in light of demographic changes worldwide. The OECD data (Table 2) show that the international flows of highly skilled labour, with a broad range of educational and occupational backgrounds, such as university students, IT specialists, researchers, business executives and managers, are significant (OECD, 2002b). Skilled workers are moving mainly from Asia to the United States, Canada, Australia and the United Kingdom. There are also significant increases in domestic and international mobility among the younger, better-educated segments of the population in developed countries. For instance, European scientists and engineers significantly increased their geographical mobility in the mid- to late-1990s (nearly a third of under-25s and over a quarter of senior managers would like to move to another country in the next few years) (Cannon, Nathan and Westwood, 2003; Cooke, 2001).
### Table 2. Inflows of Foreign Highly Skilled Workers and Share of Asian People among Them

<table>
<thead>
<tr>
<th>Country</th>
<th>Permanent workers</th>
<th>Temporary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australia (1999-2000)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>35.3</td>
<td>30.0</td>
</tr>
<tr>
<td>As a % of total permanent labour migration</td>
<td>77.4(^1)</td>
<td>-</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled</td>
<td>-</td>
<td>27.8</td>
</tr>
<tr>
<td><strong>Canada (2000)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>52.1</td>
<td>96.2</td>
</tr>
<tr>
<td>As a % of total immigrants who intend to work</td>
<td>49.2</td>
<td>-</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled</td>
<td>58.4</td>
<td>-</td>
</tr>
<tr>
<td><strong>France (1999)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers(^2)</td>
<td>-</td>
<td>5.3</td>
</tr>
<tr>
<td>As a % of total labour temporary migration</td>
<td>-</td>
<td>48.3</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled</td>
<td>-</td>
<td>14.4</td>
</tr>
<tr>
<td><strong>Germany (2000-2001)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>-</td>
<td>9.6</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled (India/Pakistan)</td>
<td>-</td>
<td>21.8</td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>-</td>
<td>129.9</td>
</tr>
<tr>
<td>As a % of total labour temporary migration</td>
<td>-</td>
<td>70.6</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled (China/Philippines)</td>
<td>-</td>
<td>53.2</td>
</tr>
<tr>
<td><strong>United Kingdom (2000)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>-</td>
<td>39.1</td>
</tr>
<tr>
<td>As a % of total labour temporary migration</td>
<td>-</td>
<td>60.6</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled (India/Philippines/China/Malaysia)</td>
<td>-</td>
<td>29.8</td>
</tr>
<tr>
<td><strong>United States (1999)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflows in thousands of highly skilled foreign workers</td>
<td>24.1</td>
<td>370.7</td>
</tr>
<tr>
<td>As a % of total labour permanent or temporary migration</td>
<td>46.0 (1998)</td>
<td>46.3</td>
</tr>
<tr>
<td>% of Asian workers among the highly skilled</td>
<td>46.4 (1998)</td>
<td>36.9</td>
</tr>
</tbody>
</table>

**Notes:**

- a) All immigrant workers to European countries mentioned above and to Japan are recruited on a temporary basis;
- b) Intracompany transferees are not included.
- c) All data relate to specific programs dedicated to highly skilled workers except for France and the United Kingdom for which highly skilled are those engaged in occupations classified as manager or professional.

2. Including permits for more than one year, generally classified as “permanent workers.”

**Source:** *Trends in International Migration, OECD (2001).*
The increased mobility of labour partially reflects the growing competition between countries, cities and companies for highly skilled labour (or “talent” as often referred to in managerial circles). According to a “survey of talent” conducted by the Economist magazine in October 2006, battles for talent are taking place – “not just among companies (which are competing for ‘human resources’) but also among countries (which fret about the ‘balance of brains’ as well as the ‘balance of power’)” (Economist, 2006). The Economist notes “the value of “intangible” assets – everything from skilled workers to patents to know-how – has ballooned from 20 percent of the value of companies in the S&P 500 to 70% today” (Economist, 2006). These trends, according to Richard Florida (2001), reflect changes in industrial structure and growth of a “knowledge economy” sector (including smaller, high tech industry, consulting and media) and a massive service sector geared mainly around lifestyle (Florida, 2001a; Cannon et al., 2003).

The competition for skilled workers is also being intensified by recent attempts by emerging economies to retain and return their emigrated “best and brightest,” as these countries realize that the increasing outflow of skilled workers led to acute skills shortages, particularly at the more sophisticated end of their economies. For instance, wage inflation in Bangalore, India’s software capital, is close to 20 percent, and job turnover is 40 percent (Economist, 2006). To woo back their highly skilled diasporas, the Chinese government has introduced a range of enticements, from bigger apartments to access to the best schools, and generous fellowships for expats—the “hundred talents programme.” These programs appear to have been relatively successful in attracting back some of the diaspora to China (Figure 10). Similarly, in India in 2001-04 some 25,000 Indian technical specialists returned home, and the number is rising rapidly (NASSCOM, 2001 as quoted in Economist, 2006). According to the Economist (2006), China (and perhaps India) are “going in the same direction as South Korea and Taiwan – first tempting back the diaspora and then beginning to compete for global talent (Economist, 2006).”

**Figure 10. Your Country Needs You**

![Figure 10](image-url)

**Box 5. Immigration and China**

In June of 2006, just 19,826 immigrant applications were processed at Canada’s mission in Beijing, compared with 37,124 in July of 2004. The number of applicants from Hong Kong is also “in free fall,” decreasing to 32,752 in June of this year from 47,260 in July of 2004.

*Source: Globe and Mail (Oct.19, 2006).*

Indeed, most recent immigration statistics in Canada reveal a steep decline in the number of Chinese immigrants (2006), mainly representing the economic class of immigrants (Box 5) (Globe and Mail, 2006). While it is difficult to interpret these statistics yet, what is clear is that global competition for skilled labour is going to grow. It will be driven by both developed countries,
including Canada, which are relying heavily on immigration to manage looming generational shifts in the next decades and emerging economies, which, in turn, increasingly realize that in order to plug into the “global knowledge economy,” efforts should be made to retain their human capital (Economist, 2006).

This trend creates significant challenges for Calgary in attracting and retaining skilled workers and is expected to become even more important in the next decades, as Calgary encounters economic growth demands and aging of the population. While Calgary’s population is slightly younger than the rest of Canada (Cooper, 2006), population aging is becoming an increasingly pressing issue for the city. The next 30 years will see a rise in the percentage of adults, aged 45 to 64 years, from 23 percent in 2006 to 28 percent in 2033 (for a total of 126,000 additional people); and in the percentage of adults over 65 years old – from 9.8 percent in 2006 to 15.4 percent in 2033 (a total of 94,000 additional seniors) (City of Calgary, 2003). As such, population and economic growth will become more heavily dependent on immigration (Table 3) (City of Calgary, 2003). According to Citizenship and Immigration Canada, “immigration will likely account for all net labour force growth by 2011, and projections indicate it will account for total population growth by 2031” (Citizenship and Immigration Canada, 2001).

Table 3. Projected Immigrant Population by Age, Calgary

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>11,699</td>
<td>12,347</td>
<td>13,348</td>
<td>13,930</td>
<td>14,361</td>
<td>14,745</td>
</tr>
<tr>
<td>15-24</td>
<td>17,412</td>
<td>19,661</td>
<td>22,509</td>
<td>23,368</td>
<td>24,607</td>
<td>25,450</td>
</tr>
<tr>
<td>25-64</td>
<td>121,366</td>
<td>136,337</td>
<td>147,861</td>
<td>161,576</td>
<td>173,596</td>
<td>184,135</td>
</tr>
<tr>
<td>65+</td>
<td>28,538</td>
<td>31,097</td>
<td>35,076</td>
<td>38,172</td>
<td>41,629</td>
<td>45,700</td>
</tr>
<tr>
<td>Total</td>
<td>179,006</td>
<td>199,442</td>
<td>218,793</td>
<td>237,045</td>
<td>254,193</td>
<td>270,030</td>
</tr>
</tbody>
</table>

Projected Immigrant Population as Percentage of Total Population by Age

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>7.0%</td>
<td>7.1%</td>
<td>7.1%</td>
<td>6.9%</td>
<td>7.1%</td>
<td>7.4%</td>
</tr>
<tr>
<td>15-24</td>
<td>12.6%</td>
<td>13.6%</td>
<td>16.9%</td>
<td>18.8%</td>
<td>17.0%</td>
<td>16.4%</td>
</tr>
<tr>
<td>25-64</td>
<td>24.8%</td>
<td>24.7%</td>
<td>24.6%</td>
<td>25.8%</td>
<td>26.8%</td>
<td>27.5%</td>
</tr>
<tr>
<td>65+</td>
<td>34.4%</td>
<td>32.7%</td>
<td>34.1%</td>
<td>32.3%</td>
<td>29.7%</td>
<td>27.9%</td>
</tr>
<tr>
<td>Total</td>
<td>20.4%</td>
<td>20.7%</td>
<td>21.3%</td>
<td>22.2%</td>
<td>22.4%</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

According to the Employment Equity Act (1986), visible minorities are “persons (other than Aboriginal persons), who are non-Caucasian in race or non-white in color” (Statistics Canada, 1997).

Source: City of Calgary (2003).

In order to achieve projected immigration growth, however, Calgary needs to become as attractive as possible to those highly mobile and sought after migrants, both nationally and internationally. A range of factors can determine a city’s attractiveness. For instance, as noted by OECD, “the most attractive locations are those with a fully developed information and communications infrastructure, favourable production structures, supply networks, expanding high tech markets, cutting edge research and a qualified and adaptable labour force” (OECD, 1997). But it is not just the economic side of life that is important. Gertler (2004) argues that “strong, vibrant
neighbourhoods whose character and street life are often defined in culturally distinctive and novel ways” are also important in determining a city’s attractiveness (Gertler, 2004). Attractive physical and natural environments are central to city “livability” and can, in turn, generate investments and jobs, thus boosting economic performance through direct and indirect multiplier effects (Florida, 2002). Moreover, quality of place and community characteristics promoting strong social cohesion, such as access to employment and social services as well as relative freedom from social deprivation, are also important factors in attracting and retaining skilled labour to the city (Gertler, 2004).

