



THE UNIVERSITY OF BRITISH COLUMBIA

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# Olympic Games Impact (OGI) Study for the 2010 Olympic and Paralympic Winter Games Pre-Games Results Report

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**Prepared by:**

The OGI-UBC Research Team

**For:**

The Vancouver Organizing Committee for the 2010 Olympic and Paralympic Games (VANOC)

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## Limitations/Feedback

All studies encounter a variety of limitations. The OGI study (and Pre-Games Report) is no exception. In an attempt to address these limitations, the OGI-UBC Research Team welcomes any feedback that supports our continuous efforts to improve the quality of the data and evaluation of the impacts of the 2010 Games. For information on how to provide feedback, please visit the OGI-UBC website (<http://www.ogi-ubc.ca>). All correspondence will be responded to by a member of the OGI-UBC Research Team.

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## Summary

The OGI project (2003) is now required of all Host Cities by the International Olympic Committee (IOC). The project has three main objectives:

- To measure the overall impact of the Games;
- To assist bidding cities and future organizing committees to maximize the benefits of the Games; and
- To create a comparable benchmark across all future Games.

OGI is an indicator-based monitoring and reporting system that is grounded in the concept of sustainability. OGI uses 126 indicators to measure the economic, social, and environmental conditions of the Host City/Region/Country. There are 80 context indicators, and 46 event indicators.

Each Games organizing committee is to present its findings in a series of four reports (baseline, pre-Games, Games-time, and post-Games) that spans 12 years, beginning two years before Host selection and ending three years after the Games.

### OGI and the 2010 Games

Vancouver was selected in 1998 by the Canadian Olympic Committee to bid for the 2010 Games, and was selected in 2003 by the IOC to host the 2010 Games.

The Baseline Report for the 2010 Games was submitted in 2007. The current report is the Pre-Games Report (2009) focuses on the 80 context indicators (28 economic, 30 social, 22 environmental). Data were compared to baseline data from 2001. The anticipated Games-time and Post-Games Reports will be compared to previous reports.

A research team (OGI-UBC) at the University of British Columbia (UBC) has been contracted to conduct the OGI study for the 2010 Games.

### The Approach Used by the OGI-UBC Research Team

The OGI project is guided by the *OGI Technical Manual*, which describes the indicators that comprise OGI. The IOC recognizes that there is no “one way” to measure the impacts of the Games. Therefore, the *OGI Technical Manual* provides guidance, but does not prescribe a particular approach to analyzing the indicator data. The OGI-UBC Research Team used an approach to analysis that included two strategies – “bundling” and the “before and after control impact” technique.

Similar context indicators were “bundled” based on governmental policies that were created or modified because of the 2010 Games. The premise is that trends in OGI indicators that coincide with these Games-related governmental initiatives may be more affected than OGI indicators that do not coincide with Games-related governmental initiatives. This approach helps address the lack of available data for some indicators (for example, a trend can not be established with great certainty based on only two data points). Because priority was given to direct Games-related policies, other non-Games-related governmental policies may have been excluded from analysis,

such as housing and climate change policies, although they are part of the context. Ideally, expert opinion about significant non-Games-related policies would have been useful (although it is also recognized that it would be impossible to include all policies in the analysis).

The “before and after control impact” (BACI) technique was used to address an important question when assessing impact: how certain can one be that any observed changes are a result of the Games, instead of a “normal” trend that would have happened anyway in the absence of the Games? The BACI method tests for differences between an impact site (e.g., Vancouver) and “control” sites before and after the event. Given the limitations of finding a “perfect” control site(s), the following sites were selected. Vancouver was compared to the Canadian cities of Calgary, Edmonton and Victoria (all are in Western Canada). For regional comparisons, we chose the Greater Toronto Area (GTA). Provincially, B.C. was compared with Alberta (and occasionally to Ontario). Canada was usually compared to the United States.

### **Attributing Impact to the Games**

Our approach to OGI makes it possible to more conclusively attribute changes in select indicators to the 2010 Games. This means documenting: 1) whether or not the Games have had an impact on the Host; 2) the direction of this impact (i.e., positive or negative); and 3) the size of this impact relative to a hypothetical “no-Games” scenario.

Impacts can be assessed at the level of indicators, indicator bundles and sustainability spheres. Any of these sub-assessments can be incorporated into a final assessment of the overall impact of the 2010 Games.

### **Context Indicator Analysis Groupings**

For most of the 80 context indicators for the Pre-Games Report, at least some data were available (88 percent), with 64 percent of the data for the indicators being classified as consistent on data source and methodology.

Based on the availability and quality of data, the 80 context indicators were organized into one of three groups for the Pre-Games Report:

- *Report Analysis*: 29 indicators (36 percent) were bundled (data were available and of sufficient quality to merit bundling);
- *Analysis Possible But Inconclusive*: 28 indicators (35 percent) were each analyzed in a one-page format (data were generally available, but for the majority of these indicators any relation to the Games at this stage is highly unlikely and would at best be weak); and
- *Analysis Not Possible*: 23 indicators (29 percent) had irresolvable data problems – No Useful Data, Methodology Inconsistent, and Baseline Errors – and time limitations precluded seeking qualitative expert opinion.

In this executive summary of the larger Pre-Games Report, we present the bundled indicators first, followed by indicators in the *Analysis Possible But Inconclusive* group, and end with the *Analysis Not Possible* group.

## Socio-cultural Outcomes

### Socio-cultural Bundle 1: Progress in Elite Amateur Sport in Canada

Two indicators comprise this bundle:

- Results at Olympic and Paralympic Games and World Championships (So19); and
- Top-level Sportsmen and Women (So16).

#### Indicator Evaluation Over Time (1998-2006)

The number of medals won at Olympic Winter Games by Canada has increased steadily from 5 medals in 1988 (when it was hosted in Calgary, Canada) to 24 medals in 2006.

#### Comparison with Other Countries

Possible factors leading to this increase were examined, and determined to have had little, if any, influence on medal counts. These factors were the number of Canadian athletes participating (which also increased), a comparative advantage for Canadian athletes (with the addition of several sports to the Olympic program), and an increase in population and therefore more athletes.

The number of top-level Canadian athletes for Winter Games (placed in top 16) also increased from 135 in 2001-2002 to 168 in 2006-2007, while those for Summer Games remained relatively unchanged.

#### Attributing Impacts to the 2010 Games

In conclusion, the hosting of the Games and the implementation of the *Own the Podium 2010* and *Podium Canada* initiatives to some extent improved the performance of Canadian athletes in elite amateur athletic competitions.

#### Special Focus: Paralympic Games

Before leaving this bundle, it is important to acknowledge Paralympic athletes as elite amateur performers, and the impact of the Paralympic Games on wider society. However, data for Paralympic indicators are not readily available. On these matters, we consulted Dr. David Legg, an international expert on these topics. At best, the state of knowledge related to each of these indicators may be described.

Five indicators comprise the Athletes with Disability bundle:

- Employability of People with Disabilities (Ec44) – employment challenges for persons with disability unfortunately continue;
- Perceptions about People with Disabilities in Society (So44) – the prejudices of individuals and society-at-large are the most significant barrier to the social inclusion of persons with disability;

- Support Network for People with Disabilities (So45) – both government and non-profit organizations must address health care, transportation, and specialized equipment necessary for recreation;
- Professional Sport Education for People with Disabilities (So46) – an example from the 2000 Games is a series of disability education programs that were geared towards coaches, teachers, and students; and
- Accessibility of Public Services (So48) – locally, the *2010 Vision for British Columbians with Disabilities* initiative has led to the development of a strategic plan and a rating instrument that helps municipalities determine how they could make their communities more accessible.

To date, independent assessments of the legacies of the Paralympic Games (not commissioned by Games organizing committees) are rare and largely anecdotal. OGI addresses a number of the key determinants to improving opportunities for people with disability in sport, recreation, and physical activity. These include: the physical/built environment; organizational policies/practices; discrimination/social attitudes; exercise equipment; and commercial and print media.

## **Socio-cultural Bundle 2: Health and Physical Activity**

Four indicators comprise this bundle:

- Health (So9), which reports on dimensions such as birth, death, and infant mortality rate;
- Nutrition (So10), which measures the amount and type of food consumed;
- Sport and Physical Activities (So12), which represents the types and extent of physical activities in the Host Country, especially in relation to gender and sport club membership (lack of available data, and therefore not reported); and
- School Sports (So13), which represents the status of sport in public schools, as measured by the number of hours that students participate in sport per day at public primary and secondary school levels (from kindergarten to grade 12) (data not available yet, and therefore not reported).

### **Indicator Evaluation Over Time (2000-2007) and Regional and Country Comparisons**

Two caveats should be kept in mind when interpreting the data for this bundle. First, changes in some measures, such as birth rate, are more evident over longer periods (decades) than that of the OGI study. Second, mega-events such as the Olympic Games rarely have a sufficiently large impact to affect these demographic trends in a noticeable way.

Between 2001 and 2007 in Vancouver, both birth rate and death rate decreased slightly. In B.C. and Alberta, birth rate decreased while death rate increased (indicating an older population). Although the rates and trends varied among comparison locations (which included Canada and the US), no significant identifiable changes were observed originating in the year 2003 (when Vancouver was selected as Host City), which suggests that there was no unusual effect due to the 2010 Games.

Between 2002 and 2004 in B.C., mean daily caloric intake increased slightly for both males and females. Analyses suggest that higher caloric intake in B.C. (compared with Alberta and Canada) was more likely due to a physically more active population that consumes more calories, than to a more affluent population (the median household income in B.C. was lower than those for Alberta and Canada) or to unhealthy eating habits and lifestyle (the prevalence of obesity was lower in B.C. than for Alberta and Canada).

### Attributing Impacts to the 2010 Games

Due to the lack of available data for some indicators for B.C. and Canada, and to the short time period for observing trends that can only be observed over longer periods, the possible impact of the 2010 Games on these health and physical activity indicators is unlikely but currently can neither be confirmed nor refuted.

### Socio-cultural Bundle 3: Host City Image – Select Foci

Three indicators comprise this bundle:

- Host City’s Media Image (So43), as portrayed by the international media;
- Homeless, Low-Rent Market and Affordable Housing (So31); and
- Olympic-induced Housing (En24), which measures units of housing constructed for athletes to use during the Games.

### Indicator Evaluation Over Time (2001-2009)

Since no quantitative data on Vancouver’s media image were available, Michael R. Real, a professor in communication and culture, offered some considerations:

- Canada has an established but not extensive image, while Vancouver and B.C. are much less fixed in the awareness of the global public;
- Recent events have led to varied reporting (both positive and negative) about the city within international press coverage, and homelessness has emerged as most problematic; and
- Vancouver, B.C., and Canada receive much more coverage in English-speaking countries and some French-language coverage because of Quebec and Canada’s two-language policy, but only rare coverage in newspapers in other languages.

Quantitative data were available, however, on homelessness and affordable housing. Vulnerable populations are especially sensitive to fluctuations in affordable housing stock, such as individuals who are unattached to a family unit and 15 years of age or older (“singles”) and seniors over 65 years of age whose income is below the low-income cut-off (LICO) threshold.

Between 2001 and 2006, the percentage of singles below the LICO line increased in Vancouver, Metro Vancouver, and Canada. Although a larger increase was observed for Canada, the rates for Vancouver and Metro Vancouver were significantly higher than the rate for Canada.

Between 2001 and 2006, the percentage of seniors below the LICO line decreased in Vancouver and Metro Vancouver, but increased in Canada.

In Canada, the general definition of affordable housing is housing that does not cost more than 30 percent of a household's gross income regardless of whether they are living in market or nonmarket housing. The term *social housing* refers to housing where rent subsidy or assistance is provided. For our purposes, both affordable housing and social housing are included.

Between 2001 and 2006, the *absolute* number of affordable housing and social housing units increased in both Vancouver and Metro Vancouver. However, further analyses showed that the increase was only in Vancouver (excluding Vancouver from Metro Vancouver showed a *loss* of units in the rest of the region), and that there has been a loss of units *relative to the population* at the Metro Vancouver level.

In Vancouver during the period 2005-2008, fewer *newly* constructed affordable housing and social housing units were built (357 units) than during the preceding period 2001-2004 (593 units). Newly constructed means that these units were not converted from previously existing regular housing units.

In Vancouver, someone is considered homeless when they lack money for a permanent residence. This definition includes people who have no shelter or are temporarily sheltered.

Between 2002 and 2008 in both Vancouver and Metro Vancouver, the *absolute* homeless count and the number of homeless persons *relative to the population* increased. Analyses with comparison locations (Capital Regional District and Toronto) suggest that homelessness is more prevalent in B.C. than anywhere else in Canada.

Between 2002 and February 2009 in both Vancouver and Metro Vancouver, the *absolute* number of places in shelters and the number of homeless *per place in shelter* increased. This suggests that the supply (shelters) was not met by the need (homeless individuals) (although there were more places in shelters available in Vancouver than in Metro Vancouver).

Between 2002 and 2008, the prevalence of people with physical disabilities among the homeless in Metro Vancouver more than doubled (from 15 to 31 percent).

At the time of analysis (May 2009), much controversy exists over housing built specifically for the Games (Athletes' or Olympic Village). The City of Vancouver originally dedicated 252 of the 1,100 housing units in the Olympic Village to be used in the future as social housing. However, this legacy is in question as a result of recent events around financing for completing the Olympic Village.

### Attributing Impacts to the 2010 Games

The difference in the prevalence of low-income singles and seniors between Vancouver and Metro Vancouver and Canada may in part be due to the 2003 selection of Vancouver as a Games Host. However, other factors could have produced the same effect (e.g., demographic changes in the target populations, higher price of necessities, etc.).

Locally, some non-governmental organizations suggest that the 2010 Games have increased homelessness, and led to a decrease in the number of units of affordable housing and social housing (through gentrification, etc). However, a lack of available data does not allow conclusions to be made with reasonable certainty about the situation. Therefore, we leave our analysis at a descriptive stage, until new data become available.

## Environmental Outcomes

### Environmental Bundle 1: Land Use for Leisure

Three indicators comprise this bundle:

- Land Use Changes (En6);
- Public Open-Air Leisure (POAL) Areas (En10); and
- Protected Sites (En7).

#### Open-air Leisure Areas

Canada has approximately 610,000 km<sup>2</sup> of strictly protected sites. B.C. has a total land area of 950,000 km<sup>2</sup>, with nearly 14 percent designated as provincial parks, 0.5 percent designated as national parks, and 13 percent designated as World Heritage sites.

Efforts are being made to protect land and foster community development in the Whistler region, which will host some events for the 2010 Games. In 2008, the Resort Municipality of Whistler entered a limited partnership agreement with the Squamish and Lil'wat Nations for the *Cheakamus Community Forest* to co-manage 36,000 ha of forestland surrounding the municipality.

Between 2001 and 2006 in Metro Vancouver, the total public open-air leisure area (POAL) stayed the same while population grew by 5 percent, leading to a decrease in the amount of POAL per person. Compared to the provincial capital Victoria where the POAL per person increased by nearly a third (both POAL and population increased), Metro Vancouver appears to be lagging.

Efforts have been made to increase POAL in Metro Vancouver, such as a *Bylaw to Authorize the Dedication of Land as Regional Park* (2007), the *Regional Parks and Greenways Plan* which includes a goal to investigate opportunities for developing integrated recreation and tourism strategies to support the 2010 Games, and a *Bylaw to Adopt the Financial Plan for the Years 2008-2012* (2007) to make regional parks the largest expenditure.

Despite these efforts, the amount of leisure space per person decreased in Metro Vancouver between 2001 and 2006 (in contrast with an increase in the Capital Regional District). The reasons for the decrease in Metro Vancouver are partly definitional (public parks with an area less than 0.25 km<sup>2</sup> or 25 ha are not included as POAL) and partly geographical (Metro Vancouver has less available space than the Capital Regional District for devoting larger public areas to open-air leisure use).

#### Land Use Changes

The total land area in Metro Vancouver is 283,180 ha. It is differentiated between 18 categories of land use. For the indicator Land Use Changes (En6), data are compared between 2001 and 2006.

For five of the categories, land area did not change in size or as a share of the total Metro Vancouver area. These five categories of land use are: 1) Harvesting and Research; 2) Port

Uplands; 3) Protected Watershed; 4) Transportation, Communication and Utilities land; and 5) Road and Lane Right-of-Way.

For four categories, land area decreased slightly in absolute area, and their percentage share of the total Metro Vancouver land area remained more or less the same (within 1.3 percentage points). These four categories of land use are: 1) Agriculture; 2) Residential Rural; 3) Open and Undeveloped; and 4) Industrial-Extractive.

For five categories, land area increased in absolute size, but did not change as a proportion of the total Metro Vancouver area. These five categories are: 1) Commercial; 2) Institutional; 3) Residential-Commercial/Mixed; 4) High-Rise (apartments, more than 5 stories) (largest increase, by more than 25 percent); and 5) Low-Rise (apartments, less than 5 stories).

For three categories, land area increased both in absolute terms and as a share of the total Metro Vancouver area. These three categories are: 1) Industrial; 2) Recreation and Protected Natural Areas; and 3) Residential Single Detached and Duplex, and Residential Townhouses (largest increase, by nearly 18 percent, but by only 0.2 percentage points of the total area).

Between 2001 and 2006, changes were observed (1.3 percentage points or less) for 8 of the 18 land use categories in their share of the total land area of Metro Vancouver. It is difficult to either confirm or refute whether these changes are part of a typical city evolution, or whether the selection of Vancouver as Host City had some catalyzing effect (especially the increase in Recreation Areas, which could potentially be Olympic venues).

### Attributing Impacts to the 2010 Games

B.C. has a relatively large portion of its territory assigned to environmental protection/recreation. In general, such territories are more or less stable, and changes to protected areas happen relatively infrequently. Therefore, it is not surprising that neither the Games, nor anything else, affected their size.

Analyses suggest that: 1) the Games did not affect POAL through an increase in population in anticipation of the Games; and 2) the hypothesis that resources were re-directed away from POAL due to the Games can neither be confirmed nor refuted due to lack of readily available data.

We conclude that the Games have had little to no impact on land use for open-air leisure in the Host Region between 2001 and 2006, at least in the specific ways in which land use for leisure is defined. The only somewhat possible impact is the 6 percent increase in Recreation (and Protected Natural) areas land use (possibly linkable to venues construction).

## Environmental Bundle 2: Transportation and Well-being

Three indicators comprise this bundle:

- Transport Networks (En11);
- Daily Travelling Distance (En12); and
- Traffic Congestion (En13).

## Data Analysis: Indicator Evaluation Over Time

Dimensions of transport supply (road capacity and supply of transit) can be compared to “demand” dimensions (the indicators Daily Travelling Distance and Road Congestion), to provide a sense of transport performance.

Between 2006 and 2007, road capacity (motorways and highways) increased in both Vancouver and Metro Vancouver. However, motorways capacity surpassed population growth in Vancouver, while it lagged behind in Metro Vancouver. This contrast for this indicator dimension may be useful in the detection of an impact due to the 2010 Games.

Between 2001 and 2007, Skytrain guideway length increased in both Vancouver and Metro Vancouver. This increase has somewhat kept pace with population growth, at least within Vancouver city. The opening of the Canada Line will most likely affect these indicator dimensions and potentially show an impact that could be attributed to the 2010 Games.

Between 2004 and 2007 in Metro Vancouver, transit bus service-km (total bus system-wide distance travelled), increased steadily each year and overall. This increase was almost four times the population growth rate (4.2 percent) during the same period. Significant changes to annual growth rates in transit supply in 2010 may indicate an impact that can be attributed to the Games.

Overall, data for transport supply (road capacity and transit supply) show that investments in sustainable transportation are being practiced in Vancouver and in Metro Vancouver.

A comparison of the years 1996, 2001, and 2006 for the Vancouver Census Metropolitan Area showed that median commute distance decreased steadily from 7.7 to 7.4 km over the 10-year period. A similar trend was observed for the municipalities of Abbotsford and Victoria. Distances typically increased in most comparison cities outside of B.C. (with the exception of Montreal) and in Canada.

Between 2001 and 2006, the number of commuters travelling to Vancouver city grew by 4.9 percent, while the city’s population grew by 4.8 percent. This compares to essentially no growth in Toronto, a slower growth rate (2.9 percent) in Montreal, and a much larger growth rate in Calgary and Edmonton (by 13-15 percent).

The growth of commuter trips needs to be assessed for modes of transportation used, specifically sustainable modes such as public transit, walking, and cycling. A comparison between five Canadian cities in 2006 showed that the highest number of commuters using sustainable transportation modes were those who were travelling to Toronto, Vancouver and Montreal (40 percent). Calgary and Edmonton had about one half this share. Nevertheless, the use of sustainable transportation modes increased between 2001 and 2006 for all five cities.