Thus, overall, the growing international mobility of production, goods, financial flows and labour will have important implications for Calgary. Deepening international interdependence and reduced trade barriers pose greater competitive challenges for the city in the decades to come. Calgary will have to compete for attracting international capital, production and skilled workers with other Canadian cities, such as Vancouver or Toronto, and increasingly internationally, with such cities as Houston and Shanghai. While growing world energy demand will likely continue driving Calgary’s economic growth, projected labour shortages, the volatility of oil and gas prices as well as the need for sustainable development will require more multi-faceted and nuanced strategies to succeed in the global economy. For a more detailed analysis of the implications of global economic trends for Calgary, refer to the next section of this report.

2.4 Global Localization

There is a significant amount of research evidence that the most substantial impacts of economic globalization are experienced at the local level. Cities are increasingly recognized as embodying and reflecting global economic trends due to their strategic linkage functions in integrating national economies into the global economy (Short and Yeong-Hyun, 1999: 9). Cities are now seen as the places where globalization’s most important flows intersect: flows of people, flows of capital, and flows of ideas (Gertler, 2001 as quoted in Bradford, 2005). A number of scholars refer to the growing importance of cities in an increasingly globalized world as “global localization,” where the skills and influences on innovation rates across the globe are predominantly local (Porter, 1998). “Global localization” implies increased competition between cities for mobile investments, including high tech industries, employment, finance, institutions, and tourism (Short and Yeong-Hyun, 1999). To maintain their competitiveness, cities will need to develop more proactive strategies to participate in the international arena. Cities are facing increasing pressure to be global players in addressing a complex set of increasingly interrelated issues such as “aid and development, social and environmental sustainability, sustainable economic development, peace, and good democratic governance” (Conference Board of Canada, 2005). While Calgary has been and continues to be an innovative city and an important player in the international arena, there is a need for a comprehensive approach to enhance Calgary’s visibility, engagement and competitiveness among other world cities. Moreover, it is important to respond to the principles of globalization and localization and address issues of sustainability, diversity, and responsibility. To do this, Calgary requires investments in both balanced economic growth and improved governance.
In addition, as part of “global localization” processes, Canada has seen major policy realignments among governments in the past years, with significant responsibilities being transferred to municipalities (Bradford, 2005; Andrew, Graham and Phillips, 2002). Bradford (2005) argues that such shifting urban landscapes in Canada can be characterized by three major themes:

- The increasing role of cities as the engines of national economic prosperity and as major centers of innovation and as service sector hubs, such as knowledge-intensive business, financial and professional services;
- Growing poverty and polarization in the cities, accompanied by spatial concentration of these problems; and
- A widening gap between growing and stagnant or declining cities, with large cities facing challenges in managing rapid growth and population diversity and many smaller communities confronting population and employment decline (Bradford, 2005; Andrew, Graham and Phillips, 2002).

These characteristics of urbanization processes in Canada pose increasing challenges for Canadian cities to respond to major public policy issues such as growing spatially-concentrated poverty and widening inequality, along with other risks associated with intensive economic growth, such as insufficient affordable housing, traffic congestion and lowered air quality. If left unaddressed, implications may “reach well beyond the boundaries of the locality and the powers of municipal authorities. Lost human capital, increased social tensions, and foregone economic opportunity will take their toll on the overall quality of life of the provinces and all of Canada” (Bradford, 2005: 13).

2.5 Technology, Innovation and a Knowledge Economy

New information technologies and low-cost telecommunications have already allowed for a dramatic increase in the rapidity and density of communication and have led to breakthrough changes in business practices and in society itself. Technology has substantially reduced transactions costs, making it far more cost-effective for business and other actors to expand their reach across the globe. While the economic effects of this immense flow of information are yet to be understood by analysts, what is clear is that knowledge has become a more important production factor than labour, raw materials or capital.

Looking ahead to the next three decades, the world will encounter more quantum leaps and the continuing diffusion of information technology will accelerate the speed of change even more. Calgary, along with other cities, will face ongoing challenges to increasing innovation, reducing costs and working more flexibly. Information technology will continue opening up a wide range of new governance techniques such as enabling citizens to have on-line access to municipal information, administrative processes and documents, new voting procedures, and a wide range of applications to city planning (Conference Board of Canada, 2005). The city will need to ensure it can enhance democratic knowledge management and design new service delivery methodologies, adequate infrastructure, and develop appropriate regulatory policies. High educational levels in the workforce will be the key to success in the new economy.8

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8 For more information on the impact of technology and knowledge-based economy on cities, refer to Graham and Marvin (1996); Atkinson (1998); and OECD (2006; 2004; 2001).
3. Projected Impacts: Challenges and Opportunities

Key Findings

- While economic globalization, growing energy demand and international trade are expected to generate stable economic growth in Calgary, these trends have a much broader range of impacts on Calgary’s sustainability indicators, including a widening economic divide.

- Calgary has already outpaced all Canadian cities in economic growth by a wide margin in the past few years. The oil and gas sector and soaring energy prices are clearly responsible for much of Calgary and Alberta’s fast economic growth. This trend is expected to continue over the next decades, though to a lesser degree. Calgary’s GDP annual growth is expected to decline to 1.4 percent by the year 2033.

- Investments in the energy sector have already contributed to the growth of other industries, such as manufacturing, construction, transportation and warehousing, and information, culture and recreation, and are expected to continue this trend over the next decades.

- Economic growth over the next 30 years is expected to generate an increase in employment in Calgary from 498,000 in 2001 to 705,000 in 2033. The rate of employment growth however is expected to decline through the forecast period from a rate of 3.6 percent in 2001 to 0.5 percent in 2033. The decline will be largely driven by the aging population in North America.

- The Calgary labour market has currently reached nearly full employment (with the unemployment rate at 3.5 percent and, according to some estimates, is likely to become even tighter (2.9 percent) over the next decades. Calgary’s ability to compete globally will depend mainly on its ability to attract and integrate skilled economic labour, including immigrants and foreign workers.

- In 2003, poverty rates in Calgary increased for the second consecutive year, following five years of decline, rising to 17 percent (compared to 13.7 percent in 2002 and 13.1 percent in 2001).

- The emergence of new financial districts and luxurious residential areas is accompanied by an increasing socio-economic separation of citizens living in highly segregated neighborhoods.

- While economic growth produces numerous benefits for Calgarians, unsustainable growth may involve noticeable health costs. Health costs arise from a number of factors such as sprawl, poor environmental conditions, and growing poverty.

- Over the next three decades, the share of immigrants, visible minorities and Aboriginal persons is projected to increase. Calgary will face increasing pressures to ensure the integration of these population groups.

- In order to accommodate population growth in the next decades, the city will require extensive and costly infrastructure development. Infrastructure costs will mainly be associated with constructing and maintaining systems for transportation (roads, public transit, paths), water (sewer, storm, fresh water), sewage and solid waste, electricity, and natural gas.

- Housing in Calgary will also likely remain an important issue in the next three decades. In particular, the city will be pressured to address the shortages of affordable housing, given the high ratio of low-income households.

- Calgary is already experiencing low-density automobile-dependent development (often referred to as “sprawl”). The city will be increasingly challenged to develop strategies to reduce automobile dependency, such as significant enhancements to its transit system.
Key Findings (Continued)

- With the International Airport, Calgary has the far-reaching potential of becoming a new type of international city. In order to build on this success even further, it will be important to maintain the existing airport infrastructure and ensure capacity for airport expansion over the next decades.

- Unimpeded and resource-rich growth as well as urbanization processes have a strong potential to threaten Calgary’s natural resources, environmental sustainability and biological diversity. Thus Calgary needs to develop a complex set of measures to address environmental threats arising from use of oil and gas products as well as automobile-dependent geographic expansion.

- Governance implications related to global economy trends range from the need for greater transparency, efficiency and flexibility, and increased participation of a multiplicity of stakeholders in the local decision-making process to the need to address increasingly complex issues faced by cities in coherent, inclusive and sustainable ways.

While economic globalization, growing energy demand and international trade are expected to generate stable economic growth in Calgary, these trends have a much broader range of impacts on Calgary’s sustainability indicators, including a widening economic divide. This section of the report aims to account for potential impacts of global economic trends on Calgary and identify possible strategies the city may consider to meet the challenges associated with international integration and pressures for continuous growth while retaining the city’s lively and inclusive nature.

3.1 Economic Development

3.1.1. Globalization, Growing Energy Demand and Calgary’s Economy

According to the Conference Board of Canada (2006), Calgary has already outpaced all Canadian cities in economic growth by a wide margin in the past few years (Figure 11). The oil and gas sector and soaring energy prices are clearly responsible for much of Calgary and Alberta’s fast economic growth. According to the Petroleum Services Association of Canada, the year 2006 will see a drilling record of 20,000 wells in Alberta. High crude oil prices (US$60-$68/barrel) allowed for major investments in drilling and oil sands, including mining projects, upgraders and refineries (Box 6). Prices are predicted to remain relatively strong due to an anticipated increase in global demand for oil, lack of spare capacity and low inventory levels in the OECD countries (City of Calgary, 2005b).

Box 6. Energy Projects

The latest estimates show that about $20.7 billion worth of energy-related projects are now underway in the province. In addition, more than $66 billion worth of oil and gas projects have been proposed for the future. Therefore, the province’s energy output outlook is bright over the entire forecast period. This is good news for Calgary’s economy, which remains the service hub of the province’s energy sector.

Source: Conference Board of Canada (2006).
These trends, driven by projected growing energy demands combined with low provincial tax rates, are expected to drive Calgary’s strong economic performance over the next decades, though to a lesser degree (City of Calgary, 2005b; Canadian Energy Research Institute, 2005). While remaining strong throughout the first decade (Table 4), Calgary’s GDP annual growth rate is expected to decline to 1.4 percent by the year 2033, although incomes are still expected to increase (City of Calgary, 2003). The decline will likely be largely due to a relatively tight labour market that restricts increased production and consumer spending and is largely due to an increased dependency on government pension plans and health services.

Table 4. Economic Indicators

<table>
<thead>
<tr>
<th>Economic Indicator</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP at basic prices (1997 $ millions)</td>
<td>43,070</td>
<td>44,690</td>
<td>46,628</td>
<td>48,487</td>
<td>50,215</td>
<td>52,025</td>
<td>53,871</td>
<td>55,745</td>
</tr>
<tr>
<td>Percentage change</td>
<td>2</td>
<td>3.8</td>
<td>4.3</td>
<td>4.0</td>
<td>3.6</td>
<td>3.6</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Total employment (000s)</td>
<td>583</td>
<td>598</td>
<td>606</td>
<td>616</td>
<td>628</td>
<td>642</td>
<td>654</td>
<td>666</td>
</tr>
<tr>
<td>Percentage change</td>
<td>1.9</td>
<td>2.5</td>
<td>1.2</td>
<td>1.7</td>
<td>2</td>
<td>2.1</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>5.4</td>
<td>5</td>
<td>3.9</td>
<td>4.2</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
<td>4.2</td>
</tr>
<tr>
<td>Personal income ($ millions)</td>
<td>39,157</td>
<td>41,173</td>
<td>43,049</td>
<td>45,481</td>
<td>47,784</td>
<td>50,190</td>
<td>52,632</td>
<td>55,080</td>
</tr>
<tr>
<td>Percentage change</td>
<td>1.8</td>
<td>1.9</td>
<td>2.1</td>
<td>2</td>
<td>1.7</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Total housing starts (000s)</td>
<td>13.6</td>
<td>14</td>
<td>13.7</td>
<td>13</td>
<td>11.7</td>
<td>10.8</td>
<td>10.1</td>
<td>10</td>
</tr>
<tr>
<td>Retail sales ($ millions)</td>
<td>14,002</td>
<td>15,231</td>
<td>16,752</td>
<td>17,904</td>
<td>18,748</td>
<td>19,677</td>
<td>20,607</td>
<td>21,614</td>
</tr>
<tr>
<td>Percentage change</td>
<td>3.9</td>
<td>8.8</td>
<td>10</td>
<td>6.9</td>
<td>4.7</td>
<td>5</td>
<td>4.7</td>
<td>4.9</td>
</tr>
<tr>
<td>CPI (percentage change)</td>
<td>3.5</td>
<td>1.7</td>
<td>2</td>
<td>2.5</td>
<td>2.3</td>
<td>2.1</td>
<td>2.3</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Conference Board of Canada (2006).
Furthermore, investments in the energy sector will also contribute to the growth of other industries. For instance, manufacturing activity in Calgary continues to be on the rise (a 12 percent increase in 2005, compared to 3 percent at the national level) (Table 5). At the same time, the detailed analysis of manufacturing activity by sector conducted by the Conference Board of Canada (2005) revealed that over 40 percent of the value of manufacturing shipments is found in the energy related sectors: refined petroleum products, chemical production, and plastics. Other manufacturing categories such as machinery and fabricated metals are also heavily dependent upon activity in the energy sector. Looking forward to the next decades, manufacturing should continue to expand, albeit at a much more moderate pace. The increase will be largely due to the growth in refined petroleum product manufacturing and other energy-related products (Canada West Foundation, 2006).

Table 5. Real GDP by Industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>1995 1997 Dollars (000,000s)</th>
<th>2005 1997 Dollars (000,000s)</th>
<th>Growth (1995-2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>230</td>
<td>256</td>
<td>11.40%</td>
</tr>
<tr>
<td>Oil and gas and mining</td>
<td>8,663</td>
<td>6,936</td>
<td>-19.90%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>3,034</td>
<td>5,166</td>
<td>70.30%</td>
</tr>
<tr>
<td>Construction</td>
<td>2,000</td>
<td>4,092</td>
<td>104.50%</td>
</tr>
<tr>
<td>Utilities</td>
<td>751</td>
<td>805</td>
<td>7.10%</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>2,602</td>
<td>5,523</td>
<td>112.20%</td>
</tr>
<tr>
<td>Retail trade</td>
<td>1,354</td>
<td>2,721</td>
<td>101.00%</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>1,274</td>
<td>2,771</td>
<td>117.50%</td>
</tr>
<tr>
<td>Finance, insurance, real estate and leasing</td>
<td>5,895</td>
<td>10,320</td>
<td>75.10%</td>
</tr>
<tr>
<td>Professional, scientific and technical services</td>
<td>1,332</td>
<td>3,134</td>
<td>135.40%</td>
</tr>
<tr>
<td>Accommodation and food services</td>
<td>641</td>
<td>902</td>
<td>40.80%</td>
</tr>
<tr>
<td>Educational services</td>
<td>1,170</td>
<td>1,810</td>
<td>54.70%</td>
</tr>
<tr>
<td>Health care and social assistance</td>
<td>1,449</td>
<td>2,119</td>
<td>46.20%</td>
</tr>
<tr>
<td>Other services</td>
<td>560</td>
<td>901</td>
<td>60.90%</td>
</tr>
<tr>
<td>Public administration</td>
<td>1,140</td>
<td>1,478</td>
<td>29.60%</td>
</tr>
<tr>
<td>All industries</td>
<td>33,414</td>
<td>51,447</td>
<td>54.00%</td>
</tr>
</tbody>
</table>

Source: City of Calgary, Corporate Economics (2005).

In addition, over the past 10 years, Calgary has already experienced significant growth in a variety of other sectors, including the business and financial services sector (Figure 12). For instance, Calgary has seen more than 25 percent growth in head offices over the past five years (2001-05) and now enjoys the highest concentration of head office employment in Canada, increasing by 37.2 percent between 2001 and 2005. Moreover, according to Economic Development Calgary (2005), 99 Calgary-based companies are on the FP500 list, 10 are among the top 50 in Canada. Calgary also has the largest concentration of small businesses among Canadian cities on a per capita basis at 35.9 per 1,000 population (Calgary Economic Development, n.d.).
The overall growth is also likely to continue in population-driven sectors, such as construction, transportation and warehousing, and information, culture and recreation (City of Calgary, 2003). Thus Calgary has already experienced the highest growth in retail sales at 8.1 percent, is among the top Canadian cities in total building permit growth, at 69.8 percent, and has the highest total growth in non-residential building permits, at 90.4 percent, over the past five years (2001-05). Total output in the construction sector increased by 12.2 percent in 2005 (combining both residential and non-residential sectors) (Conference Board of Canada, 2006). In the next decade however, according to the projections of the City of Calgary, the total value of building permits should decline from $2.4 billion in 2003 to between $1.5 and $2.2 billion annually by 2014. This decline is predicted to be a result of slower growth in employment and population and thus reduced requirements for new residential and non-residential space (City of Calgary, 2005b). An aging population is also expected to induce higher than average growth in health care and leisure-based services (City of Calgary, 2003). Growth is also projected in professional, scientific and technical services as a result of spinoffs from the energy sector and in the retail and wholesale trade sector as a reflection of expectations of rising wages and incomes (City of Calgary, 2003; Conference Board of Canada, 2006b).

Source: Calgary Economic Development (n.d.).
The booming economy in Calgary has also been responsible for increasing employment across most economic sectors, including the professional and service sectors. For instance, as evident in Figure 13, the service sector continued to employ the highest number of workers in 2003. Over the next four years, oil and gas, manufacturing, transportation and logistics as well as financial and business services are expected to be the top four growth sectors (City of Calgary, 2004). Importantly, employment growth is taking place in both highly skilled job categories and in the service sector where jobs are often low skill, part-time, at a minimum wage and with a lack of access to benefits or opportunities for training, which in turn has the strong potential of contributing to the widening economic divide in Calgary, where many poor are “working poor.”

**Figure 13. Employment by Industry – Calgary Economic Region (2005)**

![Pie chart showing employment distribution across various sectors in the Calgary Economic Region.](image)

**Source:** Calgary Economic Development (n.d.).

Furthermore, Calgary will benefit from the economic recovery in the United States, expected to take place in the next few years (after a possible period of slow down in the short-term), and the growth of the Canadian and global economy. A growing global economy will provide expanded opportunities and markets for Calgary’s businesses. Low unemployment rates and high rates of average wages will continue attracting new skilled immigrants and other job seekers from the rest of Canada and internationally. A projected influx of skilled migrants is likely to result in positive net migration and offset some of the economic slowdown associated with an aging population. Moreover, a growing population will serve as a solid base for increased consumption.
of goods and services, thus further stimulating economic growth (City of Calgary, 2003; Conference Board of Canada, 2006b). As specified in the first section of this report, by 2015 a declining rate of population growth due to reduced net migration is likely to slow GDP and employment growth. This in turn may reduce demand for new residential and non-residential space, resulting in declining housing starts and a slowing of activity in the construction and service-oriented sectors in Calgary (City of Calgary, 2004).

Overall, however, Calgary’s economy is expected to continue experiencing growth over the next three decades. Yet, such a fortunate situation is not without challenges, which include high volatility of the revenue stream based on soaring energy prices and the non-renewable nature of such energy resources. For instance, over the past 25 years, annual average prices of oil fluctuated from below $20 to over $50 a barrel, thus making it difficult to predict the contribution of resource revenue to city/provincial revenue (Canada West Foundation, 2006). This revenue volatility comes from the unpredictability of energy markets (e.g. declining oil prices) and has a number of important implications not only for the financing of ongoing program responsibilities, which can lead to erratic public spending, but also for the sustainability of Calgary’s economy. Figures 14 and 15 illustrate the fluctuations in energy prices over the past years.