Due to a lack of data on traffic speeds, traffic volumes (flow) was used as a substitute for estimating road congestion. Automatic counts are reported for traffic “screenlines,” which are conceptual boundaries that “capture” the total traffic flowing across it in both directions (mainly used to monitor traffic demand across regional boundaries over time).

Between 1996 and 2004 in Metro Vancouver, traffic screenlines on average grew by 6.7 percent, which was lower than population growth (11.8 percent) (mostly outside the core municipalities). The hypothesis that regional (*inter*-municipal) trips decreased while local (*intra*-municipal trips)

increased is supported by data from past travel surveys that show that short-distance modes, such as walking and cycling, have increased.

Data for Metro Vancouver also showed that changes in traffic screenlines ranged from *negative* growth in the urban core of Downtown Vancouver (-4.9 percent) to the most growth across Pitt River (23.1 percent). Generally, traffic growth was greater as the distance from Downtown Vancouver increased.

The negative growth of traffic into the downtown core can be attributed mostly to increased transit service into the downtown peninsula drawing people from cars onto transit, as well as to the increased density of residential units in that area. The pattern of traffic volumes crossing the Downtown Peninsula Screenline could be monitored in future years to determine whether the 2010 Games had an impact on traffic volumes into and out of the downtown core.

### Attributing Impacts to the 2010 Games

Although changes in the transportation system are not likely to reflect impacts from the 2010 Games yet, these transportation indicators could be sensitive enough to measure changes when data are analyzed 3-5 years after the Games.

The supply of transportation seems to be adhering to the sustainable transportation policies and plans that have been adopted by the region and cities over the years. Road supply has grown at a rate slower than population, whereas transit supply has exceeded population growth substantially. Together, these could indicate an impact of the 2010 Games, especially rapid transit supply given that the Canada Line will come into effect shortly before the Games. Likewise, during the Games there are planned changes to the transportation system and the monitoring of these changes during event-time could determine impacts.

## Environmental Bundle 3: Air and Water

Three indicators comprise this bundle:

- Public Water Supply (En2);
- Greenhouse Gas Emissions (or GHGs) (En4), which measures the emissions of six greenhouse gases that are linked to climate change; and
- Air Quality (En5).

### Data Analysis: Indicator Evaluation Over Time

The National Inventory monitors the following GHG emissions included in the En4 indicator dimensions – carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulphur hexafluoride (SF<sub>6</sub>), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). As the emission levels of such gasses fluctuate wildly from year to year, short-term reporting (e.g., 2001-2006) would fail to exhibit a definite trend and therefore would not be informative. Thus, we caution against focusing on GHG emissions by gas, and suggest using the total emissions overall and by industry, which reflects the economic and public sectors that are responsible for these emissions.

The total GHG emissions by industry are expressed in *standardized* units of kt CO<sub>2</sub> equivalent. The total emissions for each type of gas is converted to a CO<sub>2</sub> equivalent quantity based on the

relative global warming potential (GWP) values adopted by the Intergovernmental Panel on Climate Change (IPCC). The equivalent expresses all the GHGs in terms of CO<sub>2</sub> emissions harmful to the environment in order to enable the calculation of totals.

Between 2000 and 2006 in Canada, the total GHG emissions increased marginally by 0.4 percent. The GHG emission levels from Energy were overwhelmingly larger than from any other sector, and were the largest driver of the increase in emissions in 2003. Although Energy emissions decreased slightly in 2004, Industrial Processes and Agriculture emissions peaked in that year, making 2004 the year with the largest amounts of emissions produced nationally.

These trends were mostly mirrored in B.C. during the same period. In 2006, the total GHG emissions in B.C. were 1.6 percent higher than in 2000.

Two reasons make it difficult to assess with sufficient precision whether any of these fluctuations have been affected by the 2003 selection of Vancouver as 2010 Host – the short time period and the unlikelihood that the 2003-2004 peak in GHG emissions (driven mainly by stationary combustion sources in Canada and by fossil fuel consumption for transport in B.C.) were affected by the 2003 selection of Vancouver as 2010 Host.

GHG emissions from construction in B.C., although negligible compared to the other GHG contributors, have been continuously increasing since 2001. In 2006, they were nearly 60 percent higher than in 2000. Of all the observed changes, this increase in construction seems most plausibly to have been affected by the 2003 selection of Vancouver as 2010 Host – an 11 percent increase in 2003 over the previous year, and an additional 23 percent increase in 2004.

Air Quality (En5) was measured at 13 monitoring stations in B.C. (ten within Metro Vancouver, two within the Squamish-Lillooet Regional District, and one in the Fraser Valley Regional District at the Abbotsford Airport). Measurements of emissions of nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>) and particulate matter (PM<sub>10</sub> or PM<sub>2.5</sub>) were converted to a value based on Canada's Air Quality Health Index (AQHI).

A relative peak in AQHI was observed in 2003/2004 comparable to the peak in GHG emissions discussed above. The data (2000-2007) also show two distinct patterns. The AQHI values of nine Metro Vancouver stations reveal a generally constant trend towards an overall lower AQHI. The AQHI values of the Whistler and Squamish stations exhibit a different, strongly upward trend. While Squamish remains the most unpolluted place in terms of air quality (even with that large an increase in AQHI), Whistler's AQHI in 2007 was the highest registered ever in any of the stations.

These two distinct trends suggest that: 1) for Metro Vancouver (excluding Whistler and Squamish) there is no substantial Olympic Games impact yet (with the possible exception of the Games helping to promote a turn to a generally cleaner environment); and 2) Whistler and Squamish (a municipality located on the road to Whistler) are experiencing increasingly higher AQHI values after 2003, most likely attributable to increased construction and other activities oriented towards preparing the region for the 2010 Games. Therefore, the Games may have had an indirect negative impact on air quality in Whistler/Squamish.

Public Water Supply (En2) includes water consumption by all residential and non-residential customers plus the leaks in the municipality water main system. Data are reported for the five

Olympic municipalities in Metro Vancouver that will host events for the 2010 Games (Vancouver, North Vancouver, West Vancouver, Richmond and the University Endowment Lands).

Between 1989 and 2007, water consumption in the Olympic municipalities has been more or less stable in the five Olympic municipalities, with Vancouver exhibiting the strongest fluctuations.

Taking population size into account, water consumption per person has actually been decreasing over the years. During the most recent period 2000-2007, West Vancouver exhibited the lowest per capita water consumption and the steepest decline since 2003. North Vancouver, although using more water per capita, also shows a post-2003 decline, as does Vancouver but by a lower rate. The total water flow consumed by the regional Greater Vancouver Water District has also been marginally decreasing since 2004.

This decrease might be explained by two factors, also applicable to the decrease in GHG emissions discussed above. First, the reduction in water usage may be a result of the population (and businesses) becoming more conscious of the environment, which is a global trend in most developed countries in the world. Second, water usage in general depends on the weather, specifically the amount of rain, which affects household uses. Years with abundant rainfall usually register lowered water consumption. A comparison of data on annual rainfall with that of water consumption should allow for assessment of which factors lead to decreased water consumption (more rainwater, water use restrictions, or other factors).

### Attributing Impact to the 2010 Games

The decreasing trends in environmental indicators (GHG emissions and water usage) in B.C. after 2003/2004 and in B.C. municipalities (excluding Whistler and Squamish) together suggest a move towards more environmentally friendly practices and greater acceptance of the idea of sustainable development. These trends are likely to have existed even in the absence of the 2010 Games. Therefore, it is difficult to isolate potential Games impacts on these trends. Nevertheless, the Games may have been contributed to these trends by stimulating pro-environmental awareness and practices, directly or indirectly. On the other hand, the increase in AQHI in places like Whistler and Squamish possibly reveals a negative impact of the Games, likely tied to increased construction activities. It is possible that this impact might be temporary, to disappear once construction activities are over.

## Economic Outcomes

### Economic Bundle 1: Economic Activity

Four indicators comprise this bundle:

- Economic Role of the State (Ec23), which represents the government's contribution to the gross domestic product (GDP) in terms of spending and revenue;
- Employment Indicators (Ec2);
- Size of Companies (Ec3); and

- Dynamics of Service Activities (Ec20), which measures the net export and import of services in the Host Country.

#### Data Analysis: Indicator Evaluation Over Time

Economic Role of the State (Ec23) measures public spending and tax revenue, and their proportion of Gross Domestic Product (GDP). Between 2001 and 2007 in B.C., both public spending (by 21 percent) and tax revenue (by 29 percent) increased. However, their proportion of the GDP decreased. Similar trends were observed for Alberta and for Canada. In addition, budget balances have been largely positive (and for the most part increasing).

We highlight three points of interest. First, spending and revenue in B.C. do not appear to exhibit any particular exception to the general national trend. Second, the budget deficit in B.C. between 2002 and 2004 turned into a budget surplus after 2004, which suggests that 2010 Games do not appear to be adversely affecting the B.C. budget proportionately to the GDP. Third, the largest budget deficit was in 2002-2003, when the bidding (and presumably spending) to host the Games had reached its culmination, but similar (albeit smaller) trends were observed for Alberta and for Canada, which suggests that the situation was not specific to B.C.

Therefore, we conclude that public spending in B.C. could have been partly affected by Vancouver's candidacy, but it was not affected by the city becoming a Games Host, at least relative to a wider ranging set of positive economic developments.

Four employment-related dimensions characterize the economic activity of a region – the global activity rate, the unemployment rate, the fraction of women in the active population, and the net migration rate.

The global activity rate represents the fraction of the population who either are, or want to be, employed (i.e., the labour force) divided by the source population. The inclusion of those who want to be employed distinguishes the global activity rate from the employment rate (i.e., number of employed over the labour force). Between 2001 and 2006, the global activity rate increased very marginally in B.C., Alberta and Canada. The global activity rate in B.C. is comparable to that of Canada (about 6-8 percentage points below that of Alberta and the US).

Between 2001 and 2006 in B.C., the unemployment rate (the fraction of people in the labour force who wish to work but do not have jobs) fell by 2.5 percentage points (from 8.5 to 6.0 percent). This rate was slightly below that of Canada. In Alberta, however, the unemployment rate increased slightly (from 3.7 to 4.2 percent), but was still lower than the rate in B.C.

Between 2001 and 2006, the percentage of women in the labour force increased marginally in both B.C. and Canada, and slightly more in Alberta. An opposite trend was observed in the US (a decline).

Between 2001 and 2006, the net migration rate in B.C. declined, while in Alberta and Canada it increased (although in 2006 the net migration rate in B.C. was still higher than in both Alberta and Canada).

Of the four dimensions of employment presented, only the decrease in the unemployment rate could potentially be linked to the upcoming Games with any reasonable likelihood. A hypothesis is that the selection of Vancouver as 2010 Host created more employment

opportunities. However, more data are required in order to draw conclusions with greater certainty (could other factors have contributed to the same effect?).

Between 2001 and 2006, the total number of companies increased for all locations of interest – Metro Vancouver and B.C., the Greater Toronto Area or GTA and Ontario, and Canada – while the distribution of the size of companies (number of employees) remained relatively stable for all locations.

The number of companies grew faster in Metro Vancouver (and to a lesser extent in B.C.) than in GTA (and Ontario). Although the data are from only two time points (2001 and 2006), they do suggest that the number of businesses have grown in the major business center of the country (the GTA), and especially in the Squamish-Lillooet region (36 percent increase).

Two factors could potentially explain the growth in the number of companies. First, Metro Vancouver could have had more “room” for growth than the GTA, and the Squamish-Lillooet case bolsters this hypothesis. Second, the number of companies could have increased due to an upsurge of economic activity due to the upcoming Games (e.g., Squamish-Lillooet). In all likelihood, the growth of the number of companies in Metro Vancouver and Squamish-Lillooet was caused in part by a combination of these two factors, possibly with the 2010 Games as the driving factor.

The Dynamic of Service Activities indicator (Ec20) includes two dimensions – whether a country is a net exporter or importer of services and the relative significance of the net balance of services as a proportion of the GDP.

Canada is a net importer of services (Canadians purchase more services abroad than foreign nationals purchase in Canada), while the US is a net exporter of services. Between 2001 and 2006 in Canada, the ratio of the net balance of services to GDP increased from 0.6 to 1.1 percent, while in the US it did not change (0.6 percent).

The larger negative net balance for Canada in 2006 may indicate a trend or a one-time event influenced by macroeconomic fluctuations and the state of the global economy (for example, the strong Canadian dollar in 2006 may have made it an unattractive place for foreign tourists). However, two data points (2001 and 2006) do not fully capture changes, especially among service sectors (such as tourism) that may be caused by the 2010 Games.

### Attributing Impact to the 2010 Games

It is plausible that the unemployment rate in B.C. has been affected by the selection of Vancouver as 2010 Host and the upcoming Games through an upsurge in employment opportunities.

It is impossible to ascertain the impact of the Games on the net service balance of the country (the indicator is not sensitive enough to capture it), but at this point, there appears to be no impact.

In terms of government spending and revenue, there appears to be no post-2003 impact of the Games on the balance of the budget, although it is somewhat plausible that spending for the bid contributed to the deficit at that time.

The selection of Vancouver as 2010 Host likely contributed to the growth in the number of companies in Metro Vancouver and in the Squamish-Lillooet region.

## **Economic Bundle 2: Tourism**

Four indicators comprise this bundle:

- Hosting of International Events (Ec12);
- Tourist Nights (Ec9);
- Accommodation Infrastructure (Ec7); and
- Accommodation Occupancy Rate (Ec8).

### **Data Analysis: Indicator Evaluation Over Time**

Between 2001 and 2007 in Metro Vancouver, the number of beds per tourist establishment increased by 2.7 percent (the number of establishments decreased more than did the number of beds).

During the same period in B.C., the rate of beds per establishment also increased (both the number of establishments and of beds increased slightly).

The data suggest that while tourist accommodation infrastructure in Metro Vancouver decreased, it grew in B.C. (especially outside the Metro Vancouver region). Therefore, the data suggest no impact of the upcoming 2010 Games yet.

Accommodation occupancy rate measures the ratio of the number of *occupied* rooms to the total number of rooms. Between 2003 and 2007, the occupancy rate increased (occupancy increased more than did availability) in Metro Vancouver and in B.C. (marginally), while remaining unchanged in Canada.

A comparison with the GTA during the same period reveals that the higher accommodation occupancy rate in Metro Vancouver in 2007 is not unique to the Olympic region. Therefore, there was no (strong) Olympic Games impact on occupancy rate in the Host Region.

Of significance is that the total number of rooms in Metro Vancouver increased at almost twice the rate as that in the GTA. We cannot completely exclude that the Games had an impact on the increase in occupied rooms. Arguably, the increase in total number of rooms is part of the process of preparing the city for welcoming the large amount of visitors expected during the Games themselves.

Between 2001/02 and 2006/07, the number of events hosted in Vancouver increased by 46 percent (from 270 to 395 events). The types of events as a proportion of total events have changed too (decrease in Economic events, increase in Social and in Confidential events, decrease in Other events). Vancouver appears to be becoming more attractive as a destination for international conferences, conventions and meetings. It is plausible that to a certain extent this rising popularity is due to the greater exposure of Vancouver in connection to the upcoming Games.

Between 1998 and 2006, overnight tourists (those who spent at least one night) in Vancouver increased by more than 10 percent. In terms of place of origin, the distribution of tourists remained relatively stable, with about 30 percent of tourists coming from within B.C., about 28 percent coming from other parts of Canada, and the remaining 42 percent coming from abroad.

A comparison with Calgary, a previous Winter Games Host City, shows that between approximately 1998 and 2006, tourists tended to favour Vancouver as a tourist destination. It is possible that this effect was in part due to the upcoming Games (increased attention on and awareness of Vancouver). However, Toronto experienced a larger influx of tourists than did Vancouver, and the difference between the number of tourists in Vancouver and Toronto is widening.

### Attributing Impact to the 2010 Games

Given the greater increase in overnight tourists in Toronto compared to Vancouver, we can conclude that any potential effect of the upcoming Games on the number of tourists visiting Vancouver does not overcome Toronto's advantage as a preferred tourist destination. The data also show that the greatest increase in tourists for the 1998-2006 period in Vancouver actually occurred before 2003, which provides further evidence that the 2010 Games do not appear to have affected the number of tourists to Vancouver yet. The analysis of occupancy rate is in accordance with this finding. There is a possibility that the total number of rooms in Metro Vancouver has increased since the 2003 selection of Vancouver as 2010 Host, although the number of establishments (and beds in them) in 2007 seems to be still lower than in 2001.

Overall, our analysis suggests that Vancouver seems to enjoy increasing popularity as a place to host international events and that most likely this is due, at least partly, by the upcoming 2010 Games. In terms of number of tourists, Metro Vancouver does not appear to have experienced a unique place-specific influx of tourists that has not happened anywhere else. Finally, there is some indication that tourist accommodation has increased since 2003 but data issues preclude confirming that with any level of certainty.

### Summary and Conclusions for Bundled Indicators

Using a method of mathematical aggregation that incorporates the magnitude and direction of impact, the quality and availability of data, and our confidence in what we can say based on these, we arrived at conclusions on the impacts of the 2010 Games on the Host at pre-Games.

Our overall conclusion about the impact of the upcoming 2010 Games is that there has been a very slight positive Games impact, based on somewhat reliable to reliable data, and that we are generally confident about our conclusion.

The Games have had at least some impact on each of the three spheres in this pre-event phase. The Games have had a weak positive impact on the social-cultural sphere. Data for the socio-cultural indicators are the most unreliable of all spheres, but still allow for a relatively sufficiently conclusive analysis. For the environmental sphere, reliable data attests that indicators in this sphere have been mostly unaffected, or minimally affected in a negative way. Finally, the Games appear to have had a marginally positive impact on the economic sphere; however, this conclusion is based on somewhat reliable data.

Overall, as a pre-event outcome, it is concluded that the impact of the upcoming 2010 Games was found to be marginally positive, mostly due to the economic and socio-cultural spheres.

### **Analysis Possible But Inconclusive at Pre-Games – Indicators**

As mentioned earlier, data were generally available for these 29 indicators, but any relation to the Games at this stage is highly unlikely, and would at best be weak. The summaries below reflect a comparison between the baseline and pre-Games data points.

#### *Political Representation (So1)*

It is unlikely that the 2010 Games played a role in the resurgence of the New Democrat Party at the provincial level, or in the rise to power of either the Non-partisan Association or Vision Vancouver at the city level. The various parties have been supportive of the 2010 Games; therefore, it is unlikely that an incumbent party would lose favour with voters.

#### *Minorities (So5)*

The larger share of visible ethnic minorities (about 40 percent) than of Aboriginal people (1.9 percent) in the general population is likely due mainly to an increase in immigration, which is a long-term trend that is unlikely to be linked to the upcoming 2010 Games.

#### *Social Exclusion (So6)*

Between 2001 and 2005, social exclusion decreased in Metro Vancouver, B.C., and Canada. Fewer families and individuals were below LICO, and the Aboriginal population was earning more (though still significantly lower than the general population). Given that the increase in Aboriginal earnings was higher in Canada than for either Metro Vancouver or B.C., the increase was unlikely to have been due to the upcoming Games (although some effect might be possible).

#### *Crime Rates (So8)*

Between 2001 and 2006, crime rates in B.C. increased. Without periodic data available to compare crime rates before and after 2003 (when Vancouver was selected to host the 2010 Games), the detection of any Games impact is impossible. Although the Games may hypothetically indirectly affect crime rates, this is unlikely.

#### *Professional Leagues (So17)*

The numbers of professional sports teams in Vancouver and in B.C. remained the same between 2001 and 2008. Therefore, the selection of Vancouver to host the 2010 Games has had no impact.

#### *National Anti-Doping Controls (So20)*

It is impossible to ascertain the impact of the upcoming 2010 Games on domestic doping controls in Canada. It is possible, however, that a more strict application of the anti-doping rules of the Canadian Anti-Doping Program and lower tolerance toward doping infractions are related to the 2010 Games. Given that most of the infractions were in summer sports, there appears to be a limited increase in doping among winter sport athletes at least at this time.

### *Support Network for Disabled People (So45)*

Although the percentage of people with disabilities increased considerably in both B.C. and Canada between 2001 and 2006, a large part of the increase was most likely due to diagnosis that is more inclusive and more comprehensive recognition of disability rather than more people becoming disabled. We hypothesize no Games impact, unless it could be proven that these new criteria for diagnosis are somehow reflected by more attention, focus and sensitivity to disabilities and the “visibility” of people with disabilities potentially due to the upcoming 2010 Paralympic Games.

### *Water Quality (En3)*

Between 2003 and 2006, there was only a small change in the Fraser River’s eutrophication (process whereby excessive plant nutrients are added to a body of water), which was mostly towards decreasing concentrations of ammonia and nitrite (with the exception of nitrite at McDonald Slough). It is unlikely that the upcoming 2010 Games have had an impact on water quality at local monitoring sites.