**Figure 14. Annual Average Price of West Texas Intermediate Crude (US$ per Barrel, 1946-2005 Plus First Three Months of 2006)**

![Chart showing annual average price of West Texas Intermediate Crude from 1946 to 2005, including the first three months of 2006.](source: www.economagic.com)
If the provincial and thus municipal (through transfer payments) governments’ reliance on energy resource revenue is relatively balanced, then a reconciliation of expenditures with a volatile revenue stream can be minimized. However, if this reliance has been growing in recent years, where program financing is more exposed to price volatility, then the sustainability of Calgary’s public programs and economy as a whole can be compromised.

Another major challenge, repeatedly voiced by the Canada West Foundation and others, relates to the fact that non-renewable resources are indeed non-renewable. As specified in Seizing Today and Tomorrow: An Investment Strategy for Alberta’s Future sponsored by the Canada West Foundation, “the extensive consultations carried out through the Investing Wisely Project identified two points of strong consensus:

- the use of resource revenue today must be considered in light of the inevitable decline of Alberta’s resource endowment tomorrow; and

- over time, the global economy will shift away from carbon-based energy sources” (Canada West Foundation, 2006).

The report stressed that while neither change is imminent (as Alberta has a vast endowment of hydrocarbon resources including natural gas, conventional oil, coal, coal bed methane and the oil sands and that the global shift away from carbon-based energy sources will be at best slow and halting), they are inevitable. This inevitability requires governments and other stakeholders to be prepared and continue strategic planning for the future.

Box 7. Sustaining Calgary’s Standard of Living

Over the long-run, the standard of living in the non-renewable resource economy will be determined by the productivity of the non-resource based sectors, investment income from assets external to the domestic economy, investment in the discovery and development of new resource supplies and the productivity of other regional economies that will draw labour away from the declining resource-based economy. This long-run reality is often ignored in the management of non-renewable resources. Over the short-run, consumption in an oil and gas economy exceeds the long-run sustainable level and declines as the income stream falls with the depletion of the resource base.

Source: Canada West Foundation (2006).
Furthermore, the *Seizing Today and Tomorrow* report indicates that:

it is not only the size of Alberta’s resource endowment that will change over time, the mix of energy sources brought to market will also change. Conventional oil and gas production will taper off while oil sands production will ramp up. This change in the energy mix has important implications for public finance. Although Alberta has massive energy reserves in the oil sands, the annual revenue stream derived from this source is not expected to be as high as that from conventional oil and gas. As Figure 14 illustrates, it is estimated that the oil sands will yield between $1.2 billion and $4.0 billion in annual royalties by 2015 (assuming either $30 US WTI or $50 US WTI). Natural gas, on the other hand, will generate about $9 billion in 2005/06 in royalties alone. Oil sands production is simply more costly, and therefore the royalty return to the province will be more modest (Gibbins and Roach, 2006).

Thus the combined effects of price volatility and non-renewable natural resources suggest the standard of living associated with the status quo may not be sustainable. This requires both the city and the provincial government to develop an investment strategy that ensures Calgary’s economic prosperity and high standard of living will be sustained irrespective of scenarios involving various mixes of energy supply, prices and sources. A long-term strategy should include a savings component (part of the value of currently generated economic rents from non-renewable sources of energy) as well as measures directed towards diversifying Calgary and Alberta’s economy in order to develop an alternative resource base or productive sector that will generate income beyond the life of the non-renewable resource base (Canada West Foundation, 2006).

There are possible strategies for building a more balanced economy that would help ensure sustainability and city and regional competitiveness over the long-term. For instance, while Calgary is already home to the second largest concentration of corporate head offices in the nation
(Calgary Homes Online, 2002), more can be done in terms of attracting international businesses and investments to the city. Beyond direct employment and the generated income, international firms would import technological expertise and assist in economic diversification and serve as a magnet to attract other business enterprises (both domestic and international), which becomes an increasingly important factor in a world of increased competition amongst cities.

In addition, cultivation of dynamic and inclusive artistic and cultural communities may also increase a city’s competitiveness nationally and internationally. Duxbury (2004) notes that to maintain competitiveness, it is important for cities “to remember their essential cultural foundations and the vital role of artists and other cultural resources in fostering broad-based individual creativity, economic vitality, and social innovation.”

Furthermore, in light of an increasingly knowledge-oriented economy across the globe, studies of urban competitiveness have also stressed the importance of the relationship between the quantity and quality of the urban knowledge base and the innovation-led economic performance of the city (Lever, 2002; Knight, 1995). Thus a United States study revealed that the relative growth of retail sales, manufacturing value added and business service receipts in the period 1977-92 was correlated with the engineering and research component of the labour force. University research programs, libraries and databases, research facilities unassociated with higher education and cultural institutions were identified as important factors in the generation of a knowledge-base. The study showcases Denver as a case of high competitiveness linked to both measures of research and knowledge, followed by San Francisco, San Diego and Boston. United States cities with poor levels of research and development, such as Milwaukee, Cleveland and St. Louis, demonstrated low competitiveness (Lever, 2002; Knight, 1995). While Calgary already has a solid knowledge base (see Box 8), further investments in R&D and other knowledge-generating programs and institutions can, in the long-run, serve well in sustaining Calgary’s economic growth.

**Box 8. Post-Secondary and Research Institutions in Calgary**

Some of the knowledge base of the City of Calgary includes:

- five post-secondary institutions located in the City of Calgary;
- two public post-secondary institutions located in the Calgary region but outside the City of Calgary;
- three institutions with satellite campuses in the City of Calgary but with main campuses located elsewhere in the province; and
- more than 30 independent research institutions

*Source:* Economic Development Calgary; University of Calgary.
3.1.2. The World Economy, Calgary Economic Growth and the Labour Market

Economic growth over the next 30 years is expected to generate an increase in employment in Calgary from 498,000 in 2001 to 705,000 in 2033 (City of Calgary, 2003). The rate of employment growth however is expected to decline through the forecast period from a rate of 3.6 percent in 2001 to 0.5 percent in 2033 (City of Calgary, 2003). The decline will be largely driven by the aging population in North America and is best observed when the employment forecast is separated into 10-year periods. Thus, according to the City of Calgary, while over the next decade employment growth is expected to average 1.7 percent annually in the Calgary economic region, it is likely to drop to 1.2 percent annually in the second decade and decline even further to 0.6 percent in the third decade (City of Calgary, 2003). The long-term projections of employment and labour force participation are presented in Table 6.

At the same time, the Calgary labour market has currently reached nearly full employment (with the unemployment rate at 3.5 percent (City of Calgary, 2003; Conference Board of Canada, 2006) and, according to some estimates, is likely to become even tighter (2.9 percent) over the next decades, driven by growing energy demands. Tight labour market conditions in both Calgary and Alberta, according to the Conference Board of Canada, may represent just the tip of the iceberg. The Conference Board of Canada estimates that by 2025, Alberta is expected to face a shortage of 332,000 workers. Moreover, a large gap between labour demand and supply is predicted to lead to further soaring wages, forcing companies to substitute capital investment for labour. Higher wages could make some projects very expensive, preventing them from taking place and thereby slowing growth. 9 While there are no data available for Calgary, it is safe to assume that the city would face similar challenges as the main engine of Alberta’s economy.

### Table 6. Employment and Labour Force Projections, City of Calgary

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Employment</td>
<td>498,000</td>
<td>557,000</td>
<td>596,000</td>
<td>624,000</td>
<td>657,000</td>
<td>681,000</td>
<td>698,000</td>
</tr>
<tr>
<td>Total Labour Force</td>
<td>525,000</td>
<td>584,000</td>
<td>618,000</td>
<td>634,000</td>
<td>667,000</td>
<td>698,000</td>
<td>715,000</td>
</tr>
<tr>
<td>Unemployment</td>
<td>25,000</td>
<td>25,000</td>
<td>28,000</td>
<td>21,000</td>
<td>19,000</td>
<td>25,000</td>
<td>26,000</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>4.0%</td>
<td>3.5%</td>
<td>3.7%</td>
<td>2.7%</td>
<td>2.3%</td>
<td>2.9%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Participation Rate</td>
<td>73.9%</td>
<td>73.8%</td>
<td>73.5%</td>
<td>72.1%</td>
<td>70.3%</td>
<td>69.0%</td>
<td>68.5%</td>
</tr>
</tbody>
</table>

Source: City of Calgary (2003).

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9 For more information, refer to Conference Board of Canada (2006b).
Furthermore, global economic restructuring will continue to increase inequalities in the existing labour market. A knowledge-based economy, requiring a labour force with an increasingly high educational level, and a growing tendency to outsource jobs with lower educational requirements to other countries will continue to limit employment opportunities for individuals with low educational levels, further contributing to income inequality.

While Calgary already has one of the most educated workforces in Canada, the city will have to continue to focus efforts on labour and workforce development, such as apprenticeship programs and investing in skills training. There is a need for local initiatives that help address both the needs of marginalized groups and promote economic growth. The initiatives may include, among others, partnerships between community colleges and employers, and sectoral training initiatives involving unions and voluntary organizations (Fitzgerald, 1998; Parker and Rogers, 2000; Wolf-Powers, 2001). Moreover, the future of Calgary (and Alberta’s) sustainability and competitiveness appear to depend largely on the ability of the city to maintain labour advantages and attract a skilled workforce, such as skilled immigrants through safe neighbourhoods, good schools or downtowns, and a growing, vibrant industry sector (Wolf-Powers, 2001). Efforts to attract a skilled workforce require collaboration with multiple stakeholders, including the provincial government, and should aim at improving the process of credentials recognition (both interprovincial and international) as well as implementing labour mobility agreements with other provinces (Conference Board of Canada, 2006b).

3.2. Social Development

3.2.1 Poverty

Despite strong economic growth, poverty and social exclusion remain important issues for Calgary (Ford, 2003). According to the City of Calgary, in 2003, poverty rates in Calgary increased for the second consecutive year, following five years of decline, rising to 17 percent (compared to 13.7 percent in 2002 and 13.1 percent in 2001). Thus in 2003, more than 160,000 Calgarians lived in poor households, marking a 25 percent increase from 2002, and a 27 percent increase over the previous five years. Moreover, according to the City report, in 2003, there were an estimated 43,000 children living in poor households. This number marks an increase in the child poverty rate, which rose to 20 percent, almost double the rate of 11 percent in 2000 (City of Calgary, 2005b).

<table>
<thead>
<tr>
<th>Box 9. Social Issues: Quick Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Persons Living in Low-Income Households, Calgary, 2003: 161,000</td>
</tr>
<tr>
<td>• Percentage of Population Living in Low-Income Households, Calgary, 2003: 17.2%</td>
</tr>
<tr>
<td>• Total Number of Food Hampers Distributed by the Calgary Inter-Faith Food Bank, Calgary, 2004: 44,497</td>
</tr>
<tr>
<td>• Total Number of People Receiving Assistance from the Calgary Inter-Faith Food Bank, Calgary, 2004: 44,598</td>
</tr>
<tr>
<td>• Income Support Recipients, Calgary, 2004: 12,177</td>
</tr>
<tr>
<td>• Assured Income for the Severely Handicapped (AISH) Recipients, Calgary, 2004: 11,018</td>
</tr>
<tr>
<td>• Guaranteed Income Supplement (GIS) Recipients, Calgary, 2004: 25,178</td>
</tr>
<tr>
<td>• Average Apartment Rent, Calgary, 2004: $716</td>
</tr>
<tr>
<td>• Apartment Vacancy Rate, Calgary, 2004: 4.3%</td>
</tr>
</tbody>
</table>

Source: City of Calgary (2005).
The various forms of urban poverty range from homelessness to food insecurity and relative deprivation and in many cases arise from an increasing polarization of the labour market and earnings inequality. Labour market inequalities are also reflected in the fact that a growing portion of Calgary’s poor are in fact “working poor.” As reported by the City of Calgary (2005), in 2003 there were 113,000 poor individuals who were not receiving any provincial or federal income support. The growing ratio of the working poor in Calgary can be seen as a reflection of the increasing divide between the high- and less-educated workforce, which is likely to be further exacerbated by the growing reliance on a global supply chain and outsourcing of low-skill jobs to countries with lower wages. While no blanket approach can address all forms of poverty, there is a need for a policy agenda that includes greater public involvement in establishing social safety nets, affordable housing, skills development and other arrangements for vulnerable groups of the population. Failure to do so may significantly undermine the livability, social health and vibrancy of the city, thus decreasing its attractiveness to a future labour force.

3.2.2 Sense of Community

Pressures to accommodate economic growth imperatives and a growing population in Calgary, as in other municipalities, lead to spatial restructuring of urban areas and uneven geographic development. The emergence of new financial districts and luxury residential areas is accompanied by an increasing socio-economic separation of citizens living in highly segregated neighborhoods. Disparities among neighborhoods are known for undermining a sense of community and contributing to social inequity and exclusion. As specified in a report on smart growth (Couroux, Keough, Miller and Row, 2006: 9):

This inequity has implications not only for residential choice but also for access to employment opportunities, health care, education, social services and public facilities. According to Litman (2000), strategies such as promoting mixed land uses, offering a full range of housing opportunities, and providing efficient, reliable public transit show promise in providing greater access to economic opportunity for low-income citizens. These strategies lead to a greater degree of social equity than functionally segregated and automobile-dependent sprawl. Mixing residential and employment zones and providing efficient, reliable public transit options can free many low-income individuals of the economic burden of automobile ownership.

Furthermore, there is growing evidence that automobile dependency undermines social ties within communities by reducing the number of social contacts and weakening social networks as well as limiting access to economic and social opportunities for low-income residents (Couroux, Keough, Miller, and Row, 2006). To combat social exclusion, build a sense of community and ensure social sustainability, the city will need to partner with other levels of government, the private sector and voluntary organizations to promote a heterogeneous population, non-segregated areas and address other social problems. Moreover, while Calgary is already in the process of expanding its transit system, more needs to be done to reduce automobile dependency in the city.10

10 For more information, refer to Newman and Kenworthy (1999) and OECD (1998).
3.2.3 Health

While economic growth produces numerous benefits for Calgarians, unsustainable growth may involve noticeable health costs. Health costs arise from a number of factors such as sprawl, poor environmental conditions, and growing poverty. For instance, sprawl was identified as a key factor in the proliferation of several illnesses such as diabetes, high blood pressure, stroke, and several respiratory conditions (Couroux, Keough, Miller, and Row, 2006). A recent report by the Ontario College of Family Physicians (2005) identified four public health threats caused, in part or in whole, by sprawl:

- air pollution caused by automobile emissions;
- obesity, linked to reduced daily exercise associated with automobile dependency and pedestrian-unfriendly neighbourhood design;
- injuries and fatalities caused by automobile accidents due to the increased need to drive, dictated by the land use and transportation characteristics of sprawl; and
- social and mental health issues linked to long commutes to work, a weak sense of community, and loss of green space (Ontario College of Family Physicians, 2005a; 2005b; 2005c; 2005d).

Another trend that may negatively affect the health of Calgarians, in addition to sprawl, is growing poverty rates. There is an extensive body of research showing linkages between health status and poverty. Thus, according to the Canadian Centre for Social Development, individuals living in poverty are more likely to report being in poor or only fair health compared to middle-income and high-income adults (2.2 times and 4.6 times respectively). Poor children in turn are more likely to suffer from serious health problems such as vision, hearing, speech, mobility and cognitive impairment compared to children from middle- and high-income families (1.7 and 2.6 times respectively) (CCSD, 2000). While the health concerns of Calgarians and their root causes require a complex set of measures and partnerships among a variety of stakeholders, lack of attention to these issues will take a significant toll on Calgary’s health care system and reduce its social sustainability.11

Finally, as economic growth will likely contribute to the growth of the Aboriginal population in Calgary, Aboriginal health issues are going to grow in importance, particularly in light of the increasing benefit costs that are expected to impact employers as their workforce continues to age. As specified by Derek Cook in the 2006 CPRN report, “ensuring the health of the Aboriginal population will require attention to social factors such as adequate housing, income and diet, while focusing on barriers to accessing the health system that have been reported by many Aboriginal people.” Similarly, immigrant health issues are also likely to become increasingly important. While research has shown that immigrants tend to be healthier than Canadian-born individuals, their health tends to deteriorate to Canadian standards in the years following immigration (Cook, 2006). Thus it is critical to pay attention to social factors, such as housing, income, and environment that may undermine immigrant health status.

11 For more information on the implications of income inequality and growing poverty rates, see the 2006 CPRN report Sustainability and Health for the City of Calgary: A Discussion of Global Health Trends and Local Impacts prepared by Derek Cook for the City of Calgary.
3.2.4 Integration of Newcomers

Calgary’s ability to compete globally will depend mainly on its ability to attract and integrate skilled economic labour, including immigrants and foreign workers. Over the next three decades, the share of immigrants, visible minorities and Aboriginal persons is projected to increase (Figure 17). For instance, the immigrant labour force is expected to increase from 21 percent of the total labour force in 2001 to 24 percent in 2026; the share of visible minority persons in the total labour force would increase from 16.7 percent to 22.1 percent (City of Calgary, 2003).

![Figure 17. Immigrants and Visible Minorities as a Percentage of the Labour Force, Calgary](image)

At the same time, as specified in Merrill Cooper’s report, *Demographic Trends and Implications for the City of Calgary*, in order to be able to compete for an educated workforce, the city will need to ensure its continued “livability,” including affordability, amenities, environmental health, safety, economic security, and social cohesion (Cooper, 2006). In addition, much work remains to be done to successfully integrate existing newcomers, including improvements in the recognition of foreign credentials, language training and other supports. Although this requires specific social infrastructure and investments, failure to do so will perpetuate dependency on the state welfare system, increase poverty and social exclusion, and eventually reduce the inflow of skilled labour to the city, thus undermining economic growth. A more detailed account of the population and economic growth impact on Calgary’s social development has been provided in the report by Merrill Cooper (2006).
3.2.5. Crime and Safety

Even though Calgary has a relatively low crime rate (Table 7 and Box 10), crime and safety are becoming much more salient issues than they have been in the past. According to the Calgary Police Service’s annual statistical report, while both the number and rate of person crimes remained relatively stable, there was an increase in the number of person crimes from 8,819 in 2002 to 9,314 in 2003, which was primarily due to an increase in assaults and robberies. Calgary also saw an increase in drug offences. In 2003, the rate of drug offenses increased to 197 per 100,000 population from 146 in 1999 (City of Calgary, 2004).

Table 7. Crime Rates, Selected, Calgary

<table>
<thead>
<tr>
<th></th>
<th>Homicide</th>
<th>Robbery</th>
<th>Break-Ins</th>
<th>Motor Vehicle Theft</th>
<th>Total Criminal Code Offences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>7,813</td>
</tr>
<tr>
<td>2004</td>
<td>1.9</td>
<td>91</td>
<td>815</td>
<td>457</td>
<td>7,101</td>
</tr>
<tr>
<td>2005</td>
<td>2.4</td>
<td>103</td>
<td>777</td>
<td>440</td>
<td>7,010</td>
</tr>
</tbody>
</table>

Source: Statistics Canada

Another consequence of booming economic growth is the increasing prevalence of organized crime in Calgary. The problem of gangs and organized crime is likely to present an ongoing challenge for Calgary police in the next decades. Calgary also saw an increase in hate/bias motivated crimes, by 22 percent to 120 cases in 2003, up from 98 cases in 2002. Race (63 percent) and sexual orientation (13 percent) continue to comprise the majority of hate/bias crimes (City of Calgary, 2004). This trend can be a partial reflection of the growing population and diversity of the city. Calgary will face the need to continuously improve public safety, particularly downtown, including setting up new programs to prevent youth crime, and using technology such as cameras to assist patrols in high-crime areas and others.