### *Housing Areas (En9)*

Between 2001 and 2006 in Metro Vancouver, the population grew more (by 5.1 percent) than did the available formal residential area (by 2.2 percent). The population density (occupants per square kilometre) also increased (by 2.8 percent). Any changes in housing areas (size and population density) during this period were unlikely to have been influenced by the upcoming 2010 Games.

### *Energy Consumption by Use (En15)*

Between 2001 and 2006 in both B.C. and Canada, total energy consumption by use (Residential, Commercial/Institutional, Transportation, Agriculture) remained relatively stable, with a slight increase. These appear to be part of a long-term trend. The slight peak in energy consumption in 2004 is consistent with observations made for other indicators about the state of the national economy that year. No Games impact is hypothesized.

### *Raw Material Consumption (En17)*

Because only two data points (2001, 2004) were available for this indicator, it is difficult to isolate any potential impact of the Games. Nevertheless, the data suggest that in B.C. certain categories of raw materials (Forestry Products, Metal Ores and Concentrates, and Primary Metal Products) were used more in 2004 than in 2001. This increase may be related to an increase in construction, which in turn may be related to preparations for the upcoming 2010 Games.

### *New Waste and Wastewater Treatment Facilities (En33)*

During the past 10 years, three waste and wastewater treatment facilities were built – two in Vancouver city and one in the Metro Vancouver region. All were built before 2003, when Vancouver was selected to host the 2010 Games. Therefore, no new facilities were specifically built for the upcoming 2010 Games, and no Games impact is hypothesized.

### *Employment by Economic Activity (Ec1)*

Between 2001 and 2006 in both B.C. and in Canada, the number of individuals employed increased (as did the population). Because the observed changes are relatively small, it is unlikely that the 2010 Games had much impact. A possible exception is the increase in employment in Construction in B.C., which also increased in Canada (although less than in B.C.) and therefore the impact of the Games on employment (Construction) remains hypothetical.

### *Motor Vehicle Population (Ec5)*

The absolute number of vehicles by type of vehicle changed between 2003 and 2008, but their proportions remained essentially the same. The lack of comparable data before 2003 precludes us from evaluating trends in the number of vehicles to assess for a potential impact of the Games.

### *Public Transport (Ec6)*

Between 2002 and 2006 in Metro Vancouver, public transit ridership increased steadily. This appears to be a part of a long-term trend that reflects pro-environmental (government) efforts and changes in the preferences, values, and behaviour of the population. While the 2010 Games could have had some impact on these, it is impossible to isolate it and determine whether these changes would not have happened without the upcoming Games.

### *Airport Traffic (Ec10)*

Between 2001 and 2008 at the Vancouver International Airport (YVR), total annual passenger traffic increased by 15.4 percent (which can not be fully accounted for by population growth), while annual freight traffic decreased by 7.6 percent. It is plausible that Vancouver has become a more popular travel destination (possibly due to greater “visibility” as a future Olympic Host), but impossible to definitively conclude this because the proportion of arrivals (instead of departures) is not known.

### *Wages (Ec13)*

Data on wage gender disparity indicate that, on average, the situation has improved for women in Canada. On the other hand, it also suggests that there was greater income inequality, especially for men. The situation in Vancouver, and to some extent in B.C., is somewhat different in terms of gender disparity (decreased gender disparity ratio), but it is unlikely that the difference is due to the upcoming Games.

### *Gini Income Distribution Index (Ec14)*

The Gini index reflects the inequality of income or wealth in a country. Between 2000 and 2007/2008 in Canada, the Gini index (32.6%) did not change. Therefore, the upcoming Games are unlikely to have had an impact on this indicator. Although the indicator may be useful as a description of context at a country level, it does not reflect any changes at a local level (city or regional level).

### *Consumer Price Index (Ec15)*

The Consumer Price Index (CPI) is a measure of the average price of consumer goods and services purchased by households. There is no marked difference in the rate of change before 2003 vs. after 2003 (the year Vancouver was selected as a Host City) for either B.C. or Canada.

No Games impact can be detected, although some impact for B.C. is not completely unlikely (it is possible that monthly CPIs for B.C. during and immediately prior to the Games may be affected).

*Price Indexes (Ec16)*

Between 2003 and 2008, the annual inflation trend for prices of water/electricity and housing in B.C. were comparable to trends in Canada. Therefore, the trends in B.C. do not seem out of the ordinary. However, B.C. generally had less inflation than Canada. The available data do not allow for a comparison of inflation before vs. after 2003 (when Vancouver to host the 2010 Games). The inflation rate in B.C. may possibly increase in the lead up to the 2010 Games. In addition, future analysis must take into consideration the potential effect of the current economic crisis (2008-2009).

*Hotel Price Index (Ec17)*

Between 2001 and 2006, nominal hotel prices have increased in both B.C. and in Metro Vancouver. The “real” prices (adjusted for inflation), however, have fallen. The monthly trend in hotel pricing appears to be seasonal and thus unaffected yet by the Games. The lower “real” hotel prices could be due to numerous reasons, some of which could potentially be linked to the Games (greater availability of hotel rooms, or the desire to attract more tourists to Metro Vancouver and B.C.), although it is possible that the change has nothing to do with the Games. If annual data for all the years between 2001 and 2006 were available, a better assessment of potential Games impacts would be more feasible.

*Real Estate Market (Ec18)*

Between 2001 and 2006 in both Metro Vancouver and in B.C., average rental price and owner’s major payments increased marginally, while average residential prices increased more (in “real” dollars). Nevertheless, more residential properties were sold in 2006, and at a higher average price, than in 2001. Many reasons could potentially explain the price increases (e.g., increased demand for property, greater proportion of more expensive units sold, etc.), but it is difficult to isolate any specific impacts related to the Games. At best, it is reasonable to hypothesize that speculative property buying was/is on the rise the closer we get to the Games.

*Economic Balance (Import / Export) (Ec19)*

Between 2001 and 2007, a trend of decreased “openness” of the Canadian economy to foreign trade was observed (i.e., decreases in both imports and exports as a proportion of the GDP over time). It is unlikely that this trend can be substantially linked to the upcoming Games. Rather, the state of the national and the global economies as a whole is a more likely driving force behind the observed changes.

*Investment Risks (Ec21)*

Canada has been, and still is, estimated to be a very low-risk country for foreign capital investment. Although all of the reported ratings increased between 2001 and 2008, this change was highly unlikely to have been influenced by the upcoming Games.

### *Foreign Direct Investment (Ec22)*

Between 2001 and 2007, foreign direct investment (FDI) in Canada increased steadily, and the largest increase was in 2004 (one year after Vancouver was selected to host the 2010 Games). However, given the scale of measurement (country level), the increase in 2004 was most likely coincidental with Vancouver becoming the 2010 Host City. FDI data at a regional level may be more susceptible to impacts from the upcoming Games.

### *Structure of Public Spending (Ec24)*

Between 2001 and 2006, public spending increased at all levels – city, regional and country. Most of the observed changes, especially at the regional and country levels, seem unrelated to the upcoming Games. At the city level, however, preparation for the 2010 Games may possibly have driven the increase in public spending, especially given the increases in spending on Engineering, Recreation and Parks, Solid Waste and Community and Cultural Services.

### *Structure of Fiscal Revenue (Ec25)*

Between 2001 and 2006, fiscal revenues (in real, 2001-chained dollars) increased for Vancouver (by 20.7 percent), B.C. (by 13.5 percent), and Canada (by 6.3 percent). While the structure of the fiscal revenues of Vancouver and Canada remained mostly unchanged, the structure of the fiscal revenue of B.C. changed. The definitions of the categories in the revenue sheet preclude speculation on any potential link with the upcoming Games.

### *Public Debt (Ec26)*

The upcoming Games do not appear to have overburdened the Governments of B.C. and Canada, at least in terms of public debt. It could be speculated that public debt (both per capita and as a proportion of the GDP) could have decreased even more than they did (especially in B.C.) had Vancouver not been selected to host the 2010 Games. However, we have no means to test this speculation. Nevertheless, the decrease in public debt of the B.C. and Canadian governments suggests that the governments were able to meet the expenses associated with the Games (at least up until 2006).

## **Analysis Not Possible at Pre-Games – Indicators**

In the *Analysis Not Possible* group, the indicators are further grouped into one of three irresolvable data problems.

### *No Useful Data*

An indicator is placed in this category when there are no data available for either the baseline or the pre-Games period, or for both periods. Usually, data are available at baseline, but not for the pre-Games period.

Ten indicators comprise this group:

- Quality Management of Companies (Ec4);
- Foreign Organization Establishments (Ec11);
- Jobs Created in Olympic and Context Activities (Ec27);

- Indoor Air Quality (En25);
- Renewable Fresh Water Use (En1);
- Legislative Activity (So2);
- Sport and Physical Activities (So12);
- Available Sports Facilities (So14);
- World and Continental Championships (So18); and
- Sport Broadcasting (So22).

#### Methodology Inconsistent

An indicator is placed in this category when: 1) the source of data for the pre-Games period is different than that at baseline; 2) the source of data remains the same between the two periods, but the method used to collect or calculate the data changes between the two periods, such that the results are no longer comparable over time; and 3) the assembly of data was ad hoc in nature at baseline, which makes it difficult or impossible to reproduce the data during the pre-Games period.

Ten indicators comprise this group:

- Energy Consumption by Source (En14);
- Solid Waste Treatment (En18);
- Wastewater Treatment (En19);
- Pressure Groups (So3);
- Community Centres and Associations (So4);
- Cultural Activities (So11);
- Exclusion, Discrimination, Racism and Violence in Sports (So15);
- Media Specializing in Sport (So21);
- Information Media (So23); and
- Information and Communications Technology (So24).

#### Baseline Errors

An indicator is placed in this category when the data have errors that could not be fixed, usually due to a lack of documentation from the source, which precludes proper reproduction.

- Three indicators comprise this group:
- Energy Self-Sufficiency (En16);
- Poverty and Social Exclusion (So6); and
- Educational Level (So7).

## 1. Introduction

This *Olympic Games Impact Study – Pre-Games Report* (two volumes – Results and Technical) is submitted by the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) to the International Olympic Committee (IOC) in partial fulfillment of VANOC’s responsibility regarding the Olympic Games Impact (OGI) Program for the Vancouver 2010 Olympic and Paralympic Winter Games (2010 Winter Games).

The purpose of OGI is to measure the impact of Olympic and Paralympic Games over time through a consistent and comparable reporting system. The time frame for an OGI study is 12 years, beginning when a country’s National Olympic Committee (NOC) announces the official candidacy of the city for hosting the Games, and ending three years after the Games are over. OGI uses a series of 126 indicators that measure the status of many environmental, socio-cultural and economic dimensions of the Host City, Region and Country. Of the 126 indicators, 80 are context and 46 are event. For the current Pre-Games Report, context indicators (30 social, 28 economic, and 22 environmental) are presented. Context indicators measure changes in the broader state of regional affairs, which may or may not have been affected by the Games. Examples include air and water quality. Event indicators measure the economic, environmental and social footprint of the Games. An example is international media image.

Data and trends in these indicators are analyzed and presented in a series of four reports developed by an independent research body for each Olympic Games organizing committee. Figure 1 shows the OGI reporting timeline for the 2010 Winter Games, and includes the periods for which data are reported and the reports (and their year of production) in which they will be presented. Each subsequent report will to some extent relate to data from previous reporting periods, but also report on data since the previous report. The baseline report was produced in 2007 and presented 2001 contextual data. A second report (pre-Games, or the current report), which measures changes in the regional context 2001-2006, is produced in 2009. A third Games-time report (to be produced in 2010) will present event indicators, and is a required volume of the Official Report of the Olympic Games mandated by the Host City Contract. The fourth and final report (post-Games) will be produced in 2013, and will include trends among the indicators and an overall analysis for the complete 12-year reporting period. It is noted that although in some cases data fall into the prescribed reporting period, other data that fall outside the prescribed reporting period were used on a case-by-case basis (for example, some data are collected less frequently and therefore do not fall into the prescribed reporting period).

Figure 1: OGI Reporting Timeline for the 2010 Winter Games



This pre-Games report only addresses the 80 context indicators. This includes trends that are already present regardless of the event (the Games) *and* adaptations to that baseline in preparation for hosting the Games. In this report, data are often compared to 2001 baseline indicator data. Coincidentally, in Canada, 2001 was a National Census year, which means data for a wide range of indicators are readily available for the specified time period. This pre-Games report similarly includes a wide range of data for 2006, another National Census year.

In addition to this volume (the *Olympic Games Impact Study – Pre-Games Results Report*) which summarizes OGI results, there is a complementary volume entitled *Olympic Games Impact Study – Technical Report 1*. The Technical Report contains an extended discussion of OGI as well as the methodology developed by the research team. The Technical Report also contains the raw indicator data in spreadsheets.

OGI requirements are established by the IOC. An independent research organization evaluates the impacts of the Games for the Games organizing committee. Data collection and analysis of the OGI indicators is not integrated into VANOC's Games management systems. This ensures that the OGI study is based on independent research, although OGI reports may be a source of information for VANOC in planning and staging the 2010 Games. This independence is a key source of validation for the Pre-Games Report and subsequent reports.

The report has been prepared by a research team at the University of British Columbia. The University of British Columbia (UBC) is one of Canada's largest public research and teaching institutions and ranks solidly among the top 35 universities in the world. It offers a range of innovative undergraduate, graduate and professional programs in the arts, sciences, medicine, law, commerce and other faculties. UBC ranks in the top 10 universities in North America and number one in Canada for commercializing research, and for its patent activity in the life sciences. The members of the OGI-UBC team are, in alphabetical order:

- Feruza Abdjalieva – Indicator Data Analyst
- Mariana Gatzeva, Ph.D. – Senior Analyst, Impacts and Trends
- Meredith Hambrock, B.A. – Coordinator, Data Assembly & ERG
- Pam Jung – Indicator Data Analyst
- Brenda Kwan, M.Sc. – Senior Policy Analyst
- Clark Lim, M.A.Sc., P.Eng. – Manager, Data & Methodology
- Jessica Shing, B.Sc. – Context Data Analyst
- Rob VanWynsberghe, Ph.D. – Lead

The report is organized as follows. Section 2 provides relevant context-setting information regarding the Olympic Movement generally, and the 2010 Winter Games specifically.

Section 3 offers an overview of the geographic region within which the 2010 Winter Games will occur. This is important in setting the context for the OGI indicator data.

Section 4 offers a brief description of the approach used in data analysis, with summary tables of all the indicators.

Section 5, Section 6, and Section 7 provide a synopsis of the outcomes from the initial phase of the OGI program.

Finally, Section 8 provides an overall view of the Games' impact on selected context indicators.

A glossary, tables, and figures are appended.

## **2. The Olympic Movement, The Paralympic Movement and the 2010 Winter Games**

### **2.1. The Olympic Movement**

The Olympic Movement groups together all those who agree to be guided by the Olympic Charter and who recognize the authority of the International Olympic Committee, namely: the International Federations (IFs) for those sports included in an Olympic Games program; the National Olympic Committees (NOCs); the Organizing Committees of the Olympic Games (OCOGs); athletes, judges and referees, and all the organizations and institutions recognized by the IOC.

The goal of the Olympic Movement is to contribute to building a peaceful and better world by educating youth through sport, practiced without discrimination of any kind, in a spirit of friendship, solidarity and fair play.

#### **2.1.1. International Olympic Committee (IOC)**

The International Olympic Committee was founded on June 23, 1894 by the French educator Baron Pierre de Coubertin who was inspired to revive the Olympic Games of Greek antiquity.

The IOC is the overarching authority of the Olympic Movement and is an international non-governmental, non-profit organization. The IOC exists to serve as an umbrella organization of the Olympic Movement. It owns all rights to the Olympic symbols, flag, motto, anthem and Olympic Games. Its primary responsibility is to supervise the organization of the summer and winter Olympic Games.

The inaugural Olympic Games of the modern era opened in Athens on April 6, 1896.

The first Olympic Games to take place after the First World War were held in Antwerp, Belgium in 1920. Sports included figure skating, while ice hockey made its Olympic debut. The following year, the IOC Congress decided that the organizers of the 1924 Olympic Games in France would host a separate “International Winter Sports Week,” under the patronage of the IOC. This week proved to be a great success, and in 1925, the IOC decided to create separate Olympic Winter Games not connected to the Olympic Summer Games.

Subsequently, at the 24th IOC Session held in Lisbon, Portugal in 1926, the 1924 events in Chamonix, France were retroactively designated as the first Olympic Winter Games. These first Olympic Winter Games in Chamonix attracted more than 258 athletes (11 women, 247 men) from 16 nations, competing in 16 events.

#### **2.1.2. Olympic Games Host Nation**

The IOC awards the organization of each summer and winter Olympic Games to the National Olympic Committee (NOC) of the country of the Host City, and the Host City itself. For that purpose, the NOC forms an Organizing Committee for the Olympic Games (OCOG), which communicates directly with the IOC, receiving advice and instructions on hosting responsibilities. From the time of its constitution to its liquidation, the OCOG must comply with

the Olympic Charter, the Host City Contract entered into (involving the IOC, the National Olympic Committee and the Host City), as well as instructions of the IOC Executive Board.

### **2.1.3. Agenda 21**

Sport and Culture are the traditional pillars of the Olympic Games. At the Centennial Olympic Congress in 1994, the IOC created a new pillar, environment, while establishing a Sport and Environment Commission. In 1999, the IOC adopted its own version of the United Nations' Agenda 21 for Sustainable Development (see Technical Report). Called Sport for Sustainable Development, this statement outlines a program of action for using sport to advance sustainable development. To help implement this plan, the IOC established a formal collaboration with the United Nations Environment Programme (UNEP).

The IOC version of Agenda 21 has three objectives:

- 1) Improve socio-economic conditions in host communities;
- 2) Improve Games-based practices on environmental conservation; and
- 3) Strengthen the inclusion of women, youth and indigenous peoples in the Games.

While sustainability is still a relatively new concern within Olympic and Paralympic Organizing Committees, it is a “good fit” with the core values and ideals of the Olympic and Paralympic Movements.

## **2.2. The Paralympic Movement**

The International Paralympic Committee (IPC) was founded in 1989 and since then has become one of the largest sport organizations in the world. The IPC represents the vast majority of athletes with a disability. Through its ideals and activities, it seeks the continuous global promotion of the values of the Paralympic Movement, with a vision of inspiration and empowerment of people living with a disability.

Prior to World War II, 80% of paraplegics died within the first three years following their injury. Following the war, however, medical knowledge improved dramatically increasing lifespan. Responding to this change in 1944, the British government asked Sir. Ludwig Guttmann, a surgical neurologist, to open a Spinal Cord Injuries Centre at Stoke Mandeville Hospital in Aylesbury, England. This center's philosophy focused on the restoration of physical strength, activity of the mind, self-dignity, self-confidence and comradeship. Almost immediately, Guttmann introduced sport as part of his clinical treatment program. In Canada, similar activities began with the first on the front lawn of the Deer Lodge Rehabilitation Hospital in Winnipeg in 1946 (Legg, 2000; Legg, Emes, Stewart & Steadward, 2004).

The first Olympic-style games for athletes with a disability – now called the Paralympic Games – were held after the Rome 1960 Olympic Summer Games. The first Paralympic Winter Games took place in Örnsköldsvik, Sweden in 1976. The Paralympic Games have taken place at the same venues as the Olympic Games since the Seoul 1988 Paralympic Summer Games, in South Korea, and the Albertville 1992 Paralympic Winter Games, in France. In most Paralympic

sports, competitors with similar disabilities compete against one another, according to the specified rules of a given sport.

Canada first participated in in1968 and, in 1976, hosted the Olympiad for the Physically Disability (as it was then called) in Toronto. It was not until 1992 that the Winter Paralympic and Olympic Games were held in the same city (Steadward & Foster, 2003). Over time, the Games evolved into an elite international competition involving a wide range of athletes from around the world.

## **2.3. The 2010 Olympic and Paralympic Winter Games**

### **2.3.1. Host City Selection Process for the 2010 Winter Games**

The city of Vancouver was elected Host City of the XXI Olympic Winter Games in 2010 at the 115th IOC Session, held in Prague, Czech Republic, on July 2, 2003. Eight cities applied to host the 2010 Games: Andorra la Vella, Andorra; Bern, Switzerland; Harbin, China; Jaca, Spain; PyeongChang, Republic of South Korea; Salzburg, Austria; Sarajevo, Bosnia-Herzegovina; and Vancouver, Canada.

Three Candidate Cities were selected from the eight Applicant Cities following an extensive applications review by a working group comprised of IOC administration members and external experts. An assessment was made of each Applicant City's ability to stage high-level, international, multi-sport events, and their ability to organize quality Olympic Winter Games in 2010. Assessments were made against a set of 11 technical assessment criteria: government support and public opinion, general infrastructure, sports venues, Olympic Village, environmental conditions and impact, accommodation, transport, security, experience from past sports events, finance and general concept.