In addition, the challenges of urban sprawl and a growing population continue to affect Community and Protective Services at the City of Calgary. The City of Calgary (2004) reports that all functions of protective services are affected by the increasing geographic size of the city as well as the increasing numbers and changing demographic of the population.

Box 10. Crime: At a Glance

- Person Crime Rate, Calgary, 2003: 1,010 /100,000; 3.6% increase.
- Property Crime Rate, Calgary, 2003: 6,048 /100,000; 0.2% increase.
- In 2002 there were 350 injury-related fatalities, up from 337 reported in 2000.
- Eighty percent of Calgarians feel safe walking alone in their area after dark, up 6% from the 1997 Citizen Survey.

Source: City of Calgary (2004).
3.3 Built Environment and Infrastructure

3.3.1. Livable Cities

In Calgary, as in other cities, the logic of globalization has and will continue to stimulate the emergence of Manhattan corporate skylines, mega-infrastructure projects for building urban networks, as well as massive export processing zones. This kind of city restructuring could have an increasingly intrusive impact on urban living and working by eliminating older communities, green spaces and small-shop districts and making the costs of housing in the city prohibitive for the majority of urban workers (Douglas, 2000). The byproducts of such geographic restructuring include long commuting hours and chronic traffic congestion, and lead to the concentration of poverty in isolated and distressed urban areas. For instance, the United Way of Calgary and Area reports increased segregation by income in Calgary: in 2000, median household income in Calgary’s most well-to-do neighborhood was 3.6 times that of Calgary’s poorest neighborhood (Sustainable Calgary, 2004). As well, income segregation precludes individuals with limited economic means from living in areas that may be most accessible to employment opportunities and social services (Couroux, Keough, Miller and Row, 2006). Neil Bradford notes that:

> Low-income people [often] find themselves “trapped” in deteriorating urban neighbourhoods. The poverty afflicting residents is rooted in a mix of difficulties ranging from labour market weaknesses and racial, gender or other discrimination to limited social contacts and a fraying community infrastructure of housing, education, health, transit, and so forth. In such “spaces of hardship,” the variables are interconnected, and the problems of poverty build on one another “in more than an additive way (Jenson, 2001: 20 as quoted in Bradford, 2005).

As such, more efforts are required to ensure poverty reduction and the full integration of distressed urban areas. The presence of poverty pockets in distressed urban areas has the potential of altering the pattern of city investment and job creation and may encourage alienation and exclusion. The OECD also stresses the importance of integrating distressed urban areas by suggesting that

> [i]f nothing is done, the social costs to the public sector in the future could increase dramatically, and the growth of the informal economy and emergence of an underclass may yet threaten the strength of the economic system itself (OECD, 1998).

Distressed urban areas often represent an interlocking mix of environmental, social and economic circumstances and require a holistic approach on the part of the local government and other stakeholders. If left unattended, such challenges have the potential to reduce the city’s capacity to pursue long-term goals, including, notably, competitiveness and sustainability (OECD, 1998).\(^\text{12}\)

\(^\text{12}\) For more information on integrating distressed urban communities, refer to the 2001 OECD report *Integrated Distressed Urban Communities*. A case study, “Greater Vancouver Regional District: The Livable City,” presented in this report describes some of the possible solutions to balancing growth and city livability.
Another important consideration in creating “livable” cities is the way land use planning systems and the physical shape and built form of the urban environment are shaped. It is important for the city to find ways to work together with provincial governments and influence how urban built form is shaped and other investments in hard infrastructure (such as public transit, highways, trunk sewer lines, and water supply networks) are made (Gertler, 2004). These aspects of city “livability” are important as they help cities “support creative and other knowledge-intensive forms of economic activity, and appropriate policy responses” (Gertler, 2004). Gertler argues that in order to attract the right population mix, city-regions must ensure that:

- elements of the existing urban fabric that are qualitatively unique, distinctive and authentic are maintained and strengthened (examples here include: ethnic neighbourhoods with distinctive shopping streets, dining opportunities, streetscapes, etc.; historically significant buildings, streets and districts);
- natural environmental assets are protected and, where appropriate, enhanced to take advantage of their attractiveness; residential and employment densities are high enough, and land uses are mixed sufficiently to support a vibrant urban economy and cultural scene; and
- alternatives to automobile travel, such as public transit, walking, and cycling, are readily available (Gertler, 2004).

Only the right mix of economic growth and city livability can provide for sustainable development of the city in the long-run.

### 3.3.2 Infrastructure and Housing

Over the next 30 years, population growth will inevitably impose increasing infrastructure demands on the city. In order to accommodate population growth, the city is projected to continue an outward expansion in most directions and will require extensive and costly infrastructure development. Infrastructure costs are mainly associated with constructing and maintaining systems for transportation (roads, public transit, paths), water (sewer, storm, fresh water), sewage and solid waste, electricity, and natural gas (Cooper, 2006). Uneven neighborhood development, however, may result in an inefficient use of the city’s space and infrastructure. Inefficiencies arise from the high cost of providing public services, from the significant capital costs of building roads and other public infrastructure, and from long-term costs associated with the maintenance of this spatially extensive infrastructure. Calgary is already facing growing costs associated with maintenance of its current infrastructure and if the city continues to grow in a sprawling, infrastructure-intensive fashion, it may lock itself into further long-term cost increases (Couroux, Keough, Miller and Row, 2006). This may become a particularly salient issue due to increasing fiscal constraints in the city, associated with the growing population (despite the nominal growth in the city revenue).

Housing in Calgary will also likely remain an important issue in the next three decades. In particular, the city will be pressured to address the shortages of affordable housing, given the high ratio of low-income households. Currently, according to the City of Calgary, 58,555 households are in need of affordable housing because they earn less than $38,000 and spend more than 30 percent of gross income on housing (City of Calgary, 2005b). Of these, 59 percent are renter households, 63 percent of which earn less than $20,000, leaving little disposable income for food.
and other necessities. The short-term estimates show that by 2008, there will be approximately 19,000 at-risk households (using population growth projections of 20.2 percent for individuals and 13.9 percent for families). The total potential demand for emergency and transitional housing is estimated to grow to between 2,600 and 6,600 by 2008 (City of Calgary, 2005b). As discussed in detail in the Demographic Trends and Implications for the City of Calgary report (Cooper, 2006), the city is already making progress in addressing the need for affordable housing, by initiating several new affordable housing projects, in collaboration with other partners. However, there is a need to increase collaboration with other levels of government and the private and non-profit sectors to fully address both the current and future needs of low-income Calgarians for affordable housing.

3.3.3 Transportation

Population growth and the need for social and environmental sustainability will drive both the need for a developed transportation infrastructure and for more sustainable choices in the decades to come (Cooper, 2006). Calgary is already experiencing low-density, automobile-dependent development (often referred to as “sprawl”). Over the next 30 years, the car is predicted to remain the dominant choice of travel (Calgary Transportation Plan, 2005); hence the city will face increasing pressures to develop strategies to reduce automobile dependency. The Calgary Transit system already provides safe transportation to thousands of Calgarians, yet the city will need to make significant enhancements to its transit system in order to promote a compact transit-oriented development (Calgary Transportation Plan, 2005). A more developed transit system will assist in addressing rapid population growth and in easing congestion on the city’s roads. For a description of possible approaches to addressing this issue, see the case study “Singapore’s Rapid Transit System: Sustainable Commuting” in this report.

Finally, growing interdependencies among countries will make international trade and communications even more important over the next decades. With the declining costs of cargo shipments, air transportation is likely to become key for future economic growth. Calgary has already built the Calgary International Airport (CIA), which is pumping billions of dollars of economic activity into the provincial and municipal economy. The CIA’s contribution to the total GDP of the Calgary area was $4.89 billion, which amounted to roughly 10 percent of Calgary’s 2004 GDP of $49.29 billion (Calgary International Airport Study). With the international airport, Calgary has the far-reaching potential of becoming a new type of international city. In order to build on this success even further and accommodate the growing interconnection amongst emerging economies, however, the CIA may need to review the adequacy of non-stop international flights to and from Asia, Latin America and Europe. Airline traffic is often used to measure city “connectedness” to the global world, thus it will be critical to both maintain the existing airport infrastructure and ensure capacity for airport expansion over the next decades.
3.4 Natural Environment

3.4.1 Effect of Sprawling Development

Unimpeded and resource-rich growth, as well as urbanization processes, have a strong potential to threaten Calgary’s natural resources, environmental sustainability and biological diversity. For instance, uneven and unrestricted geographic development, “sprawl,” has a significant environmental impact both locally, through habitat loss, degradation of water and air quality, and globally, through the emission of greenhouse gases that contribute to climate change (Couroux, Keough, Miller, and Row, 2006). Habitat loss is considered one of the most significant threats to Alberta’s biodiversity. As indicated in the report *Improving Transportation without Putting Nature Second*, habitat loss can often result from sprawling development and poorly planned roads and other transportation infrastructure (White and Ernst, 2003). Sprawl can contribute to habitat loss by its conversion to developed land, and through fragmentation of landscapes that can disturb breeding grounds and reduce resources to inadequate levels, damaging habitat just as much as outright conversion (Miistakis Institute for the Rockies, 2003; Peck, 1998; Couroux, Keough, Miller, and Row, 2006).