In 1998, the Canadian Olympic Committee selected Vancouver to be the candidate for Canada's bid for the 2010 Winter Games. The three Candidate Cities submitted their candidature files to the IOC in January 2003. These were subsequently analyzed in detail by the IOC Evaluation Commission. Members of the Commission also inspected the Candidate Cities, before issuing a report in May 2003. The Vancouver-Whistler bid was successful.

The 2010 Winter Olympic Games will be held from February 12–28. The 2010 Paralympic Winter Games will be held from March 12–21. The 2010 Winter Games will be held venues throughout the Greater Vancouver area, and in Whistler, Canada.

During the 2010 Olympic Winter Games, a projected 5,500 athletes and team officials will be involved in seven sports and 15 sport disciplines (alpine skiing, biathlon, bobsleigh, cross-country skiing, curling, figure skating, freestyle skiing, ice hockey, luge, Nordic combined, short track speed skating, skeleton, ski jumping, snowboard and speed skating) and 86 separate medal events. In the 2010 Paralympic Winter Games, a projected 1,350 athletes and team officials will be involved in five sports (alpine skiing, biathlon, cross-country skiing, ice sledge hockey and wheelchair curling) and 64 separate medal events.

### **2.3.2. Vancouver Organizing Committee**

The Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) was established on September 30, 2003. VANOC's mandate is to support and promote the development of sport in Canada by planning, organizing, financing and staging the 2010 Winter Games.

In addition to the IOC-related obligations noted under "Olympic Games Host Nation" (see Section 2.1.2), other documents relevant to VANOC's sustainability commitments include:

- a) 2002 – Multiparty Agreement for the 2010 Winter Olympic and Paralympic Games

b) 2002-05 – a series of agreements between VANOC and the Lil'wat, Musqueam, Squamish, Tsleil-Waututh First Nations.<sup>1</sup>

c) An Inner-City Inclusive Commitment Statement

d) 2004-10 – requirements of federal and provincial environmental assessment legislation and project approvals

VANOC is guided by a 20-member board of directors nominated by the Government of Canada, the Province of British Columbia, the City of Vancouver, the Resort Municipality of Whistler, the Canadian Olympic Committee, the Canadian Paralympic Committee and local First Nations.

### **2.3.3. Vancouver 2010: "Sustainability in Action"**

VANOC's vision is:

A stronger Canada whose spirit is raised by its passion for sport, culture and sustainability.

VANOC's mission is:

To touch the soul of the nation and inspire the world by creating and delivering an extraordinary Olympic and Paralympic experience with lasting legacies.

VANOC's values are:

- Team: Fair play, respect, compassion, accountability and inclusion
- Trust: Integrity, honesty, respect, fairness and compassion
- Excellence: Recognition, compassion and accountability
- Sustainability: Financial, economic, social and environmental sustainability
- Creativity: Innovation, flexibility and adaptability

For the 2010 Winter Games, "sustainability" means managing the social, economic and environmental impacts and opportunities of the Games to produce lasting benefits – locally and globally. VANOC recognizes the opportunity to demonstrate how sustainability, in all its aspects, can be incorporated throughout Olympic and Paralympic Games.

VANOC's plan for the 2010 Winter Games contains specific initiatives to ensure the Games leave a positive legacy, not just for sport, but also for Canada's environment, economy and local communities. These initiatives are based on the principle of maximizing opportunities and minimizing any negative impacts.

In 2005-06, VANOC established a set of six corporate-wide sustainability performance objectives. These objectives are based on Bid Commitments, best management practices of other Organizing Committees and input from sustainability experts and key partners and stakeholders. They are now an integral part of VANOC's strategic and business plans, and are being

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<sup>1</sup> First Nations are Canadian Aboriginal communities.

incorporated into the more detailed operational plans essential to delivering an extraordinary Olympic and Paralympic Games experience.

VANOC's sustainability performance objectives are:

1) Accountability

- To behave ethically, set measurable performance targets and communicate openly about our progress and challenges
- To consult with external groups affected by our activities

2) Environmental Stewardship and Impact Reduction

- To conserve natural environments and manage, mitigate and offset negative impacts

3) Social Inclusion and Responsibility

- To convene accessible Games that have a positive impact on socially and economically disadvantaged groups that otherwise would not benefit
- To care for our workforce, protect human rights and ensure health and safety

4) Aboriginal Participation and Collaboration

- To partner with the Four Host First Nations to achieve an unprecedented level of Aboriginal participation in the Games

5) Economic Benefits

- To demonstrate that sustainable innovation and practice makes good business sense

6) Sport for Sustainable Living

- To use sport, and growing athlete and public interest in living more sustainably, to inspire action on local and global sustainability challenges.

## References

- Legg, D. (2000). Strategy Formation in the Canadian Wheelchair Sports Association (1967-1997). Doctoral Dissertation, Edmonton, AB: University of Alberta.
- Legg, D., Emes, C., Stewart, D. & Steadward, R. (2004). Historical overview of the Paralympics, Special Olympics and Deaflympics, *Palaestra*. 20(1): 30-35
- Steadward, R. & Foster, S., 2003, History of Disability Sport: From Rehabilitation to Athletic Excellence. in *Adapted Physical Activity*, eds. Steadward, R., Wheeler, G. and Watkinson, J., (Edmonton, AB: University of Alberta, 2003). p. 471-496

### **3. International, National, Regional, and Local Context for the 2010 Winter Games**

#### **3.1. International Context 2006**

##### **3.1.1. Global Demographics**

In 2006 The United Nations estimated the population of the world to be approximately 6.5 billion, with an annual rate of increase of about 1.2 percent. Africa's population saw the highest rate of increase at 2.2 percent per year and Europe the lowest at 0 percent. The global median age was 28.4 with 65.2% of the population falling between the ages of 15 and 64. The global life expectancy was 64.7 years (The United Nations...2008). The population density of the world was 48 people per square kilometre of land. In 2005 the urban population made up of 48.6% of the total population with a likely increase of 1.98% per year between 2006 and 2010. 7.4% of the total population was over 65 years of age and by 2008 this number will increase to 7.6% signifying a population that is getting older (CIA 2006, CIA 2007).

##### **3.1.2. The Economy**

The economies of low and middle income countries, especially China and India saw rapid growth in 2006. Their participation rates within the global markets grew by 7% and the outlook was positive for low and middle income countries due to a greater reliance on their supplies of oil, metals, minerals and manufacturing by the international community (World Bank, 2008). The exportation of manufacturing based jobs to countries like China and India attributed to this change. The loss of a domestic manufacturing base lead to the dissolution of a large portion of the middle class economy in the western world and appeared to have a strong influence on the political systems of many countries. A large shift to the left, especially to parties with working class roots, was noted in 2006 in attempts to re-domesticate the manufacturing based workforce (Roach, 2007).

##### *China*

By the end of 2005 China was the greatest contributor to the global output with a 9.3% rate of growth within the fiscal year. In 2006, China's GDP was 10 trillion dollars with a 10.5% growth rate. 48.1% of the GDP was in to the industrial sector while 40% was attributable to the service industry. The labour force was estimated to be made up of 798 million people with 10% of the population living below the poverty line. While China is an emerging giant it faces great challenges due to population that is aging rapidly as a direct result of the one child policy- a process implemented to slow down population expansion. Despite this challenge, it was predicted in 2006 that China will increase its GDP 45% by 2010 (CIA: China 2007).

##### *India*

India's economy continued to grow in 2006, finishing 2005 with the second highest global output rate of 7.6%. The GDP increased by 8.5% after two years of steady 8% increases. This was due to an even larger focus on the burgeoning manufacturing industry and an educated workforce with a well rounded knowledge of the technology sector. The service industry accounted for 55% of the GDP however 60% of the workforce consisted of agriculture and its

workers with a per capita GDP of only \$3,700 proving that India still had a large shift to make in order to support its growing population (CIA: India 2007).

#### *Gross World Product*

In 2006 the Gross World Product (GWP) was 65 trillion dollars, with a reported increase of 5.1% in twelve months. The per capita GWP was \$10,000 (CIA: World 2007). This amount is more than 3X that of the relatively meager \$18.5 trillion dollar GWP estimated in 1988 (CIA: World 1989). The labour force was constructed primarily by those working in the agriculture sector (42%) however, this sector only contributed to 4% of the GWP. In 2006 42% of the working population was sharing 4% of the GWP, illustrating a globally disproportionate distribution. (CIA: World 2007).

In Spring 2006 the Dow Jones Industrial Average had been performing poorer than expected, however, as the year progressed the market rallied and the Index closed at a record high (MSNBC.com 2007). In Canada, the case was no different, the Toronto Stock Exchange closing out the year with a record high as well. International Gas Prices were soaring, feeding the Alberta economy and causing the province to obtain a GDP 60% higher than the Canadian counterpart. The success of these markets indicated a strong economy (Wyld 2007).

#### **3.1.3. Terrorism**

Issues of terrorism and security continued to remain potent in 2006 and had an impact on the travel and tourism industry. Increased security and the banning of liquids and gels from checked bags and carry on luggage, a flight policy which still exists today, impacted the ease with which people travelled to different areas of the world and the acts of terrorism themselves effected the perceived safety of countries. Suspicions of terrorism in Canada grew when seventeen men were arrested in Toronto, Ontario. On June 3<sup>rd</sup> they were taken into custody by CSIS who tied the men to a plot to launch attacks against Canadian targets (Meserve 2006). Twenty days later the FBI foiled another terrorist plot to attack the Sears tower in Miami. According to reports, the Sears Tower was not the only proposed target (BBC 2006). On July 11<sup>th</sup> commuter trains in Mumbai, India were attacked during rush hour as citizens were heading home from work killing more than 100 people (CNN 2006). Furthermore, on August 10<sup>th</sup> in London, 21 arrests were made in connection to a terrorist plot which involved aircraft (Sullivan 2008). Airports continued to be a target into December when a Spanish Terrorist organization bombed the Madrid Barajas International Airport. Only two casualties were reported (Goodman 2006). The following night, nine bombs were reportedly detonated in Bangkok during New Years celebrations. No individuals or groups have taken responsibility for this atrocity which injured 41 and killed 3 (AFP 2008). These are only a few examples of the numerous terrorist acts which occurred around the world in 2006.

#### **3.1.4. Weather**

2006 was a year of dramatically polarized temperatures and disasters across the globe. It was the sixth warmest year on record causing severe amounts of ice to retreat at record speed in the Arctic. Droughts, severe weather and flooding all dramatically impacted the world and the typhoon season in South East Asia was generally more severe and caused vast amounts of damage. North America and Europe both saw extreme heat waves and Europe also experienced

significantly lower temperatures than normal during the winter months. Both Australia and Brazil broke their record high temperatures (World Meteorological Organization 2007).

In Africa, over 11 million people suffered when extreme drought caused unprecedented food shortages, especially in Somalia. Droughts also affected Australia, Brazil and China. To further illustrate the odd weather polarities that existed in 2006, many African, Central American and South East Asian countries were struck by heavy rainfall that caused mudslides and flooding (World Meteorological Organization 2007). 2006 was a year that illustrated the effects of climate change and the growing threat of warming global temperatures.

### **3.1.5. Health**

Global health trends in 2006 included drought and famine, as mentioned above and pandemics. Fears concerning the deadly strain of the Avian Bird Flu, H5N1, reached a head in 2006 when 97 citizens of Asia and the Middle East were reported dead and the World Health Organization announced that there was a possibility that the disease could be transmitted between humans (CBC 2009). A WHO report released in 2006 sparked fears of a looming global pandemic that could have such catastrophic effects as the Spanish Influenza Outbreak in the early 20<sup>th</sup> century however, the epidemic did not reach such catastrophic proportions.

A 2006 WHO report stated that the world was experiencing a supreme shortage of doctors, midwives and nurses, especially in Sub Saharan African Countries in response to the HIV/AIDS crisis. The report numbered the shortage at 4.3 million and illustrated the disparity between health care in North America and Africa. This doctor shortage will continue to cause problems both for the first and developing world (WHO 2006).

### **3.1.6. Sporting Events**

The Winter Olympics was held in Turin, Italy in February 2006 with Germany winning 29 medals, closely followed by the United States with 25. Canada achieved 24 medals, a record high (Molinaro 2007). In March, Melbourne hosted the 18<sup>th</sup> Commonwealth Games. Canada placed third in the medal rankings after England and Australia (Melbourne 2003). The very first World Baseball Classic was held in San Diego from March 6<sup>th</sup>-20<sup>th</sup>. Asia dominated the championship, which featured 16 different nations including Canada. Japan won the round robin tournament, winning the first title (World Baseball...2006).

### **3.1.7. Politics**

The influence of economics on politics (see economy above) was made evident as several countries moved to a more social democratic form of government representation. The United States, with a Democratic majority in Congress as well as the Senate, (Alfano 2006), France, Spain, Italy, Germany and Japan all became significantly more liberal (Roach, 2007). In Canada, while the official opposition of the minority government was liberal, the Prime Minister was a newly elected conservative, Stephen Harper, who won a federal Election in January 2006 and took office in early February (Conservative Party...2009).

After suffering a hemorrhagic stroke, Israeli Prime Minister Ariel Sharon underwent surgery and fell into a coma. Four months later, in mid April, he was removed from office (Bronner 2006). On October 13<sup>th</sup> a new Secretary General of the United Nations was confirmed, Ban Ki-Moon, a

citizen of South Korea however he did not officially take office until January 2007 (The United Nations 2008).

## References

- AFP, "Thai police abandon probe of Bangkok blasts." 03 20 2008  
.http://afp.google.com/article/ALeqM5gnOoHBVHrkeELopRitabC0fjIUbQ (accessed April 30 2008).
- Alfano, Sean. "Why the Democrats Won." 11 08 2006.  
.http://www.cbsnews.com/stories/2006/11/08/politics/main2161309.shtml (accessed May 5 2009 ).
- Amnesty International, "Amnesty International Report 2007: Sudan."  
2007.  
.http://report2007.amnesty.org/eng/Homepage (accessed May 4 2009).
- BBC News, "Seven charged over 'Chicago plot.'" 06 23 2009.  
.http://news.bbc.co.uk/2/hi/americas/5110342.stm (accessed May 5 2009).
- Bronner, Ethan . "Sharon Set the Stage His Heir Reacts On." 08 06 2006  
.http://www.nytimes.com/2006/08/06/weekinreview/06bronner.html?\_r=1 (accessed May 5 2009).
- CBC News, "The Next Pandemic? ." 05 12 2009 .  
.http://www.cbc.ca/news/background/avianflu/ (accessed April 30 2009).
- CIA, "The World Factbook: China."  
2008.  
.http://www.allcountries.org/wfb2007/china/china\_economy.html (accessed May 5 2009).
- CIA, "The World Factbook: China."  
2007.  
.http://www.allcountries.org/wfb2007/china/china\_economy.html (accessed May 5 2009).
- CIA, "The World Factbook: India."  
2007.  
.http://www.allcountries.org/wfb2007/china/china\_economy.html (accessed May 5 2009).
- CIA, "The World Factbook: World." April 23 2009.  
.https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html (accessed April 30 2009 ).
- CNN, "At least 174 Killed in Indian Train Blasts." 07 11 2006.  
.http://www.cnn.com/2006/WORLD/asiapcf/07/11/mumbai.blasts/index.html (accessed May 5 2009).
- Conservative Party of Canada, "Stephen Harper." 2009.  
.http://www.conservative.ca/EN/1002 (accessed May 5 2009).
- Goodman, Al. "Madrid Bomb Shatters ETA cease-fre." 12 31 2006.  
.http://www.cnn.com/2006/WORLD/europe/12/30/madrid.blast/index.html?section=cnn\_est (accessed May 5 2009).
- Majtenyi , Cathy. "Sudan Rejects UN Resolution on Darfur Peacekeeping." 09 01 2006.  
.http://www.voanews.com/english/archive/2006-09/2006-09-01-voa48.cfm?CFID=186451216&CFTOKEN=98756370&jsessionid=0030feb844a7c969dfe114277410771b6c7d (accessed May 4 2009).

"Melbourne 2006 Commonwealth Games." 2003.<http://www.melbourne2006.com.au/Channels/> (accessed May 7 2009 ).

Meserve, Jeanne. "Toronto Terror Plot Foiled." 05 03 2006  
<http://www.cnn.com/2006/WORLD/americas/06/03/canada.terror/index.html> (accessed May 5 2009 ).

Molinaro, John. "CBC Sports: Top Ten Stories."  
2007.<http://www.cbc.ca/sports/indepth/2006review/topstories.html> (accessed April 30 2009).

MSN.com staff, "Year in Review: Top 10 Business Stories of 2006."  
01,2007.<http://www.msnbc.msn.com/id/16327022/> (accessed April 30 2009).

Roach, Stephen. "The Global Economy and the Lessons of 2006." 01 10,  
2007.<http://www.moneyweek.com/news-and-charts/economics/the-global-economy-and-the-lessons-of-2006.aspx> (accessed April 30 2009).

The United Nations, "Appointment Process." 2009.<http://www.un.org/sg/appointment.shtml>  
(accessed May 5 2009 ).

The United Nations Statistics Agency, "Population, rate of increase, birth and death rates, surface area and density for the world, major areas and regions: selected years." 2008.  
<http://unstats.un.org/unsd/demographic/products/dyb/dyb2006/Table01.pdf> (accessed April 30 2009).

WHO, "The World Health Report 2006."  
2007.<http://www.who.int/whr/2006/overview/en/index.html> (accessed May 7 2009).

World Bank, "A Portrait of the Global Economy." 2008.  
[http://siteresources.worldbank.org/DATASTATISTICS/Resources/WDI08\\_section4\\_intro.pdf](http://siteresources.worldbank.org/DATASTATISTICS/Resources/WDI08_section4_intro.pdf)  
(accessed April 30 2009 ).

World Baseball Classic, "2006 Standings ."  
2006.<http://web.worldbaseballclassic.com/standings/2006.jsp> (accessed May 7 2009).

World Meteorological Organization, "WMO statement on the status of the Global Climate in 2006 ." 2007.[http://www.wmo.int/pages/themes/wmoprod/documents/WMO\\_1016\\_E.pdf](http://www.wmo.int/pages/themes/wmoprod/documents/WMO_1016_E.pdf)  
(accessed May 7 2009).

Wyld, Adrian. "TSX Hits a New High ." <http://www.cbc.ca/news/interactives/who-business2006/> (accessed April 30 2009).

## **3.2. Host Nation for the 2010 Winter Games – Canada**

### **3.2.1. Population**

Canada is justifiably proud of its international status as a thriving mosaic of different people and cultures from across the globe. Coupled with a rich diversity of First Nations, the Canada of 2009 is a truly multicultural society. In 2006, Canada's population was 31,612,897, up from 30,007,094 in 2001 (Statistics Canada 2008). This 5.4 percent growth is reflected in nearly every province and territory and between 2001 and 2006; it was the highest rate of population growth for any G8 country in the same period.

In 2006, 3.7 percent of the total Canadian population was Aboriginal. Immigration was responsible for two-thirds of population growth between 2001 and 2006, making up 19.8 percent of the population (Statistics Canada 2007). The majority of immigrants were from the United Kingdom, the People's Republic of China, and India. In recent years, a large number of people have also emigrated from the Philippines. In 2006, the national average birth rate (number of live births per 1,000 people) was 10.9, and the median age was 39.5, showing an increase from 37.6 in 2001. The 65 years old-and-over population made up 13.7 percent of the total population in Canada, which was a new record high. On the other hand, a new record low was set for the proportion of the under-15 population, which fell to 17.7 percent, reflecting a world wide trend toward aging population in developed countries.

### **3.2.2. Land**

As the second largest country in the world, Canada's total land area is 9,017,699 square kilometres, only slightly less than all of Europe, which is approximately 10,360,000 square kilometres in size. Translated into population density, Canada has 3.5 persons per square kilometre of land. 80 percent of Canadians live in cities (see Figure 2).

### **3.2.3. Government**

Confederated in 1867, Canada is a constitutional monarchy, with division of powers between the federal government and the provincial and territorial governments. Multiculturalism is reflected by the national policies and constitution, such as official bilingualism in English and French, and Aboriginal rights protection entrenched in the Charter of Rights and Freedoms.

The federal government has jurisdiction over issues such as the country's economy, international trade, security, and immigration among others. The federal government is also responsible for initiating national sports and culture programs. Provincial and territorial governments, on the other hand, hold responsibility for social, education and cultural policies, as well as management of natural resources and the environment.

The last federal election was in 2008, won by the Conservative Party of Canada. Canada now has a minority government, led by the honourable Stephen Harper.