Another detrimental impact of unrestricted economic expansion is observed on quantity and quality of water. The impact on water is manifested through:

- Hydrological processes that provide us with the clean, reliable surface and subsurface water flows. Altering the hydrology of a region potentially alters ecosystem processes, seriously affecting downstream water quality;
- Increased water consumption, creating strain on water supplies;
- Water usage – in Calgary, water use increases by an average of 50 percent during the spring and summer months, which can be seen as a result of the form of development supporting larger residential properties with more expansive lawns and gardens (Miistakis Institute for the Rockies, 2003; Peck, 1998; Couroux, Keough, Miller, and Row, 2006).

As the population grows and water supply diminishes, water usage will become a critical issue for Calgarians.

Finally, automobile exhaust, associated with automobile-dependent economic growth, is responsible for more than 27 percent of the greenhouse gas emissions in Canada (Climate Change Central, 2005). In 2003, Albertans traveled 34 billion vehicle kilometers consuming 4.1 billion litres of fuel in the process (Couroux, Keough, Miller, and Row, 2006). Studies have shown that greenhouse gas emissions are one of the major contributors to the climate change process (Canadian Energy Research Institute, 2005b). One of the most important effects of climate change is the increased melting of polar ice caps, which is expected to cause a rise in sea levels leading to the displacement of hundreds of

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**Box 11. Impact of Energy Prices**

High energy prices are likely to have a positive environmental impact. High prices may induce changes in consumer behaviour, such as changing transportation modes on the part of households, switching fuels and implementing more energy-efficient equipment on the part of businesses. New energy-saving technologies as well as more investments in technologies reducing environmental impact are likely to emerge in response to high prices.

Source: Conference Board Canada (2005).
thousands of people (Natural Resources Canada, 2002). Specific impacts on Calgary may include an increase in local temperatures that would place Calgary’s sources of fresh water at risk, as glaciers in the Rocky Mountains would shrink and eventually disappear, causing more frequent and intense drought conditions in the region (Bow River Basin Council, 2005; Couroux, Keough, Miller, and Row, 2006). 13

These trends may further be intensified by growing pressures placed on Calgary, along with other urban centres, to devote scarce resources to attracting international investment over the next 30 years. These pressures may force the city to avoid charging industries the true environmental costs of their operations in order to attract investors to the city. While this may be a successful short-term strategy in attracting investors, in the long-run urban regions that are not capable of sustaining their environments may be abandoned “in favour of other localities where environmental deterioration is not as great” (Douglass, 2000). Thus, Calgary will have to resolve a dilemma of how to maintain long-term environmental sustainability while also effectively competing for investment and growth (Angel and Stone, 2000; Douglass, 2000).

3.5 Governance

City governance is becoming increasingly important in the globalized world. As noted by the OECD:

Being geared to world markets, metropolitan areas are particularly vulnerable to international economic fluctuations and many are threatened with “growth without development”... In today’s global economy, growth may be driven by sources external to a region... But, without endogenous economic activity as well, urban regions may become highly dependent on international economic fluctuations. This is why better urban governance which incorporates integrated area-based strategies, aimed at enhancing the endogenous economic, social and environmental characteristics of a city region, is likely to make the difference between “growth” and “development,” thus conferring a comparative advantage on certain cities over the medium or long term (OECD, 2001: 26).

City governance implications range from the need for greater transparency, efficiency and flexibility on the part of local policy-makers to pressures of increased participation of a multiplicity of stakeholders in the local decision-making process and the need to address increasingly complex issues faced by cities in coherent, inclusive and sustainable ways.

13 For more information on the effect of climate change on Calgary, see the 2005 report Potential Effects of Climate Change on the City of Calgary: Adapting to a New Environment prepared for the City of Calgary by the Canadian Energy Research Institute (2005b).
3.5.1 Role of Civil Society and Citizen Engagement

The intensive processes of economic and population growth and urban restructuring that will be taking place in Calgary over the next decade and beyond will require new mechanisms and forms of governance. Given the growing diversity and size of city-regions, a principal dimension of the emerging forms of governance will be increasing participation of the civil society, private sector and citizens in the governance process. The city will have to increasingly utilize new technologies and communication methods to support more interactive policy environments, promoting citizen engagement. Development of information technology does not only promote greater access to information to the public, it also requires the city to adapt its services to the increasing expectations on the part of its stakeholders. To tackle complex issues under conditions of fiscal uncertainty, the city will increasingly have to rely on partnerships with private and voluntary organizations, as well as other levels of government. In addition, the roles and responsibilities of each level of government and among local authorities across jurisdictions should be clearly defined.

3.5.2 Greater Transparency, Efficiency, and Accountability

Expectations of the growing middle classes in Calgary will continue to increase and the city government will have to operate with greater transparency, cost-effectiveness and responsiveness to address those expectations. The needs of the economy will have to be met, as will citizen expectations for higher quality of life, by maintaining and enhancing the attractiveness and livability of the city. At the same time, as the drive for efficiency and value-for-money accelerates, the city will increasingly have to demonstrate the costs and benefits of public services. In order to adapt to economic trends, technological innovation, and spatial development, the city will need to maintain a forward-looking approach to allow for flexibility as well as sound strategic planning.

3.5.3 Coherence, Comprehensiveness and Sustainability

Given the complexity of issues faced by Calgary, the city, in collaboration and cooperation with other levels of government, will have to ensure coherence in policy objectives and focus on key local issues such as economic development, sprawl, affordable housing, congestion and environmental quality. These issues should be tackled simultaneously, taking into account linkages and trade-offs and fully integrating and reconciling economic, social and environmental objectives. In addition, given the dependence of Calgary’s economy on the energy market and the volatility of energy prices, it seems important to place an increasing emphasis on investment in infrastructure and human development to best take advantage of local resources, rather than pursuing economic growth mainly through attracting investments based on financial and fiscal incentives.14

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14 The recommendations found in this section are largely based on the OECD (2001b) report on metropolitan governance.
3.5.4 Building on Strength: Tapping Local Knowledge

The new challenges of urban policy-making will require Calgary to increasingly rely on locally-situated and contextual knowledge to inform policy development. Bradford (2005) argues that this local or “tacit” knowledge tends to include three interconnected components:

- **Knowledge of communities.** This type of knowledge is primarily based on input from the community members about “their lived experience and intimate familiarity with conditions “on the ground and in the streets” of their place” (Bradford, 2005).

- **Knowledge about communities.** This type of knowledge can represent a local profile of the place and includes local statistical data disaggregated, such as local labour market trends, population health, poverty concentrations, asset mapping, and so forth.

- **Knowledge for changing communities.** This type of knowledge includes theoretical models, articulating linkages between policy actions and outcomes, based “on understandings of the factors that have produced success or failure in different places.” These models help to guide local decision-makers in setting policy priorities.

The ability of the city to develop its capacity to build on these forms of local knowledge can help “maximize the synergy and complementarity among the different policy inputs” (Bradford, 2005).
4. Conclusion

Global economic trends will influence Calgary in a number of important ways. The world economy will continue driving economic growth and development in Calgary, as well as bringing new opportunities for international trade and investment over the course of the next three decades. World demand for natural resources is likely to remain strong, especially with the emergence of Chinese and Indian economies, ensuring that Alberta’s abundant energy resources will continue being an important source of prosperity for the city. Yet to ensure that Calgary continues to enjoy the benefits of its resource rich economy in the next few decades and much beyond that, it is important to consider economic, environmental and social factors in designing an approach to future development (Canada West Foundation, 2006).

As discussed throughout the report, economic considerations include volatility of energy prices in the world market and thus relative unpredictability of the economy. Augmented by growing energy sustainability concerns, such an unstable economic and public financing situation requires careful planning, a savings and investments strategy and a set of measures for economic diversification to ensure sustainable development. Moreover, economic growth and aging of the population will require the city to increasingly compete for financial and human capital with other cities in the world arena by taking a proactive approach. Importantly, as noted by Neil Bradford (2005), “it is not just the collection of assets in a place that matter. It is the social networks, personal interactions and distinctive amenities that spur the learning and innovation process” (Bradford, 2006). Richard Florida (2002) in turn adds that these elements determine quality of life and are crucial in attracting and retaining highly-educated people (Florida, 2002). Failure to attract the appropriate levels of capital and labour may significantly undermine the ability of the city to enjoy the benefits of expanded economic opportunities.

Environmental concerns mainly arising from greenhouse gas emissions, associated with highly automobile-dependent economic growth, will need to be managed. The pressure to address environmental concerns will be particularly salient with growing international efforts to curtail greenhouse gas emissions. In addition, cities will face complex challenges to address air and water quality, develop effective waste management systems, and preserve green space and ecosystems.

Moreover, the benefits of economic growth are not divided equally among different layers of the population. Such social issues as poverty, growing income inequality, health problems, and other concerns will increasingly require an active collaboration amongst a variety of stakeholders, including all levels of government and the voluntary sector. Addressing growing polarization and segregation in terms of living spaces can make a significant difference to the quality of life of all Calgarians. The effects of addressing these concerns can “manifest in prospects for employment, housing, health, personal safety, and cultural recognition” (Bradford, 2005), as well as a new sense of meaning and belonging. Integration of distressed areas can also foster citizens’ mobilization, thereby “developing new sources of rights and new agendas of citizenship” (Holston, 2001: 326 as quoted in Bradford, 2005). Addressing these considerations requires a coherent and comprehensive approach, based on collaboration among a variety of stakeholders, including all levels of government, private and voluntary sectors.
As noted by the OECD in its report, *Competitive Cities in the Global Economy*, a range of strategies must be employed by cities to succeed in the globalized world of today and tomorrow (OECD, 2006a). As such, cities must consider, amongst other things, the importance of:

- A flexible strategic vision to foster competitiveness, ensure a diversified range of interdependent ventures, and information and transportation links between universities, researchers, technicians, and manufacturers.
- Livable cities with high quality infrastructure, green spaces, and inner city residential areas and public projects which contribute to economic success, attracting foreign investors as well as highly qualified professionals and tourists.
- Effective governance of cities dependent on leadership from all levels of government and the non-governmental sector.
- Balancing the financial needs of cities with those of the rest of the country by diversifying tax revenues with “smart taxes” such as congestion charges and use public-private partnerships to raise money for public projects.
5. Illustrations/Case Studies

5.1 Greater Vancouver Regional District: The Livable City

While planners in the Greater Vancouver Regional District (GVRD) started focusing on the “livability” of the region in 1972, it has become particularly important in light of Greater Vancouver’s growth in the form of relatively low density sprawl, interspersed with pockets of higher density that were largely unconnected by effective transportation services in the 1990s (GVRD, 1999). To address resulting livability and environmental concerns, in 1996 the GVRD put forward the Livable Region Strategic Plan (LRSP). The plan created the regional growth strategy and framework for planning decisions made by all GVRD stakeholders, including all levels of government and the private sector. The LRSP focused on land use in the Green Zone, regional town centres and higher density centres (including downtown Vancouver) and aimed to:

- protect green space and natural resources,
- create complete communities based on regional town centres,
- achieve a compact metropolitan region, and
- increase transportation choice through a transit supportive and automobile-restrained transportation system.