## **3.3. Host Region for the 2010 Winter Games: The Province of British Columbia, Metro Vancouver, and the Squamish-Lillooet Regional District**

The province of British Columbia (B.C.) is found on the west coast of Canada and is famed for its natural beauty. The capital city of the province of BC is Victoria, and the largest city is Vancouver--the third-largest metropolitan area in Canada.

Metro Vancouver is a regional level of government (regional district) containing 22 municipalities, including the City of Vancouver, and 1 electoral area (Figure 3).<sup>2</sup> Places to note

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<sup>2</sup> Metro Vancouver is "both a nonpartisan political body and corporate entity operating under provincial legislation as a 'regional district' and 'greater boards' on behalf of twenty-two member municipalities and one electoral area. The three primary roles are service delivery, planning, and political leadership" (<http://www.metrovancouver.org/about/Pages/faqs.aspx>) (accessed April 2, 2009). It includes four separate corporate entities, including: 1) Greater Vancouver Regional District (GVRD); 2) Greater Vancouver Sewerage and Drainage District (GVS&DD); 3) Greater Vancouver Water District (GVWD); and 4) Metro Vancouver Housing Corporation (MVHC).

in its regional natural environment include the coastal mountain range, the Strait of Georgia, and the Fraser River. The Squamish-Lillooet Regional District stretches from Britannia Beach in the south to Pavilion in the north. It includes the Resort Municipality of Whistler and the Sea-to-Sky Corridor

### **3.3.1. Population**

The population of British Columbia was 4,113,487 in 2006, a 5.3 percent increase from 2001's population of 3,907,738 (Statistics Canada 2008). B.C.'s population is the third largest provincial population in Canada, after Ontario (12,160,282) and Quebec (7,546,131). About 4.8 percent of the population in British Columbia was of Aboriginal/First Nation descent, and persons who were immigrants made up about 27 percent of the population. Most of the immigrants were born in the People's Republic of China, the United Kingdom, India, and Hong Kong. Together, immigrants from these places made up about 43 percent of the immigrant population in British Columbia. The province's birth rate in 2006 was 9.7, the fourth lowest in the country, and the median age was 40.8, up from 38.4 in 2001 (B.C. Stats 2008a).

Metro Vancouver had a population of 2,116,581 in 2006, representing 51 percent of the population in British Columbia. Forty percent of people living in Metro Vancouver were born outside Canada and 42 percent were born in B.C. The average household had 2.6 people, while the median age had increased to 39.1 from 37.4 in 2001. The most popular language spoken in households was English at 58 percent, with Chinese coming in second. Cantonese, Mandarin, and other Chinese dialects made up 15 percent. More than 70 other languages are spoken in Metro Vancouver.

The Squamish-Lillooet Regional District had a population of 35,335 in 2006, representing a 6.7 percent growth in population from 33,011 in 2001.

### **3.3.2. Land**

The province of British Columbia has a total land area of 924,815 square kilometres, which is similar to the combined areas of Germany, France and Belgium. This translates into a population density of 4.4 persons per square kilometre (higher than the national Canadian average of 3.5).

Metro Vancouver has a land area of 2,877 square kilometres, resulting in a population density of 735.6 persons per square kilometre (in 2006).

The total land area of Squamish-Lillooet is 16,354 square kilometres (see Figure 4), with a population density of 2.2 persons per square kilometre.

### **3.3.3. Government**

The most recent B.C. provincial general election was in 2005, and was won by the Liberal Party led by former Vancouver mayor Gordon Campbell. This is his second term. Provincial general elections are held every four years, and the next one is scheduled for May 12, 2009.

Municipal elections for local governments are held every three years, the most recent of which was held in November, 2008.

### **3.3.4. Economy**

In 2007, the GDP at market price for British Columbia was \$192,528 million, compared to \$182,743 million in 2006 (B.C. Stats 2008b). The unemployment rate rose to 4.6 percent in 2008 from 4.2 percent in 2007 (B.C. Stats 2008b). The construction boom seen in Metro Vancouver over the past decade has slowed considerably due to the recent economic downturn and global recession.

### **3.4. Host City and Resort for the 2010 Winter Games – City of Vancouver and the Resort Municipality of Whistler**



**City of Vancouver. Source: City of Vancouver.**

Consistently ranked as one of the most livable cities in the world, the City of Vancouver is home to a population of 611,869, up from 583,282 in 2003 (B.C. Stats, 2007). As the biggest municipality in the metropolitan area of Vancouver, the City of Vancouver was chosen as their place of residence by the majority of immigrants to the area. 28.7 percent of newcomers chose it as their destination when they arrived between 2001 and 2006. Encompassing a total land area of about 115 square kilometres, Vancouver has a population density of 5,039 per square kilometre. In 2006, there were 273,804 private dwellings (defined as a set of living quarters for human habitation in which a person or group of persons could reside). The average household size was 2.2 persons, and the average value of an owned dwelling was estimated at \$628,682.



**Whistler. Source: Resort Municipality of Whistler**

In 2006, the Resort Municipality of Whistler had 9,595 permanent residents and an estimated 2,266 seasonal residents. It had a total land area of about 162 square kilometres, but has recently expanded to about 243 square kilometres.

There are ongoing efforts to make both Vancouver and Whistler municipalities more sustainable, and local governments have concentrated efforts into zero waste, smart growth, green buildings, sustainable transportation, energy efficiency, and water conservation. Another major policy area is physical activity and health, as demonstrated in the increase of programs.

The distance between Whistler and Vancouver is about 120km, and travel time by car takes about two hours. Tourism is a very important industry to the area, pumping money into the local economy while offering sustained employment. In 2007, there was an estimated 2,747,337 overnight visitors to the Greater Vancouver Area, of approximately 5,373,504 visitors to Canada (Tourism Vancouver 2008). Approximately 2.15 million people visit Whistler annually, and as of December 31, 2005, the total number of dwelling units zoned for tourist accommodation in Whistler was 5,967. An increase in the total number of dwelling units zoned for tourist accommodation is expected in Vancouver. In 2008, there were a total of 24,060 hotel/motel rooms in Metro Vancouver, and more accommodation is planned to be complete by 2010 (Tourism Vancouver 2008).

## References

B.C. Stats. 2007. "British Columbia Municipal and Regional District Population Estimates." (<http://www.bcstats.gov.bc.ca/data/pop/pop/mun/mun2007e.pdf>) (accessed February 28, 2009).

B.C. Stats. 2008a. "Ethnic and Visible Minority Characteristics of BC's Population." *B.C. Stats Infoline* 08-39 (2008): 1-5 (<http://www.bcstats.gov.bc.ca/releases/info2008/in0839.pdf>) (accessed February 28, 2009).

B.C. Stats. 2008b. "Economic Activity: British Columbia and Canada." ([http://www.bcstats.gov.bc.ca/data/bus\\_stat/bcea/tab1.asp](http://www.bcstats.gov.bc.ca/data/bus_stat/bcea/tab1.asp)) (accessed February 28, 2009).

Statistics Canada. 2007. "Population by immigrant status and period of immigration, 2006 counts, for Canada, provinces and territories – 20% sample data."  
(<http://www12.statcan.ca/english/census06/data/highlights/Immigration/Table403.cfm?Lang=E&T=403&GH=4&SC=1&S=99&O=A>) (accessed February 2 2009).

Statistics Canada. 2008. "Census 2006 Population and Dwelling Counts."  
(<http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97-550/Index.cfm?TPL=P1C&Page=RETR&LANG=Eng&T=101>) (accessed February 2, 2009).

Tourism Vancouver. 2008. "Market Origin of Overnight Visitors to Greater Vancouver."  
([http://www.tourismvancouver.com/pdf/research/ytd\\_visitor\\_volume\\_2007.pdf](http://www.tourismvancouver.com/pdf/research/ytd_visitor_volume_2007.pdf)) (accessed February 28, 2009).

Tourism Vancouver. 2009. "Hotel/Motel Rooms Available In Metro Vancouver 2008."  
([http://www.tourismvancouver.com/pdf/research/hotelmotel\\_rooms\\_available.pdf](http://www.tourismvancouver.com/pdf/research/hotelmotel_rooms_available.pdf)) (accessed February 28, 2009).

## 4. OGI Indicator Analysis

The OGI Technical Manual provides guidance to the OGI researchers. The Technical manual identifies OGI as a study that emphasizes acquiring comprehensive knowledge of the range and depth of the impacts of the Games. OGI, however, is more than data assembly. It also provides judgments about the relative size, value and importance of these impacts.

OGI spans a time period from the beginning of the bid to become a Host City, to the years of preparing for and delivering the Games, to the post-Games period. This pre-Games research component recognizes the fact that major strategic planning and investments occur before the Games, and that people start reacting to the Games before the actual event. Consequently, data are assembled for analysis and evaluation in baseline, pre-Games, Games, and post-Games reports. This is the pre-Games report.

The IOC recognizes that there is no “one way” to measure the impacts of the Olympic Games and the techniques that this will involve; as such, the OGI Technical Manual does not prescribe a particular approach to analyzing the indicator data. The two-part method of analysis that was used is described in this section.

### 4.1. Data Analysis Approach

Context indicators, according to the *OGI Technical Manual*, are the “environment in which the Games will be staged.” To better equip the research to determine Games-related impacts on the Host, the researchers operationalized the burgeoning developments *surrounding* the Games. Operationalization involved an examination of investments at all levels of government in Canada (federal, provincial, and municipal) that were attempts to “leverage” the 2010 Games. Leveraging refers to meeting a policy, program or other objective by linking it to the Games. Generally, initiatives that leverage the Games have specific goals that coincide with the three sustainability spheres used in OGI (socio-cultural, environmental, and economic). Investments that “leverage” the Games are distinct from investments towards planning and staging the Games, such as construction of Olympic venues and security. Specific OGI indicators that coincide with such governmental investments have the potential to be affected more than other OGI indicators that have no initiatives with coincidental objectives. Therefore, analysis of governmental initiatives and the identification of “primary” (OGI) indicators form the basis of the “bundling” approach (Hiller, 1998; Kasanko et al, 2005). It is recognized that there are other governmental initiatives that are significant but are not related to the 2010 Games, yet have the potential to affect trends in OGI indicators. As much as possible, these initiatives are also included to provide additional context.

An example of a bundle is Socio-Cultural Bundle 1 entitled “Progress in elite amateur sport in Canada,” which combines the following three indicators: So19 Results at the Olympic/Paralympic Games and World Championships; So16 Top-Level Sportsmen and Women and So18 World and Continental Championships. As a package, these three indicators measure national and regional changes in the athletic development of Canadians in the Games era. The context for this bundle includes government initiatives like *Own the Podium* and *Podium Canada* whose collective objective is to achieve excellence in Canadian sports. Combining indicators that circumscribe a specific impact area with the policies designed to

mediate them provides a more powerful basis on which to make recommendation on the plausibility of hypothesizing, testing, and uncovering Games impact.

In addition, we employed the “before and after control impact” (BACI) technique to provide further analyses (Manly, 2001). The goal of this method is to establish a statistically significant change in the difference between the impact and control sites, before and after the event. Briefly, the method compares the host/impact city (Vancouver) to other cities over time on indicators of interest. The control site(s) ideally are cities that are maximally similar to Vancouver, and are supposed to serve as a natural baseline to which Vancouver is then compared (Preuss, 2000; Baade and Matheson, 2002; Hagn and Maennig, 2007).

In order to control for variation to the greatest extent possible, it is desirable that the control sites be numerous, and be randomly selected from a larger group of sites; ideally, as similar as possible to Vancouver (the impact site). In reality, however, it is extremely difficult to find even one city sufficiently similar to Vancouver in all the relevant aspects, much less a group of such cities for the purposes of random selection. With these limitations in mind, we chose Calgary, Edmonton and Victoria for comparisons. Like Vancouver, all three are cities in Western Canada. Using Canadian cities for comparison allowed us to control for the political structure, geography and economic perturbations present internationally. For regional comparisons, we chose the Greater Toronto Area (GTA). Like Metro Vancouver, it is an urban and growing regional district with common issues (e.g., homelessness). Provincially, B.C. was compared with Alberta (and occasionally to Ontario). Both B.C. and Alberta are resource-based economies with lots of urban growth and in-migrations. Educational policies are similar as are geographies. Canada was usually compared to the United States, except when there was a need a comparison to smaller populations.

## References

Hiller, Harry H., 1998. Assessing the impact of mega-events: A linkage model. *Current Issues in Tourism* 1: 47-57.

Kasanko, Marjo, José I. Barredo, Carlo Lavallo, Valentina Sagris, and Elisabetta Genovese, 2005. Towards urban *un*-sustainability in Europe? An indicator-based analysis. Paper presented at the 45th Congress of the European Regional Science Association, Land Use and Water Management in a Sustainable Network Society, August 23-27, in Amsterdam, The Netherlands.

### 4.2. Data Sources

The organizations and agencies that gathered the primary data used in this study largely dictated the kind and quality of data that could be assembled for any given indicator dimension. The main source of data originated from Statistics Canada (or StatsCan).<sup>3</sup> StatsCan provides very reliable data. It is collected across the country (indicating robust and broad standardization) on a regular basis (every 5 years) using a consistent methodology (as required for their trend analyses). As prescribed by the requisite data parameters for the OGI process, StatsCan typically provided data for the years 2001 and 2006 (their Census years) and on national, provincial

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<sup>3</sup> Statistics Canada is a federal government agency commissioned with producing statistics about Canada.

(“B.C.”), regional (“Metro Vancouver”) and city-level (“City of Vancouver”) scales. Other typically reliable sources of multiple datasets were provincial agencies (e.g., B.C. Stats) and regional agencies (e.g., Metro Vancouver). The presence of these agencies made it possible to gather reliable and consistent secondary data for the OGI data assembly process.

In some cases, reliable sources of data were not available for indicators. These were mainly concentrated in the Socio-Cultural sphere. Data assembly methodologies that required more significant efforts usually rectified this problem. However, at times, these efforts gradually produced diminishing returns and left indicators with a partial or full DNAA (Data Not Available or Accessible) status. A lack of data was initially seen as an opportunity to assemble new variables and this was done using the following criteria:

- a) Similarity to the original data dimension and congruent to the definitions of the indicator;
- b) Availability of a series of multiple time periods, preferably in annual frequencies;
- c) Availability of data for other cities from the same source;
- d) Measures defined by absolute numbers rather than percentages (to increase sensitivity to determine changes over time);
- e) Dimensions that are sensitive to changes over time, but are not overly-sensitive so that “random noises” in the data significantly affect the analysis.

Criteria d) and e) together address the need to balance a stable variable over time (plasticity) with the need for enough sensitivity (elasticity) to be able to discern impacts related to the Olympic Games.

### **4.3. Context Indicator Summary Tables**

The availability and quality of the data for socio-cultural, economic, and environmental indicators are separately summarized in Table 1, Table 2, and Table 3. These tables summarize the individual indicators within the sustainability spheres.

An overall summary of the total indicator data availability by sphere is presented in Table 4. For the Baseline Report, at least some data are available for 95 percent of the 80 indicators. For the Pre-Games Report, at least some data are available for 88 percent of the 80 indicators. 64 percent of the data for the indicators were classified as being consistent on data source and methodology.

Twenty-nine indicators (36 percent) were bundled within this report; 28 indicators (35 percent) were analyzed in a one-page report format (8 indicators were addressed qualitatively either in the bundles or the one-pagers). For the majority of the indicators that were addressed in a one-page format, any relation to the Olympic Games at this stage is highly unlikely, and would be tenuous at best. Twenty-three indicators (29 percent) had irresolvable data problems and time limitations precluded the solicitation of qualitative expert opinion, resulting in their being categorized as Analysis Not Possible (see below).

The data analysis (availability and quality) and the possible conclusions about the impact of the Games on individual indicators led to the classification of the 80 indicators into one of three groups – Report Analysis, One-pager, and Analysis Not Possible.

#### *Report Analysis*

This group includes indicators for which data were available and of sufficient quality to merit bundling.

#### *One-pager*

This group includes indicators for which data were generally available, but for which it was not possible to definitively attribute an Olympic Games impact.

*Analysis Not Possible* is more fully developed in the final three columns (No Useful Data, Methodology Inconsistent, Baseline Errors) in the data summary tables (Table 1, Table 2, and Table 3). These columns list the indicators that could not be analyzed. Each of the columns is a category that explains the reasons why analysis for these indicators could not extend beyond data assembly. We include a list of the indicators that are classified into each of the categories.

*No Useful Data:* An indicator falls under this category when there are no data available for either the baseline or the pre-Games period, or for both periods. An indicator would also fall under this category when data are available for only one of the two periods for a specific dimension of the indicator. Usually, data are available for the dimension at baseline, but not during the pre-Games period. Finally, this category captures indicators for which data are so sparse at both baseline and pre-Games periods, such that no meaningful analysis can be performed. *Ten indicators were identified to have such problems.* They are the following: Ec4 Quality Management of Companies, Ec11 Foreign Organization Establishments, Ec27 Jobs Created in Olympic and Context Activities, En25 Indoor Air Quality, En1 Renewable Fresh Water Use, So2 Legislative Activity, So12 Sport and Physical Activities, So14 Available Sports Facilities, So18 World and Continental Championships and So22 Sport Broadcasting.

*Methodology Inconsistent:* An indicator falls under this category when the source of data for the pre-Games period is different than the source of data at baseline. An indicator would also fall under this category when the source of data remains the same between the two periods, but the method used to collect or calculate the data changes between the two periods, such that the results are no longer comparable over time. Finally, this category captures indicators for which the assembly of data was ad hoc in nature at baseline, which makes it difficult or impossible to reproduce the data during the pre-Games period. For most of the indicators in these cases, the source of data was not a "central authority" from which comprehensive information could be obtained. Therefore, for the pre-Games period, data assembly involved the unsuccessful effort to reproduce how data was collected or calculated for the baseline. *Ten indicators were identified to have such problems.* They are the following: En14 Energy Consumption by Source, En18 Solid Waste Treatment, En19 Wastewater Treatment, So3 Pressure Groups, So4 Community Centres and Associations, So11 Cultural Activities, So15 Exclusion, Discrimination, Racism and Violence in Sports, So21 Media Specializing in Sport, So23 Information Media and So24 Information and Communications Technology.

*Baseline Errors:* An indicator falls under this category when the data have errors that could not be fixed. Errors ranged from simple mis-typing of numbers to errors that were made in spreadsheet formulation (i.e., totals that should logically add up to 100% did not). In some cases, errors could be (and were) fixed relatively quickly. However, in other cases logical errors that were identified could not be fixed, usually due to a lack of documentation from the source, which precludes proper reproduction. *Three indicators were identified to have such problems.* These are the following: En16 Energy Self-Sufficiency, So6 Poverty and Social Exclusion and So7 Educational Level.

## References

- Baade, R.A. & V. Matheson. 2002. "Bidding for the Olympics: Fool's Gold?" Pp. 127–151 in C.P. Barros, M. Ibrahim and S. Szymanski (Eds.) *Transatlantic Sport: The Comparative Economics of North America and European Sports*. London: Edward Elgar.
- Hagn, F. and W. Maennig. 2007. "Short-Term to Long-Term Employment Effects of the Football World Cup 1974 in Germany." Hamburg Working Paper Series in Economic Policy, 9/2007.
- Manly, Bryan F.J. 2001. *Statistics for Environmental Science and Management*. Boca Raton, Florida: Chapman and Hall/CRC Press.
- Preuss, Holger. 2000. "Electing an Olympic city – a multidimensional decision." Pp. 89–104 in K.B. Wamsley, S.G. Martyn, G.H. MacDonald, H. Gordon and R.K. Barney (Eds.) *Bridging three Centuries: Intellectual Crossroads and the Modern Olympic Movement*. London, ON.

## 5. Socio-Cultural Outcomes

### 5.1. Socio-Cultural Bundle 1. Progress in Elite Amateur Sport in Canada

The indicators used to assess *progress in elite amateur sport in Canada*, So19 and So16, show the national changes in athletic performance and events during the Olympic Games. This bundle of indicators also details initiatives implemented during the Games era that favour top-level sport.

#### 5.1.1. Indicators

##### *So19 Results at the Olympic/Paralympic Games and World Championships*

Results at the Olympic/Paralympic Games and World Championships is a socio-cultural indicator that captures gains achieved by the country's athletes at these events. The So19 indicator reports these results in terms of medals won by Canadian athletes in Winter Olympic Games. The following shows the number of medals won by Canadian athletes before and after 2003, which was the year when Vancouver won the bid to be an Olympic Games host.

##### *So16 – Top-level Sportsmen and Women*

Top-level Sportsmen and women represent a count of athletes who, according to their national sport federations, have reached the top levels in international competition. Analysis will highlight changes in the number of top-level athletes before and during the Games era.

#### 5.1.2. Policy and Context Assessment

Two initiatives, *Own the Podium 2010* and *Podium Canada*, have been implemented by the Governments of Canada and British Columbia specifically to promote improvement in achievements by Canadian athletes. These interrelated initiatives both aim to achieve excellence in Canadian sports, especially with the upcoming 2010 Games in British Columbia, Canada. Both initiatives date from 2004-2005, shortly after Vancouver was selected as a Host City in 2003. Both represent a concerted effort by the Governments to improve Canadian sports performance before the 2010 Games (and beyond).

*Own the Podium 2010* is a five-year, \$110 million winter sport initiative that the Government of BC will implement with a variety of partners, including other government partners, corporate 2010 Games sponsors, and sport partners). The goal of *Own the Podium 2010* is for Canada to win the most medals at the 2010 Olympic Winter Games, and to be one of the top three nations in terms of gold medals won at the 2010 Paralympic Winter Games. The mandate of *Own the Podium 2010* is to provide expertise and leadership to National Sport Organizations whose athletes have the potential to win medals at the 2010 Winter Games. *Own the Podium 2010* offers programs that focus on: athlete recruitment; research in equipment, technology, information and training; professional development for coaches; use of technologies; and creation of sports science/medicine teams. Although the goal of this initiative relates specifically to the 2010 Games, there is intention to continue it beyond 2010. A working group was established in January 2008 to prepare a report about the future of the initiative beyond 2010. The Government of Canada has indicated that it will continue its annual contribution of \$11 million following the 2010 Games.

*Podium Canada* is a long-term umbrella initiative that includes *Own the Podium*. The Canadian Olympic Committee provides administrative support for *Podium Canada*, which makes use of pooled resources, expert-based decision-making and targeted sport funding to achieve the *Own the Podium* goals for 2010 (in terms of total medal count and gold medal count).

*Podium Canada*, *Own the Podium*, and other initiatives (e.g., *Road to Excellence*), demonstrate the willingness of the Governments of Canada and B.C. and their partners to dedicate millions of dollars of funding to improve Canadian performance at the Olympic Games, and to place Canada among the top sport nations in the world. The goals of these initiatives directly impact So19 and So16, as these indicators specifically measure the number of medals won by Canadian athletes at Olympic Games and the top-level number of athletes in the country.

### **5.1.3. Indicator Selection and Indicator Data Collection**

Out of the 80 context indicators prescribed by the IOC, the So19 and So16 indicators are those that most match the goals of the sport achievement policies outlined above. These indicators are also the most straightforward and clearest measure of *any* government initiative that aims to improve the achievement of Canada's athletes at the Olympic Games. Any changes to indicators So19 and So16 over time are likely to have been influenced (at least in part) by government initiatives (such as *Podium Canada* and *Own the Podium*) that were *specifically created as a result of the 2010 Games*.

The dimension of the So19 indicator that is expected to reflect the most sizable change in response to these initiatives is Results at Olympic Winter Games by Canadian Athletes. The data consist of the number of Canadian medals won at different Games over the period of 1998-2006. Data were collected through archival work from, and personal interviews with, the Canadian Olympic Committee. There are no concerns about the reliability of the data (i.e., medal counts) since the records of all Olympic Games are widely and publicly available and can be easily cross-referenced.

### **5.1.4. Data Analysis: Indicator Evaluation Over Time, 1998-2006**

For the past twenty years, since Canada hosted the 1988 Games in Calgary, the number of Olympic Winter Games medals won by Canada has risen slowly and steadily. For example in the most recent years, from Lillehammer 1994 to Nagano 1998, and from Nagano 1998 to Salt Lake City 2002, the number of Canadian medals has increased by the rate of two per Game. Canada won its highest number of medals ever at the 2006 Olympic Games in Turin (24 in total, or seven more than in Salt Lake City) (see Table 5).

One of the reasons for the continuous increase in medal count through the years is undoubtedly the addition of sports events to the Olympic Games program that favour Canada's strengths.<sup>4</sup> For example, at the Nagano 1998 Olympic Games, snowboarding was added to the program and curling was returned to the program as an official sport for the first time since the inaugural Games in Chamonix 1924. At the Games following Nagano (Salt Lake City 2002), public interest increased in "extreme" sports such as snowboarding, free-style skiing aerials and

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<sup>4</sup> We thank Mr. Bruce Deacon from the Canadian Olympic Committee for his expert advice on this matter.

moguls, which have appeared before, but have been garnering more attention in recent years. Events that made an Olympic debut in Turin 2006 included mass start biathlon, team sprint cross country skiing, snowboard cross and team pursuit speed skating (IOC, 2008). In addition, new sports facilities which became available for training athletes after 1988 Winter Games in Calgary (e.g., the Calgary Olympic Oval) also helped improve the performance of Canadian athletes.

Furthermore, in 2006 Canadian athletes won a record of 24 medals, which were 7 medals more than the previous Winter Games in 2002. This record was three years after Vancouver was selected as a host city, and two years after *Own the Podium* was launched. A plausible hypothesis is that this increase in medals is in part a result of the Canadian Governments' initiatives (*Own the Podium* and *Podium Canada*) that aim to improve athletes' performance at the upcoming Games in 2010.

To examine this hypothesis, the increase of seven medals between the two consecutive Games of 2002 and 2006 needs to be examined relative to the number of athletes, i.e., were more medals won because there more athletes? While there were only three more Canadian athletes at the 2002 Games than at the 1998 Games, there were 38 more athletes at Turin in 2006 than at the previous Games. A calculation of medals per athlete suggests that the increase in medals in 2006 over 2002 was *not* simply a result of an increase in the number of competing athletes (see Table 7). While there was an increase in medals per athlete of approximately 0.011 between 1998 and 2002, the increase between 2002 and 2006 is 36 percent larger, at 0.015 medals per athlete.<sup>5</sup> Data for total medal count per sport discipline for Canada similarly suggest that the increase in medals was not simply due to a larger number of competing athletes. Canadian athletes won 1.6 medals per discipline in 2006, compared to 1.25 medals per discipline in 1998 (an increase of nearly 30 percent for the eight year period).

It is interesting to note that the overall rise in Canadian medals over the past three Olympic Winter Games is virtually all due to an improved performance of female athletes. In Turin in 2006, Canadian women won an impressive count of 16 medals (compared to 8 in Nagano in 1998 and 9.5<sup>6</sup> in Salt Lake City in 2002), while Canadian men won 8 medals, which was half as many as women athletes that year (men won 7 medals in 1998 and 7.5 medals in 2002) (Table 6). The medals count per female athlete has steadily increased from 0.13 in 1998, to 0.14 in 2002, to 0.18 in 2006. At the same time, the performance of male athletes remained stable at approximately 0.07-0.08 medals per male athlete.<sup>7</sup> This difference between male and female athletes does not appear to be related to an increased female-to-male ratio of participation in the Olympic Games. If anything, the number of male athletes increased more than that of females between the last Games in 2006 and the Games prior in 2002. Again, however, it should be noted that if male athletes participate (and win) more in team sports than female athletes do, this difference in performance by gender might be less pronounced.<sup>8</sup>

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<sup>5</sup> This type of calculation is somewhat misleading, however, due to the country's participation in team sports. The more team sport events a country enters, the larger its delegation size. Since only one medal is awarded to a country for an entire team, it means that the real medal count per athlete is likely higher. We include the calculations to give the reader a general idea but caution against overestimating their accuracy. The underlying assumption which justifies this across-time comparison in this case is that Canada entered (roughly) the same number of teams (and athletes per team) for each year 1998, 2002 and 2006.

<sup>6</sup> In 2002, Canada won a mixed-pairs skating competition, hence the half medal.

<sup>7</sup> All numbers are subject to the same caveat regarding team sports as mentioned previously.

<sup>8</sup> Since the more male teams there are, the larger the number of male athletes and the lower the medals per athlete count.

Overall, the data show a definite increase in medals won by Canadian athletes at Olympic Winter Games between the years of 1998 and 2006.

#### 5.1.5. Data Analysis: Comparison with Other Countries

Canada placed third in medal standings among the 80 participating countries at the 2006 Olympic Winter Games, compared to placing fourth in 1998 (72 participating nations) and in 2002 (78 participating nations). By comparison, the United States has risen from fifth place in 1998 to second place in the Olympic Winter Games medal standings at both subsequent Games (2002, 2006).<sup>9</sup> Considering that the American Olympic delegations are generally larger than Canada's, the U.S. had fewer medals per athlete (0.113) in 2006 than did Canada (0.122)(but the U.S. had more medals per athlete (0.169) than Canada (0.108) in Salt Lake City 2002).<sup>10</sup> As previously mentioned, several sports that were recently added to the Olympics program may have given Canadian athletes an advantage. However, it is likely that it also gave an advantage to athletes from the United States. In other words, Canada does not have as large a comparative advantage in these sports over the U.S. as it does with other countries. Therefore, the reason for the improved performance of Canadian athletes must in part lie elsewhere (not due only to the addition of new sports that give Canadian athletes an advantage).

To test the hypothesis that the improved performance of Canadian athletes was not due to comparative advantage only, data from a geographical area that is comparable by population and dedication to winter sport must be used. That geographical area is Scandinavia, which covers Norway, Sweden and Finland (data for Scandinavia sums data from all three countries). The population of Scandinavia is about 19 million<sup>11</sup> (compared to 33 million in Canada and 300 million in the U.S.). The medal count per athlete for Scandinavia has fluctuated only slightly (around 0.145) over the 1998, 2002, and 2006 Olympic years. In comparison, Canada's medal count per athlete rose from 0.097 to 0.108 to 0.123 during the same years. If the relatively stable rate of medals per athlete in Scandinavia<sup>12</sup> over the three Winter Olympiads can be considered a "normal state" (not an Olympic host, and no new government initiatives created in preparation for being an Olympic host), then the increase in Canadian medals per athlete may be interpreted as an indication that the state of hosting the Winter Games and the creation of new government sport performance initiatives have led to improved performance among Canadian Olympic athletes.

Results and athletes' effectiveness (as measured by the medals-per-athlete count) notwithstanding, it is also worth noting that Canada does not have a disproportionately large Winter Olympic team, a concern that could be potentially related to our findings. Canada's greater commitment to winter sports compared to the U.S. is perhaps reflected in the larger number of athletes *relative to population* sent to compete (in 2006 Canada sent 5.94 athletes per

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<sup>9</sup> The US also pursued a program to boost medal winning performances at the 2002 Winter Games in Salt Lake City.

<sup>10</sup> As with the across-time comparison of Canadian athlete's medals, more teams sport medals for the U.S. would affect that difference with Canada. The underlying assumption here is that the U.S had a similar team count as Canada in that year. Albeit problematic, the assumption gives *some* indication of a difference.

<sup>11</sup> Including Denmark and/or Iceland is problematic since they do not have similar commitment to winter sports: for the past three Olympic Winter Games, they have won a total of 1 medal together, with combined delegations of 10 to 20 athletes each year.

<sup>12</sup> The exact rates are 0.154, 0.135 and 0.146 for 1998, 2002 and 2006, respectively.

million people population while the U.S. sent only 0.74 athletes per million people). At the same time, however, Scandinavia sent 15.2 athletes per million people (specifically, Norway sent 14.8, Sweden sent 12.4 and Finland sent 20.4 athletes per million population) to compete in the Turin 2006 Winter Olympic Games. Thus, the size of a country in terms of population does not appear indicative of the size of its delegation of Olympic athletes, and therefore should not be taken into consideration. The delegation size itself is the basis of comparison: the fact that Canada sends more people to compete relative to population than the U.S. does not impact on the fact that Canadian delegations are generally smaller than the American ones; nor on the fact that in 2006 Canada won more medals per athlete than the U.S. did, a clear improvement over 2002 when Canada had sent 5.06 athletes versus the American 0.72 athletes per million population and still won less medals per athlete than the U.S.<sup>13</sup>

So16 offers further proof to the effectiveness of the government initiatives discussed above. The indicator counts top-level Olympic and Paralympic athletes (i.e., placing in top 16) in both Summer and Winter Olympic Games. Table 7 shows that the number of Summer Olympic and Paralympic top-level athletes has remained more or less the same between 2001 and 2007. The situation with top-level *Winter* Olympic and Paralympic athletes, however, is different. In 2006-2007 there were nearly 25 percent more Winter Olympic and Paralympic athletes who placed within top 16 in their discipline than there were in 2001-20002; about 50 percent more than there were in 2003-2004. This increase in top-level winter-sport athletes in recent years, especially given the mostly unchanged number of top-level summer-sport athletes, can serve as an additional indication of an impact of the Games era and the performance-oriented government programs.

#### **5.1.6. Attributing Impact to the Games: Alternative Explanations**

So far, we have mentioned three factors that may have contributed to the markedly improved medal count of Canadian athletes over the past three Winter Games (recent additions to the Olympic program that give Canadian athletes an advantage, the state of being an Olympic host, and the creation of new government sport performance initiatives due to being an Olympic host). It is possible that other factors may have contributed to improved performance in Canadian athletes. For example, the larger medal count of the post-2003 Games could reflect a rising population, and hence a larger pool of (potential) athletes.

Between 1998 and 2006, the population of Canada increased<sup>14</sup>. However, Table 6 shows that the rate of increase in medals was larger than the rate of increase in the Canadian population. While Canada's medal count per million people was about 0.54 in 1998 and 2002, the rate in 2006 rose by more than a third to approximately 0.73.<sup>15</sup> Thus, it appears that the increase in population

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<sup>13</sup> In general, countries which host Olympic Games arguably tend to aim at excelling (i.e., winning more/most medals) at their "home" Games; these goals are substantiated by associated large investments in athletes' performance. Canada's *Own the Podium* is just one example of this general trend. It should be noted that the U.S. has made significant investments in athletes' performance for the 2002 Winter Olympic Games in Salt Lake City, which partly explains the high U.S. Olympic medal count of that year.

<sup>14</sup> Canadian population growth is mainly due to immigration (from predominantly non-winter sport nations at that). The population growth suggested as alternative explanation, therefore, refers mostly to the growth due to natural increase (births minus deaths). Between 1994 and 2004, the Canadian rate of natural increase was 0.39 (second highest in the G-8 countries, exceeded only by the U.S.). Thus, considering the fact that the population growth of Canada is predominantly immigration-induced, the medal count per million people presents a conservative estimation.

<sup>15</sup> Although a cross-country comparison over population size is somewhat misleading, the U.S. rates are much lower at 0.05, 0.12 and 0.08 for the 1998, 2002 and 2006 Games, respectively.

size cannot (completely) explain the rise in medals won, beyond perhaps potentially improving the quality of the pool of athletes due to its larger size. At the same time, a larger pool of athletes (and larger Olympic delegations) itself is a possible indication of the effectiveness of initiatives such as *Podium Canada* and *Own the Podium*, and therefore could be construed as a positive result of the goals set forth in these initiatives in anticipation of the Olympic Games coming to Canada in 2010.

In view of the analysis in the preceding three sections, it can be concluded that *the increased medals count, the larger numbers of athletes noted in the ongoing period from 1998 on and the increased number of top-level Winter Olympic and Paralympic Games athletes are indicative that the Games era (encompassing the launching and implementation of Podium Canada and Own the Podium) affected to some extent the athletic performance of the host country in elite amateur athletic competitions.*

Please see Section 8 for a quantified summary evaluation of the Olympic Games impact on the indicators discussed in this bundle.

## 5.2. Special Focus: Paralympic Games

Before leaving this bundle, it is important to acknowledge Paralympic athletes as elite amateur performers. It is also important to recognize the impact of the Paralympic Games on wider society. However, data for Paralympic indicators are not readily available. In order to address these, we consulted with Dr. David Legg,<sup>16</sup> an international expert on athletes with disabilities and the impacts of the Paralympic Games in society (see side bar “OGI Indicators Recognizing the Games Impacts on Athletes with Disabilities” on the next page). At best, the state of knowledge related to each of these indicators may be described.

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<sup>16</sup> Dr. David Legg has spent the past fifteen years actively involved as an educator, researcher and volunteer in sport management and adapted physical activity. At Mount Royal College, David teaches in the Bachelor of Applied Business and Entrepreneurship - Sport and Recreation Applied. In 2004 David was a visiting professor at Dalhousie University in Halifax and in 2008 he was a visiting scholar at Deakin University in Melbourne. David has published over 20 articles and made over 30 professional presentations with many related to Paralympic sport and the Legacy of Paralympic Games. As a volunteer David is currently the Vice President for the Canadian Paralympic Committee.

### OGI Indicators Recognizing the Games Impacts on Athletes with Disabilities

Dr. David Legg

The Olympic Games Impact study has chosen five indicators in the Athletes with Disability bundle. Employability of People with Disabilities (Ec44) represents the Games' impact on encouraging an able-bodied populace to see people with disability as employable. Employment challenges for persons with disability unfortunately continue (Participation and Activity Limitation Survey, 2007).

Perceptions of People with Disabilities in Society (So44) captures advances in the able-bodied majority's perceptions of persons with disability. The second indicator seeks to monitor the shift in perceptions from seeing people with disabilities from patient to athlete to citizen. According to research, prejudice on the part of individuals and society-at-large is the most significant barrier to the social inclusion of persons with disability (Environics, 2004).

Support Network for People with Disabilities (So45) reflects the effective support and integration of people with disabilities into society as measured by per capita expenditures related to participation in physical activity. According to research, a combination of government and non-profit organizations must address the health care, transportation, and specialized equipment necessary for recreation (Environics, 2004).

Professional Sport Education for People with Disabilities (So46) represents the quantity of higher education training for people with disabilities. As Goodwin, Gustafson and Hamilton (2006) note, academic training increases competence and attitudes about athletes with disabilities. Notably, one of the 2000 Games' legacies was a series of disability education programs that were geared towards coaches, teachers, and students (Cashman & Darcy, 2006).

Accessibility of Public Services (So48) capture gains achieved in providing people with disabilities access to public buildings that provide essential services such as City Hall and post offices. This indicator will specifically address the number of buildings made more accessible before and during the Games era. The *2010 Vision for British Columbians with Disabilities* (2003, City of Vancouver and Government of BC) has led to the development of a strategic plan and a rating instrument (*Measuring Up*) to help municipalities determine how they could make their communities more accessible.

To date, (independent assessments of a Paralympic Games' legacy beyond those commissioned by host Games organizing committees are rare (Cashman & Darcy, 2006; Cashman, 2006) and largely anecdotal. OGI addresses a number of the key determinants to improving opportunities for persons with disability in sport, recreation, and physical activity including: physical/built environment; organizational policies/practices; discrimination/social attitudes; exercise equipment; and commercial and print media (cf. Rimmer, Riley, Wang, Rauworth & Jurkowski, 2004).

#### References

- Cashman, R. & Darcy, S. (2006). *Benchmark Games: The Sydney 2000 Paralympic Games*, Sydney: Walla Walla Press.
- Cashman, R. (2006). *The Bitter-Sweet Awakening: The Legacy of the Sydney 2000 Olympic Games*, Sydney: Walla Walla Press.
- Environics Research Group Limited (2004). *Canadian Attitudes Towards Disability Issues; 2004 Benchmark Survey*, Office for Disability Issues Social Development Canada, Ottawa, ON.
- Goodwin, Gustafson and Hamilton (2006). *The Experience of Disability in Physical Education in Stones in the Sneakers* (eds.) G. Dickinson, S. Rae & G. Millburn, The Althouse Press, London, ON.
- Rimmer, J. H., Riley, B., Wang, E., Rauworth, A., & Jurkowski, J. (2004). Physical activity participation among persons with disabilities: Barriers and facilitators. *American Journal of Preventive Medicine*, 26(5), 419-425.
- Participation and Activity Limitation Survey (2007). Statistics Canada. Retrieved February 8, 2009 from <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=89-628-X&CHROPG=1&lang=eng>.

### 5.3. Socio-Cultural Bundle 2. Health and Physical Activity

**Health and Physical Activity** combines the health, nutrition, physical activity, community centre, and school sport indicators. These indicators provide a snapshot of the health and well-being status of the city, region and country in light of the 2010 Games. Numerous resources have been made available by Games' partners to help make improvements in these areas.

### 5.3.1. Indicators

#### *So9 Health*

The Health indicator represents major demographic characteristics of health for the host city, host region, and host country. Specifically, So9 reports on dimensions, such as birth, death, and infant mortality rate at the city, region, and country levels. Changes in these before and during the Games era will be analyzed.

#### *So10 Nutrition*

Nutrition is a socio-cultural indicator that measures the amount and quality of food consumed. So10 reports on dimensions such as mean daily energy intake at regional level, and consumption of key foods at country and regional level. The following will analyze changes in the amount and quality of food before and during the Games era.

#### *So12 – Sport and Physical Activities*

The Sport and Physical Activities indicator represents the types and extent of physical activities in the host country, especially in relation to gender and sport club membership. So12 reports on membership in winter sports organizations by gender. The following is an analysis of any change in the number of members before and during the Games era.