The LRSP was based on the assumption that creating compact and complete communities surrounded by protected natural areas and farmland would enhance quality of life. While the overall effectiveness of the plan is yet to be assessed, the LRSP is seen as a positive step in achieving livability in the GVRD. For instance, as described in the report The Livable City prepared for the Urban Forum 2006, “There is a designated Growth Concentration Area (GCA) that comprises 46 percent of the total urban area in the region. The GCA has been designated in order to reduce pressure on the Green Zone, balance the jobs/housing ratio in these areas, and concentrate settlement for more effective access by transportation systems and infrastructure. The LRSP set a target of approximately 70 percent of total population and employment to occur in the GCA by the year 2021 and it is effectively moving in this direction” (International Centre for Sustainable Cities, 2006). As of 2001, 67 percent of the population resided within the GCA, thus marking a growth of 112,800 residents since 1996 and accommodating 73 percent of the region’s population growth (GVRD, n.d.). This was achieved through designating eight regional town centres as principal locations for building complete communities of “high density residential, with region-serving employment, retail, cultural and community facilities” (GVRD, n.d.) and adding about 17,000 new dwelling units both to the regional centres and the metropolitan core between 1996 and 2001.
Another example of the success of the LRSP is the protection of green space and agricultural land. The process used to establish the Green Zone was different from traditional North American approaches to urban development. Despite the continuing growth needs of the GVRD, the GVRD’s Board wanted to maintain green agricultural and natural areas and worked with municipalities to establish a Green Zone through zoning, designation and development permits. Further, the Green Zone also established an automatic urban containment area, which defined the planning process and use of the remaining land in the region.15

5.2. Seattle: Competing in a Knowledge Economy

Seattle is known for its biotech industry concentration (sixth in the United States), as well as for its vibrant high tech sector, which includes software and Internet-based companies as well as advanced technology manufacturers. For instance, from 1995 to 1998, Seattle saw 6,000 new high tech jobs while the region as a whole saw 27,000 new high tech jobs. Most of the growth occurred in the software/computer services/Internet cluster, which nearly doubled inside Seattle. After the economic recession in 2001, a gradual growth in high tech jobs resumed. The number of high tech jobs in the state of Washington increased by 1,200 to 152,000 in 2004, according to a new report from the AeA trade association.

The question of what are the key features that attracted major knowledge-intensive companies and talent within those “clusters” to Seattle was addressed by the Brookings Institute in 2000. According to the study Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, which was based on the interviews with CEOs of high tech firms in Seattle, there are a number of factors that create a more competitive city in a knowledge-based economy. Some of these factors are listed below.

Developing a research and educational base – The experience of Seattle illustrates that knowledge-intensive companies, including biotech ones, tend to locate in close proximity to the University of Washington, due to their dependence on close associations with university-based researchers in basic research and proprietary development. Such clustering of technology companies around major research universities is also observed in other cities in the United States and Europe. In addition, the presence of a high quality university helps to ensure the ready availability of a highly skilled workforce. Recently Seattle was named the smartest city in the United States (if one equates education with intelligence), where 52.7 percent of its residents age 25 or older have completed a bachelor’s degree or higher (CNNMoney.com, 2006). The Brookings Institute report suggests that the municipal government has a leadership role in ensuring that the educational institutions in the city “have math, science, and IT programs of first rate quality, and these institutions can attract faculty and expand to meet probable needs of local companies and the demands of students for access to seats in relevant programs.”

15 For more information on the LRSP and other initiatives related to livability of GVRD, visit the GVRD Web site at www.gvrd.bc.ca/growth/lrsp.htm.
Enhancing quality of life – Another key factor in attracting and retaining highly educated and talented people, according to the Brookings Institution, is an attractive urban environment. Seattle has been making significant investments in developing an active urban environment to make it attractive as a place to live, work and play. City planning has focused on preserving views, historic structures, zoning for mixed use buildings and neighborhood quality of life. The report notes that Seattle has also worked to provide arts and culture, concerts, sports and a lifestyle that attracts people and revitalizes its downtown. Furthermore, clean environment and developed, modern infrastructure are also key components of high quality of life in Seattle. Good infrastructure, for instance, is critical to the direct operations of high tech companies. Of particular importance is the telecommunications infrastructure, which is becoming one of the essential ingredients supporting a high tech economy. As noted in the Pacific City Strategies for the New Century, “whether it is fiber optic cable in the streets or the use of laser transmission of data, being pioneered by companies like Terabeam in Seattle, a technology city of the future must be connected to the world.” 16 Thus in order to succeed in the information age, cities need to ensure that fiber optic infrastructure, wireless sites and other modern infrastructure are as much a part of a city’s economic agenda as are roads and highways.

Creating a research and development presence – Another essential component of Seattle’s competitiveness is the presence of long-term, high quality research programs that at some point bear fruit in terms of commercializable technologies. Thus, as indicated in the Brookings Institution report, the role of cities in this area can be to facilitate and help to fund public/private ventures that establish and maintain leading edge research centers and educational institutions.

Creating a favourable business environment – Creating a favourable business environment is another factor that can help attract companies to a certain area. Some of the steps in this direction, which were undertaken in Seattle, include but are not limited to streamlining of permits, planning, and other public services, adapting and simplifying local laws (such as special tax policies and administrative procedures), providing venture and seed capital, and supporting local entrepreneurs. For instance, Seattle’s Office of Economic Development utilized a revolving loan fund to assist in the redevelopment of laboratory space vacated by the Fred Hutchinson Cancer Research Center to create an incubator for biotech companies.

Using IT in the public sector – Lastly, Seattle’s experience shows that use of IT in the public sector can support tech development in the regional economy. In Seattle, several of the start-up and more established companies are concentrating on products and services for public sector organizations, such as developing applications of streaming media products in the public sector to improve citizen access to governmental decision-making processes (Real Networks).

The Seattle case study shows that cities can succeed in competing with others for attracting knowledge-intensive companies and highly skilled workers by creating a healthy climate for knowledge-based sectors, such as high tech, by stepping out beyond traditional roles on infrastructure, fostering and promoting research institutions, and encouraging world-class education systems. The case study also shows that success takes time. Seattle leaders were planning for a high tech future at least 15 years ago by supporting a strong university-based

16 For more information, see William Stafford’s paper Pacific City Strategies for the New Century. Available at www.citistates.com/essays/essay_stafford.html.

5.3. Singapore’s Rapid Transit System: Sustainable Commuting

With 3.6 million people living in an area of 646 square kilometres, Singapore is one of the most densely populated and urbanized countries (cities) in the world. Rapid economic growth and intensive development required a corresponding growth in transport infrastructure. Yet increasing environmental concerns compelled the Singapore government to establish the Land Transport Authority (LTA) with the main purpose of building a sustainable, comprehensive, efficient and yet environmentally acceptable land transport system to minimize the impacts of an ever expanding transport network, such as traffic congestion and air pollution. To do that, Singapore has employed various strategies – including improving public transport, integrating transport needs into land use planning, managing demand for road usage and harnessing technology to optimize the capacity of the island’s transport infrastructure.

The public transport system in Singapore consists of two integrated train networks: the mass rapid transit (MRT) lines and the light rapid transit (LRT) system; and buses and taxi services. In 2005, the average daily ridership on the MRT network was about 1.34 million, which represented a 76 percent increase compared to 1995.

The strategic challenge was to shift commuters towards public transport modes, such as the urban Rapid Transit System (RTS) network and buses. To address this issue, Singapore has implemented a range of measures, from equipping taxis with a satellite global positioning system, allowing them to be directed to the nearest passenger pick-up points and thus reducing customers’ waiting time, to measures aimed at moderating the ownership and use of motor vehicles. For instance, as described by Lim Swee Say, Singapore’s Acting Minister for the Environment and Minister of State for Communications and Information Technology, “under the vehicle quota system, a certificate of entitlement (COE) must be acquired before a person can register a vehicle for use on the road. The price of a COE is determined by market demand through a public tendering system, and it has a validity period of ten years. By limiting the number of COEs issued each month, the quota system has served as an effective means to keep the growth of the vehicle population in Singapore at a level of 3 percent per year.”

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In addition, to moderate the use of vehicles on busy roads, the city has implemented an electronic road pricing system. Cash card readers have been installed on all vehicles in Singapore. A fee has to be paid whenever a car passes through the gantry point of a busy road during peak hours. All transactions are done electronically. In order to avoid such charges, car drivers are encouraged to use less busy roads or take public transport. A similar system has recently been implemented in London.  

21 These measures allow Singapore to address environmental concerns through avoiding congested roads and motorways and reducing air pollution, as well as generating revenue for the city budget.


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21 See UN Habitat (2006). For more information, go to: http://hq.unhabitat.org/HD/hdv12n1/Vol12No1e.pdf.
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