#### *So13 School Sports*

School Sports is a socio-cultural indicator intended to represent the status of sport in public schools. So13 indicator reports the number of hours that students participate in sport per day at public primary and secondary school levels (from kindergarten to grade 12).

### 5.3.2. Policy and Context Assessment

*ActNow B.C.* was launched in March 2005. It is led by the Ministry of Health, but involves all provincial ministries as well as external partners. As an overarching initiative, it was designed “to improve the health of British Columbians by taking steps to address common risk factors and reduce chronic disease” (*ActNow B.C., 2005*). It has provided substantial funding to external partners to help implement the initiative. For example, a one-time grant of \$25.2 million was given to the B.C. Healthy Living Alliance (BCHLA), to pursue recommendations as part of its B.C. Risk Factor Intervention Plan (outlined in a BCHLA report).<sup>17</sup>

*ActNow B.C.* has five central goals. Several are explicitly Games-related and are being implemented by specific programs.

The first 2010 goal is to increase by 20 percent the proportion of the B.C. population (aged 12+) who are physically active during their leisure time. In the baseline year of 2003, the proportion of the population who were physically active was 58.1 percent. The most relevant *ActNow B.C.* program is *Action Schools! B.C.* It is a physical activity and nutrition model that integrates physical activity and healthy eating into schools.

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<sup>17</sup> The BCHLA report is called “The Winning Legacy – A plan for improving the health of British Columbians,” available at [www.bchealthyliving.ca/files/file/Winning\\_Legacy\\_Highlights.pdf](http://www.bchealthyliving.ca/files/file/Winning_Legacy_Highlights.pdf).

The second 2010 goal of *ActNow B.C.* is to increase by 20 percent the proportion of the B.C. population (aged 12+) who eat the daily recommended amount of fruits and vegetables. In the baseline year of 2003, 40.1 percent of the target population achieved the recommended level. An example of a program is the *School Fruit and Vegetable Snack Program*. It encourages school children, including adolescents, to eat the recommended daily intake of fruits and vegetables. *Healthy Living Guides* is another *ActNow B.C.* resource. It provides additional important information for parents and others.

The third 2010 goal of *ActNow B.C.* is to reduce by 10 percent the proportion of the B.C. population (aged 15+) that use tobacco. The 2003 rate of tobacco use was 16 percent. Two *ActNow B.C.* programs support this goal. *Quitnow by Phone* offers a confidential tobacco cessation help line. *Quit Smoking Now!* offers free nicotine patches and gum to British Columbians who are on income assistance and attempting to quit using tobacco.

The fourth 2010 goal of *ActNow B.C.* is to reduce by 20 percent the proportion of the B.C. population (aged 18+) who are classified as overweight or obese.<sup>18</sup> The 2003 baseline obesity rate was 42.3 percent.

The final goal of *ActNow B.C.* is to increase by half the number of women counselled regarding alcohol use during pregnancy. Both these goals are targets of *Healthy Communities Initiatives* and *Healthy Planning Seminars*. Both of these initiatives support the development of policy and leadership in healthy family planning in communities.

*ActNow B.C.* has supported programs that have led to healthier communities. A good example is the City of Vancouver's version of the *Active Communities* program. This program targets the first *ActNow B.C.* goal (increasing the proportion of the population who are physically active). The City of Vancouver allocates \$100,000 a year to implement its program.<sup>19</sup>

### **5.3.3. Data Analysis: Indicator Evaluation Over Time, 2000-2007, Regional and Country Comparisons**

During the period under study (2001 – 2007, six years), changes in these health indicators may not be detectable for two reasons. First, some measures are better observed over longer time periods such as decades. Changes are rarely evident over a short time period such as in this study. These measures include birth and death rates, infant mortality rate and life expectancy at birth. Second, mega-events such as the Olympic Games rarely have a sufficiently large impact to affect these demographic trends in a noticeable way. With these caveats in mind, it is not surprising that the next five tables and their corresponding figures do not show considerable change from the period immediately preceding the selection of Vancouver as a host city in 2003 to the period immediately after.

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<sup>18</sup> The prevalence of obesity is the percentage of people whose body mass index (BMI) is above 30. The prevalence of being overweight is the percentage of people whose BMI is 25-30. The BMI is a measure of weight adjusted for height, calculated by dividing weight in kilograms by height in metres squared. Individuals with BMI above 30 (i.e., above 30 kg per m<sup>2</sup>) are considered obese, according to Canadian guidelines (Health Canada 2003), in line with the World Health Organization's guidelines (WHO, 1995) (Shields and Tremblay, 2008).

<sup>19</sup> Initiatives include a series of different walks with different themes including Cultural Walks and Walks for the Environment. The Park Board also provides a website ([www.vancouverparks.ca](http://www.vancouverparks.ca)) that contains information about special events and tips on the benefits of a healthier and more active lifestyle. Finally, there is a Fitness and Adventure Passports program where children receive a stamp on completion of each of ten fitness adventures (e.g., swimming, etc.).

Table 8 shows that both the birth rate and the death rate<sup>3</sup> in the city of Vancouver are (mostly) slightly declining. However, there appears to be no significant change specifically identifiable as originating in 2003 (Figure 5). Both rates are dependent on the age structure of the population. An aging population would result in declining fertility rates and increasing death rates (despite the fact that mortality at every age could be decreasing). The fact that Vancouver does not exhibit a rising death rate indicates a younger population, possibly a result of the high rate of immigration.

In support of this hypothesis, Table 9 shows an increase in the death rate in the B.C. population, as well as a decrease in the birth rate. These trends are typical for all developed countries/regions due to an aging population. For comparison purposes, the corresponding rates of Alberta are shown in Table 10. It is apparent in Figure 6 that, although the rates differ between the two provinces, the difference remains generally constant over the years and no unusual effect can be detected in and after 2003.

Table 11 and Table 12 present the relevant rates at country level for Canada and the U.S., respectively. The data show that Canada as a whole has a higher birth rate than B.C., while the death rates for both are generally similar. The infant mortality rate<sup>20</sup> is lower in B.C. The comparison of Canada to the U.S. reveals that despite noticeable differences (lower birth, death and infant mortality rates, and higher life expectancy at birth<sup>21</sup> in Canada), these differences again are by and large constant, indicating no change after 2003 (Figure 7).

Fertility and mortality rates are health indicators that provide measures of the population at a broad level. Nutrition and physical activity are more specific indicators that reflect population health. Current survey data suggests that the average caloric consumption has not increased in Canada since the early 1970s<sup>22</sup> (Garriguet, 2007). Comparing 2002 and 2004 data for British Columbia generally confirms this conclusion, revealing only slight changes in the mean daily energy intake of B.C. residents (see Table 13). Table 14 shows that, on average, B.C. men and women both consumed more calories per day in 2004 than in 2002; men consumed 90 kcal (or 3.5 percent) more per day, and women consumed 40 kcal (or 2.2 percent) more per day. The largest increase for both genders was observed in the 31 to 50 year-old age group; 284 kcal (10.8 percent) for men and 154 kcal (8.5 percent) for women.

A comparison of mean daily caloric consumption from 2004 shows that, on average, British Columbian's consumed more calories per day than Albertans. This can be observed for both genders across all age groups, although the differences in some groups were trivial (e.g., for women aged 19-30). On average, men in B.C. consumed 325 kcal (or 14.6 percent) more than men in Alberta. For women, the difference is smaller. Women in B.C. consumed 94 kcal (or 5.6 percent) more than women in Alberta. Again, the age group that contributed most to these differences was 31-50 years old.

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<sup>20</sup> The infant mortality rate gives the number of deaths of infants under one year old in a given year per 1,000 live births in the same year.

<sup>21</sup> Life expectancy is the number of years a person is expected to live, on average. It can be measured at birth (for countries with low infant mortality rates), or later, e.g., at the age of 5 (in countries where the infant mortality rate is too high so it affects disproportionately the life expectancy at birth).

<sup>22</sup> Certain age groups are even found to consume fewer calories per day on average than in the 1970s (Garriguet, 2007).

Table 14 shows further that, on average, British Columbian men also consume more calories per day than the national average (by 220 kcal, or 9.4 percent), while British Columbian women consume slightly less than the national average (28 kcal, or 1.6 percent). The largest contributors for these differences are B.C. men aged 31-50 (who consume 15.9 percent more calories per day than the national average for this age group), and B.C. women aged 51-70 (who consume a surprising 18 percent less calories per day than the national average<sup>23</sup>).

Table 15 shows that British Columbians eat more dairy and grain products than the national average. They also eat less meat and meat alternatives, and less fruits and vegetables.

In summary, British Columbians' mean daily caloric intake was marginally higher in 2004 (by 3 percent) than it was in 2002. It was also slightly higher than the national average (by about 4 percent) and higher (by 10 percent) than the caloric intake of Albertans.

A higher daily average caloric intake affecting health can be interpreted in different ways. Three hypotheses are proposed and addressed: 1) it might signify a more affluent population that can afford more food; 2) it might suggest a more physically active population (higher caloric expenditures) with higher energy needs; 3) if the population is not more physically active, high daily caloric intake may simply point to a population with unhealthy eating habits and lifestyle. (Note that the first hypothesis is consistent with either of the other two.)

The first hypothesis (that an affluent population can afford more food, and therefore has higher caloric intake), is not supported.<sup>24</sup> The 2004 median household income in B.C. was \$55,900, lower than in Alberta at \$66,400, and in Canada at \$58,100 (Statistics Canada, 2008).

To test the second hypothesis, the prevalence of obesity was used, because it is usually considered a good measure of health, lifestyle and eating habits of a population. Although the prevalence of obesity among British Columbians above the age of eighteen increased from 18.2 percent in 1999 to 19 percent in 2004 (reflecting a national as well as a global trend for rising obesity in developed countries), this was the lowest in the Canada. In 2004 the prevalence of obesity in B.C. was four percentage points below the national level of 23 percent, and 6.5 percentage points below Alberta at 25.5 percent. Compared to Canada, B.C. had a lower prevalence of obesity, but a higher mean daily caloric consumption. This suggests that, on average, the population of B.C. is leading a more physically active and therefore healthier lifestyle than the rest of the country. Therefore, the second hypothesis (that a physically active population with higher energy needs consumes more calories) is favoured over the third (high daily caloric intake due to unhealthy eating habits and lifestyle).

So13 (School Sports) captures trends that impact obesity. The indicator measures the number of hours that students devote to physical activity. In accordance with *ActNow B.C.* guidelines, the *Program Guide for Physical Activity K-12* of the B.C. Ministry of Education specify that boards of education and school authorities are required to offer 30 minutes of daily physical activity to all students from kindergarten to grade 9, and that students in grades 10 to 12 must document and

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<sup>23</sup> This figure is large enough to affect the total calories consumed by B.C. women per day; all the other female age groups, however, tend to consume slightly more than the national average, ranging from 0.9 percent (women aged 19-30) to 6.3 percent (women aged 31-50).

<sup>24</sup> Alternatively, food in BC might be relatively cheaper which could also help explain a higher level of caloric intake by British Columbians.

report a minimum of 150 minutes per week<sup>25</sup> of physical activity at a moderate to vigorous intensity (B.C. Ministry of Education, 2008). Students (kindergarten to grade 9) are to receive school, home and community options for meeting the 30 minutes per day requirements.

Because the *Program Guide for Physical Activity K-12* was recently implemented (September, 2008), it is too soon to measure its outcomes. However, it is clear that the program was put into place as a direct result of *ActNow B.C.*'s goals to promote healthy lifestyles and improve the health of British Columbians to make it the healthiest jurisdiction to host an Olympic and Paralympic Winter Games.

Many of the initiatives in *ActNow B.C.*, including the schools program described above, focus largely on reducing the prevalence rate of the population who are obese and overweight. In 2004 in B.C., the prevalence of obesity was 19 percent. In 2005, the prevalence of obese *and overweight* B.C. residents was 42.3 percent. As stated in Section 5.3.2 above, one of the five key goals of *ActNow B.C.* is to reduce that number by 20 percent (to 33.8 percent) by 2010. For comparison, the national prevalence of obese and overweight in 2004 was nearly 60 percent (Tjepkema, 2006), which was higher than the rate in B.C in 2005.

#### **5.3.4. Attributing Impacts to 2010: Summaries, Alternative Explanations and Contextual Factors**

To summarize, the analysis of health and physical activity indicators based on currently available data provides evidence that, on average, the populations of Vancouver and B.C. tend to be more physically active and therefore healthier (at least in terms of obesity prevalence) than the rest of the country.

It is also evident that there is a desire and concerted effort on behalf of the B.C. Government to achieve improvements in population health and to reduce the increasing BMI. *ActNow B.C.* targets B.C.'s rising obesity (which is also a national and global trend) by promoting school physical activity. The initiative also takes measures to promote healthy eating habits through school programs that encourage the consumption of more fruits and vegetables (as British Columbians eat less of these than Canada). Initiatives such as *ActNow B.C.* have been launched in anticipation of the Games. They have the potential to, or maybe are already making, an impact on the health of the B.C. population in the Games era; however, the data to assess this fully has not been gathered at this stage.

Excluding demographic measures of fertility and mortality, the scope of the available historical data regarding health and physical activity at both regional and national levels is limited. Thus, at this stage, it is not possible to estimate change at a macro level with precision, especially within a period of 5-7 years or less. In addition, given the currently available data, detecting and recording Olympic Games impacts on health and physical activity is improbable. As noted above, macro level demographic indicators such as birth and death rates: 1) need longer periods to detect change, and 2) are unlikely to be affected by a mega-event like the Olympic Games in the short-term (as demonstrated for So9 in Table 8 to Table 12 and Figure 5 to Figure 7). At the same time, judging by policy initiatives already put into place, nutrition, obesity and physical

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<sup>25</sup> For comparison, in 2005 the government of Alberta prescribed 30 min physical activity per day for all students Grades 4 to 10.

activity are indicators that are relatively more likely to experience Games-induced change in the future.

Steps are being taken by the Canadian Government to gather data that would provide new insights on the health status of a population. For example, the Canadian Health Measures Survey (CHMS) is a new study that intends to build a comprehensive database on the health of Canadians. The survey was launched in March 2007, and data collection is still underway (at the time of this report, 2009). Output (data, etc.) is expected in 2010.

Since the last comprehensive survey of the health of Canadians was conducted thirty years ago in 1978/1979 (Canada Health Survey), it was imperative to obtain more recent data. A survey of health measures involves the actual physical measurement of respondents in clinics. In order to address the lack of recent data on the health of the Canadian population, Health Canada and the Public Health Agency of Canada supported Statistics Canada in implementing a direct measurements survey. This new CHMS will be able to fill gaps and address limitations in existing health information through direct measures of health and wellness in the Canadian population (Tremblay, Wolfson and Connor Gorber, 2007). Tremblay et al (2007) provide the following description of the forthcoming survey:

“The information will be used to establish national baseline data for a range of important health indicators such as obesity, hypertension, cardiovascular disease, exposure to infectious diseases, and exposure to environmental contaminants. In addition, the survey will provide insight into the fitness of the nation and the extent of undiagnosed disease...The survey will create a unique and nationally representative dataset, including stored samples of serum, plasma, isolated genomic DNA and urine, for future research. The complex and intricate data collection platform and infrastructure provide opportunities for ongoing, direct physical measures surveys.”

The potential utility of this survey can be shown with an example (obesity). For instance, data had shown that the prevalence of obesity in Canada increased steadily over the past quarter century among people of all ages (Tjepkema 2006; Shields 2006), an increase that is part of a global trend (WHO, 2000). For a long time, however, the accuracy of prevalence rates of obesity was uncertain, because the data were based on self-report by respondents. Current studies suggest that estimates based on self-reported data tend to underestimate BMI as opposed to estimates obtained through direct measurements of height and weight (Shields, Connor Gorber and Tremblay, 2008). Shields et al (2008) find that the prevalence of obesity based on measured data was 7 percentage points higher than the estimate based on self-reported data (22.6 percent versus 15.2 percent). Therefore, direct measurements of height and weight, as in the Canadian Health Measures Survey, may be more accurate than self-report.

In conclusion, at the present time we cannot confirm (or refute) whether the Olympic Games have had impacts on the indicators of health and physical activity. However, the public policy field concerning these indicators has been affected quite noticeably. More time is needed in order to better assess the impacts of the 2010 Games concerning matters of health and physical activity. As data become available in the future, a better assessment of Olympics impacts can be made. For example, the CHMS data that will become available in 2010 will enable a more comprehensive portrayal of health impacts.

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

#### **5.4. Socio-Cultural bundle 3. Host City Image: Select Foci**

The Host City Image can be gauged by examining how the media portrays the host city in the lead up to the 2010 Games. This bundle also includes an issue that international audiences have identified as important, i.e., housing, which affects host city image. We include an environmental indicator (En24 Olympic Induced Housing) because it addresses housing constructed for athletes to use during the Games, which will then be converted into social housing post-Games.

##### **5.4.1. Indicators**

###### *So43 Host City's media image*

Host City's media image is a socio-cultural indicator that represents the international media's portrayal of the city, region and country in the lead up to 2010 Games. The views of Dr. Michael Real, an expert on media images of Olympic hosts, offer a survey of the city and country's representation in the media in the Olympic Games era.

###### *So31 Homeless, Low-rent Market and Affordable Housing*

Homeless, Low-Rent Market and Affordable Housing is a socio-cultural indicator used to capture changes in the availability of affordable housing and homeless shelter beds during the Games era. The So31 indicator reports on the percentage of low-income singles and seniors; numbers of homeless people, number of shelter spaces; percentage of existing and affordable housing units, wait lists for shelters, and new social housing units. Changes in these dimensions are used to analyze the impact of the Games on vulnerable sub-populations (i.e., the homeless, seniors, and individuals unattached to family units) as well as people with disabilities and the working poor (those for whom the basics cost a disproportionate amount of their income). This indicator is included in the host city image bundle, because housing has historically been a high profile topic for Olympic hosts, and has received considerable media coverage.

###### *En24 Olympic Induced Housing*

En 24 is an environmental indicator used to measure changes in the residential housing stock, and includes units built directly (i.e., Athletes' Village) or indirectly (i.e., urban regeneration) for the Olympic and Paralympic Games. The En24 indicator reports on the total net floor area built.

##### **5.4.2. Policy and Context Assessment**

Homelessness is a concern across Canada, and various governmental initiatives have been developed to reduce homelessness. Although most of these initiatives are not Games-related, they are mentioned here because they reflect efforts to address a high-profile issue that may be exacerbated by mega-events like the Olympic Games.

In 2007, the Homelessness Partnering Strategy (HPS) replaced the National Homelessness Initiative (NHI).<sup>26</sup> The HPS is a Government of Canada program that provides \$269.6 million over two years to prevent and reduce homelessness. The HPS represents a “housing-first” approach with three main components. The first is the *Homelessness Partnership*, which allocated funding to 61 designated communities, including Vancouver, to identify and address their own distinct needs and priorities. The second is the *Homelessness Accountability Network*, which supports regional networks and measurement of results at different levels.<sup>27</sup> The third is *Surplus Federal Real Property for Homelessness*, where federal real properties are made available to community organizations, not-for-profits, other government levels for projects that help prevent and reduce homelessness.

In 2008, the Government of BC purchased a total of 23 single room occupancy (SRO) hotels in Vancouver to reduce homelessness and protect affordable housing stock. This is in addition to hotels previously purchased in Vancouver, Victoria, and New Westminster (part of the Metro Vancouver region) (25 hotels, 1,400 rooms). Many of the hotels are in need of substantial repairs that will bring the hotels to an acceptable standard for safety and security. The Government of BC has also partnered with the City of Vancouver to build 14 supportive housing developments on city-owned sites (1,400 units), and to expand the number of temporary shelter beds in three locations across Vancouver (with the Streethome Foundation) (over 400 beds).

At the regional level, the Metro Vancouver *Affordable Housing Strategy* (2007) and *Three Ways to Home: Regional Homelessness Plan for Greater Vancouver* (2003) offer plans for reducing homelessness by increasing the amount of affordable housing. In addition, both aim to increase prevention and outreach services for those who are vulnerable, while education and advocacy goals aim to mobilize the broader public around legislative reforms and employment programs.

Homelessness is also a concern that is recognized at the city level. In 2005, the City of Vancouver prepared the *Homeless Action Plan*, which uses the same framework as the regional level *Three Ways to Home*. The *Homeless Action Plan* identifies three essential components to alleviate homelessness – income, housing, and support services. More recently in 2008, Gregor Robertson (Vision Vancouver) became the newly elected mayor of the City of Vancouver. A prominent goal of his election campaign is to end street homelessness by 2015.

Investments have been committed to establish a specific Games-related housing legacy. In October 2008, the Government of B.C. and VANOC signed a memorandum of agreement to establish Olympic Legacy Affordable Housing. The agreement specifies that 320 temporary housing units from the Olympic and Paralympic Village in Whistler will be relocated after the Games and converted into 156 permanent supportive housing units in six communities in B.C. The total capital cost is estimated at \$43.6 million. Locally, the City of Vancouver enacted the Single Room Accommodation Bylaw (#8733) in October 2003, shortly after the bid was won (July 2003). The bylaw regulates conversions and demolitions of rooms in the downtown core

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<sup>26</sup> Launched in December 1999, the NHI was a 3-year initiative to develop new and to enhance existing programs to address the homelessness crisis in Canada, with a budget allocation of \$753 million. It was extended in February 2003 for another 3 years with a budget allocation of \$405 million. It was extended yet again for another year (2006-2007) with budget allocation of \$134.8 million to sustain communities through investments in successful homelessness initiatives.

<sup>27</sup> Federally, there is another research dissemination initiative that should be mentioned. Called the Homeless Individuals and Families Information System (HIFIS) Initiative, it is a national information system for shelter service providers.

that are designated as “single room accommodation.” These rooms typically house the poor and vulnerable in Vancouver’s inner-city. The bylaw states that demolition or conversion may only proceed if a permit is applied for and approved.

#### **5.4.3. Data Analysis: Indicator Evaluation Over Time, 2001-2009**

Vulnerable populations are especially sensitive to fluctuations in affordable housing stock. Low-income individuals who are unattached to a family unit and 15 years of age or older, as well as low-income seniors over 65, are particularly affected by changes in the housing sector. Low-income individuals<sup>28</sup> are defined in Canada as those who devote a larger than average share of their income on the necessities of food, shelter and clothing, i.e., those under the low-income cut-off (LICO) threshold.

Between 2001 and 2006, the percentage of singles (i.e., “unattached persons 15 years and older”) below the LICO line increased marginally in Vancouver (from 43.1 to 44.2 percent), and in Metro Vancouver (from 39.8 to 40.3 percent) (see Table 16). On the other hand, the percentage of seniors (65 year old or older) below LICO in Vancouver *decreased* during that period, from 15.8 percent in 2001 to 8.9 percent in 2006. There was a corresponding decrease of 8.2 percentage points in the prevalence of low income seniors in Metro Vancouver, from 22.7 percent in 2001 to 14.5 percent in 2006. At the same time, the national prevalence of low income persons rose from 30.8 percent to 37.1 percent among singles and more than doubled from 15 percent to 35 percent among seniors.

Although the singles population in Vancouver and Metro Vancouver below LICO increased, this increase was relatively small compared to Canada – though the rates were still significantly higher. Moreover, the seniors in Vancouver and Metro Vancouver were much better off than Canadian seniors overall in 2006 than in 2001.

The falling prevalence of low income seniors in Vancouver and Metro Vancouver may be attributed to several influences, including: 1) an increase in seniors’ incomes (above LICO); 2) attrition of below-LICO seniors (due to death); 3) an increase in more affluent individuals entering the “above 65” group; and 4) any combination of these three influences. Regardless of the exact cause(s), in 2006 seniors in the Games host region were living in better conditions on average than seniors in Canada.

The OGI Technical Manual recommends that localized definitions of “low-income, affordable, and social housing” be used. In Canada, the general definition of *affordable* housing is housing that does not cost more than 30 per cent of a household’s gross income regardless of whether they are living in market or nonmarket housing. The term *social* housing refers to housing where rent subsidy or assistance is provided. For our purposes, both affordable housing and social housing are included.

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<sup>28</sup> “Measures of low income known as low income (before tax) cut-offs (LICOs) were first introduced in Canada in 1968 based on 1961 Census income data and 1959 family expenditure patterns. At that time, expenditure patterns indicated that Canadian families spent about 50% of their total income on food, shelter and clothing. It was arbitrarily estimated that families spending 70% or more of their income (20 percentage points more than the average) on these basic necessities would be in ‘straitened’ circumstances. Since its initial publication, Statistics Canada has clearly and consistently emphasized that *the LICOs are not measures of poverty*. Rather, LICOs reflect a consistent and well-defined methodology that identifies those who are substantially worse-off than average.” (Statistics Canada 2006; emphasis added.)

In 2001, the number of affordable housing and social housing units in Vancouver was 20,133 (Table 16). In 2001 Metro Vancouver had 47,220 such units. In 2006, there were 23,623 units in Vancouver, and 47,857 for the Metro Vancouver area (McLanaghan 2008). This suggests a 17.3 percent increase in affordable housing and social housing units for Vancouver, and a 1.3 percent increase for Metro Vancouver. Given that the city of Vancouver is part of Metro Vancouver, excluding Vancouver from the Metro Vancouver count shows that there was actually a *loss* in the number of such units in the rest of Metro Vancouver during the five-year period 2001-2006.

During the period 2005-2008, 357 affordable housing and social housing units were newly constructed (i.e., completed) in the City of Vancouver. This number does not include projects that were initiated during this period *and* still under construction or in development (planning). Compared to the number of new units (593) built during the preceding period 2001-2004, fewer new units were built from 2005-2008. This suggests that the rate of construction of affordable housing and social housing units has slowed down between the two 3-year periods (nearly 40 percent decrease). Not including incomplete projects in the count provides a more appropriate comparison over time. This is because incomplete projects during one period become completed projects in a future period. Counting both incomplete *and* complete projects would lead to double-counting over time (i.e., counted as incomplete in one period, and counted *again* as complete in a later period). In addition, not all projects that are initiated necessarily get completed.

*On the surface*, there appears to be a discrepancy between the numbers reported for affordable housing and social housing units in Vancouver, i.e., fewer *new* units (950) were built during a longer time period (between 2001 and 2008) than there were increase in units (3,490) during a shorter time period (between 2001 and 2006). However, this is not an actual discrepancy. While the 950 units represents newly built units *only*, the increase of 3,480 units represents affordable housing and social housing units that were *both* newly built and converted from previously existing regular housing units (neither affordable nor social). Conversions include regular units purchased by government to stabilize the affordable housing and social housing stock. This protects regular units from being converted into other uses (e.g., market housing, backpacker hostels, etc.) or speculation.<sup>29</sup>

It is also important to evaluate the availability of affordable housing and social housing relative to population size. Table 16 shows the number of units per 1,000 people. In 2001, there were 35.7 units per 1,000 population in *Vancouver*. In 2006, there were 39.4 units per 1,000 population (an increase of 10.5 percent). However, the situation was different for Metro Vancouver. While there was a small increase in the absolute number of units (from 47,220 to 47,857, an increase of 637 units), the units per 1,000 population actually decreased (from 22.3 to 21.8). This confirms the hypothesis that there has been a loss of units *relative to the population* at the Metro Vancouver level. However, these numbers do not take into account the target population of such housing. If the population of Metro Vancouver has become more affluent in

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<sup>29</sup> There is much debate about whether conversion is tantamount to new housing. For this reason, we excluded converted housing from the newly built affordable housing and social housing totals.

that period, and the target population (i.e., the proportion of low-income persons relative to the entire population) has decreased in size, the actual change in unit availability might be different.

To summarize, there has been an increase in the number of affordable housing and social housing units *in Vancouver* between 2001 and 2006. Despite this increase, additional data suggest that this increase has not yet met the need for such housing. In 2006, 3,577 households in the city of Vancouver were on waiting lists for social housing.<sup>30</sup>

At this point, it is important to comment on En24, Olympic Induced Housing. This indicator tracks housing built specifically for the Olympic and Paralympic Games. At the time of this publication, there is much controversy on this topic. The City of Vancouver originally dedicated 252 of the 1,100 housing units in the Olympic Village to be used in the future as social housing. This legacy is in question as the result of recent events. On February 17, 2009 Vancouver City Council voted unanimously to finance the incomplete Olympic Village. This \$500-million housing project investment is a controversial move to finance the developer (Canadian Press, 2009). Recent reports state that the city is considering moving the social housing to a more affordable location (Bula, 2009). The rationale provided for the move is the cost overruns of subsidizing the social housing project. Originally slated to cost \$65 million, the latest estimate suggests a \$110 million cost (Snoski, 2009). This translates into \$436,508 per unit or \$546 per square foot for units that are 800 ft<sup>2</sup> in size.

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<sup>30</sup> In addition, Pivot Legal Society (a not-for-profit legal advocacy organization) maintains a list of the number of social housing units that have been closed in Vancouver since the Olympic Games were awarded to Vancouver in July 2003. The number stands at 1448 units but 58 units that are currently closed may reopen. The reasons for closure are various, including renovation, conversion (to non-market housing) and maintenance or by-law violation. The data for the list comes from a variety of sources including the City of Vancouver, Pivot Legal Society Carnegie Community Action Project (a local non-governmental organization), B.C. Housing (provincial housing authority) and Downtown Eastside Residents' Association.

### So43 The Image of Vancouver in World Media: Some Preliminary Considerations

Michael R. Real, PhD<sup>31</sup>

The city of Vancouver, the Province of British Columbia and the country of Canada have been present for decades in the world press in intermittent news stories with few patterns evident in such coverage. Canada has an established but not extensive image, but Vancouver and British Columbia are much less fixed in the awareness of the global public.

Vancouver, in the period following the closing of the Turin Winter Games in 2006, generated three stories that indicate the varied reporting about the city within international press coverage. First, the preparation for the 2010 Olympics was the most widely reported event globally. This story line included positive reports of venue development and landmark events in the countdown to Feb. 2010 but also negative stories about escalating security and construction costs as well as conflicts with advocates for the homeless. Second, an amateur video of the taser death of Polish immigrant Robert Dziekanski in the Vancouver airport at the hands of RCMP officers received instant and widespread coverage in virtually all major news networks and organizations. Subsequent investigations and hearings, some supported by the Polish government, kept the story in world news. This storyline was clearly a devastatingly negative image-maker for Vancouver and Canada. Third, detached human feet washed up on Vancouver area and BC shores on six different occasions, creating an international news curiosity; they apparently were unrelated incidents largely resulting from the ability of athletic shoes to keep a foot afloat after it detaches from the body. This story was a neutral feature neither helping nor hurting the city and province but it evoked considerable foreign interest.

These and less prominent stories are what appear in searches in PressDisplay.com and other news media monitoring services.

Apart from the Dziekanski airport tragedy, homelessness seemed to emerge as the most problematic. Budget controversies seemed reminiscent of many previous Olympics. The formal budget for security proved glaringly unrealistic (\$175 million initially when nearly \$1 billion proved necessary), and the billions spent on highway and mass transit infrastructure were criticized because they serve the Olympics but are not counted in the official Olympic budget. The homelessness issue, however, kept recurring with protests and charges of neglect that had begun well before the Vancouver public approved the Olympic bid on February 23, 2003 with a 64 percent majority. A report by an independent television news service, directed by former CBS anchor Dan Rather, focused on the homelessness and drugs in Vancouver and received discussion in the international press. Noting Vancouver's approaching Olympic host role, The Washington Post wrote an investigative feature on homelessness and related problems in Vancouver, published more than a year before the Games. Controversy over Olympic construction and preparations displacing populations happens in every Olympics and Vancouver is no exception.

Preliminary reviews indicate that Vancouver, B.C., and Canada receive much more coverage in English-speaking countries, some French-language coverage because of Quebec and Canada's two language policy but only rare coverage in newspapers in other languages. Will Vancouver 2010 break through this linguistic-cultural barrier and will it also reach the many countries not historically associated with the Winter Olympics? Careful quantitative and qualitative measures will indicate the successes or failures in this regard.

As Dr. Real's survey conveys (see side bar "So43 The Image of Vancouver in World Media: Some Preliminary Considerations" on previous page), homelessness is a continuing part of the 2010 story. In Vancouver, someone is considered homeless (or "unsheltered" or "street/service homeless") when they lack money for a permanent residence. This definition includes people who have no shelter or are temporarily sheltered (i.e., emergency shelters, youth safe houses, transition houses or "sofa surfers").

<sup>31</sup> Michael Real, PhD has been a professor with the School of Communication and Culture at Royal Roads University since 2004. Dr. Real has three books to his credit. In addition, Dr. Real has led several major research projects, including a UNESCO-sponsored project that looked at media coverage of the Olympics.

Homelessness counts as an indicator has its limitations. First, they reflect only one period in time (e.g., a 24 hour period). Second, the indicator is generally thought to under-represent the *actual* number of homeless people. This is because it only captures those who report themselves to be homeless. It also misses those in hospitals, detoxification facilities, or recovery houses who will have no place to go when released. In 2002, the homeless count in Vancouver documented 628 homeless individuals (Table 17). In 2005, this number had more than doubled (1,291). By 2008, the count was 1,576 (an increase of 22 percent since 2005). Table 17 shows that the Metro Vancouver counts reflected a similar trend – a 94 percent increase between 2002 and 2005, and an additional 22 percent between 2005 and 2008.

Absolute numbers, such as counts, do not reflect changes in the population. To exclude the possibility that the increase in homelessness was due simply to a larger population, we present homelessness *rates*, which report the number of homeless persons per 1,000 population (see Table 17). While the *number* of homeless has increased with each count, the *rate* (adjusted for population size) has also increased, but more slowly. In Vancouver, the 2005 count reflects an increase of 106 percent over the 2002 count, and the 2008 count reflects an increase of 22 percent over the 2005 count. The count adjusted for population (homelessness rate) in Vancouver in 2005 (2.18) reflects an increase of 100 percent over the 2002 rate (1.09), and the 2008 rate (2.56) reflects an increase of 17 percent over the 2005 rate. In Metro Vancouver, the 2005 count reflects an increase of 94 percent over the 2002 count, and the 2008 count reflects an increase of 22 percent over the 2005 count. The homelessness rate in Metro Vancouver in 2005 reflects an increase of 89 percent over the 2002 rate, and the 2008 rate reflects an increase of 17 percent over the 2005 rate. In each count year, the homelessness rate in Metro Vancouver (0.53 in 2002, 1.00 in 2005, and 1.17 in 2008) has been less than half that of Vancouver (1.09 in 2002, 2.18 in 2005, and 2.56 in 2008). Nevertheless, a similar trend in the homelessness rate is observed for *both* Vancouver and Metro Vancouver; the rate doubled or nearly doubled between 2002 and 2005, and increased by an additional 17 percent between 2005 and 2008. In summary, *both* the absolute homeless count and the homelessness rate increased between 2002 and 2008, which suggests that the increase in homelessness was *not* due simply to an increase in population size.

A look at one other regional district – the Victoria metropolitan area, or Capital Region District (CRD) – reveals that there were 1,242 homeless in CRD in 2006, a rate of almost 3.5 homeless per 1,000 population. This is more than three times higher than the Metro Vancouver rate in 2005 and still nearly three times higher than Metro Vancouver's rate in 2008. Comparing the City of Vancouver to Toronto shows that Toronto's homelessness rate in 2006 was 2.02, or 7 percent less than the Vancouver rate in 2005. These numbers give some support to the widespread popular opinion that homelessness is more prevalent in B.C. than anywhere else in Canada. It further suggests that the problem of homelessness is more prominent in the B.C. Capital Regional District than in Metro Vancouver.

Along with the increasing homelessness rate in Vancouver and Metro Vancouver between 2002 and 2008, there has been a corresponding increase in the number of places in homeless shelters (see Table 17). In Vancouver between 2002 and 2008, the homelessness rate increased by 134 percent, while the rise in number of places in homeless shelters was 103 percent between 2002 and February 2009. In Metro Vancouver, the homelessness rate increased by 121 percent in homelessness rate, and the number of places in homeless shelters increased by 108 percent.

All in all, the increase in places in homeless shelters for the past 6-7 years (supply) does not appear to meet the need (homelessness rate). This is based on the number of homeless per place in shelter, and the situation seems to be worsening. In Vancouver, there were 1.12 homeless per place in shelter in 2002, and 1.39 homeless per place in shelter in 2008/2009 (an increase of 23 percent, or 0.27 more homeless per place in shelter). In Metro Vancouver, there were 1.64 homeless per place in shelter in 2002, and 1.87 homeless per place in shelter in 2008/2009 (an increase of 14 percent, or 0.23 more homeless per place in shelter). Still, there were more places in shelters available per homeless person in Vancouver than in Metro Vancouver. Finally, the prevalence of people with physical disabilities among the homeless in Metro Vancouver has more than doubled between 2002 and 2008, from 15 percent to 31 percent.

Analysis of the data for indicator So31 for both Vancouver and Metro Vancouver show five main findings. First, the percentage of low-income singles has remained fairly stable and has declined in seniors between 2001 and 2006, a period when both percentages increased nationally. Second, the number of affordable housing and social housing units in both Vancouver and Metro Vancouver has increased during the same period (in Vancouver, the increase is relative to population too). Some reports suggest that the need for affordable housing and social housing outnumbers the supply. However, due to lack of available data, we are unable to evaluate the supply (number of units) relative to need (homelessness). Third, both the number of homeless and the homelessness rate per 1,000 population have more than doubled between 2002 and 2008. Fourth, the number of places in homeless shelters has more than doubled between 2002 and February 2009. Fifth, there were more homeless than places in shelters in 2002. By February 2009, this gap had become more pronounced. In addition, data for Metro Vancouver show that the percentage of homeless with physical disabilities increased between 2002 and 2008.

#### **5.4.4. Attributing Impacts to 2010**

Understanding how and why these changes came about is a complex undertaking. For example, the prevalence of low-income singles and seniors decreased in Metro Vancouver, while for Canada, it remained the same or worsened. It is possible that this difference may in part be due to the selection of Vancouver as an Olympic Games host in 2003. However, other factors could have produced the same effect (e.g., demographic changes in the target populations, higher price of necessities, etc.). Locally, a different take on the situation has been suggested. Non-governmental organizations like Pivot Legal Society suggest that the 2010 Games has led to an *increase* in homelessness, while at the same time also leading to a *decrease* in the number of units of affordable housing and social housing (through gentrification, cleaning out of neighbourhoods, etc). However, a lack of available data does not allow for conclusions to be made with reasonable certainty about the situation. Specifically, we cannot discern whether the increase in homelessness is due to individuals in Vancouver/Metro Vancouver being displaced and becoming homeless, or due to an in-surge of homeless into Vancouver/Metro Vancouver from other parts of Canada (which in itself may or may not be caused by the upcoming Games). These data constraints make it difficult for us to control for alternative explanations. Therefore, we leave our analysis at a descriptive stage, with the hope that new data will become available in the future to help inform us about the impacts of the Olympic Games on vulnerable populations in the host city/region.

It is worthwhile to note that several initiatives (described above) target homelessness in Vancouver. It is quite plausible that these initiatives have contributed to the overall increase in affordable housing. However, the outcome of these initiatives (i.e., a decrease in homelessness) depends on the *need* for affordable housing and social housing. An increasing need (i.e., a steadily increasing homeless population in Metro Vancouver) may not be met by the supply (units of affordable housing and social housing). In the lead up to the 2010 Games, the media have been reporting on issues associated with the Games. According to Dr. Real, some of these media reports portray the host city in a negative light, including the homelessness situation in Vancouver.

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## References

- ActNow BC. 2005. Access website (<http://www.actnowbc.ca/>)
- British Columbia Ministry of Education. 2008. *Program Guide for Daily Physical Activity Kindergarten to Grade 12*. ([http://www.bced.gov.bc.ca/dpa/pdfs/program\\_guide.pdf](http://www.bced.gov.bc.ca/dpa/pdfs/program_guide.pdf))
- Bula, Frances. 2009. "Olympic Social Housing Twice as Costly as Planned, Reports Say." *The Globe and Mail*, February 18, 2009. (<http://www.theglobeandmail.com/servlet/story/RTGAM.20090217.wbcvillage17/BNStory/Front/home>) (retrieved February 18, 2009).
- The Canadian Press. 2009. "Vancouver Takes Full Control of Athletes Village." *The Globe and Mail*, February 18, 2009. (<http://www.theglobeandmail.com/servlet/story/RTGAM.20090218.wathletesvill0218/BNStory/GlobeSportsOther/>) (retrieved February 18, 2009).
- Health Canada. 2003. *Canadian Guidelines for Body Weight Classification in Adults*. Catalogue H49-179. Ottawa: Health Canada
- IOC. 2008. "Factsheet—Olympic Winter Programme." ([http://multimedia.olympic.org/pdf/en\\_report\\_851.pdf](http://multimedia.olympic.org/pdf/en_report_851.pdf)) (retrieved on March 18, 2009).
- McClanaghan D., 2008. *Housing Affordability in Metro Vancouver*. Prepared for Metro Vancouver Housing Affordability Workshop "Responding to the Challenge," May 15, 2008. (<http://www.metrovancouver.org/planning/development/housingdiversity/AffordableHousingWorkshopDocs/McClanaghanAffordability2008Report.pdf>) (retrieved April 2, 2009)
- Snoski, Kelli. 2009. "Social Housing in Athletes' Village Threatened by Soaring Costs." *The Vancouver Sun*, February 17, 2009. (<http://www.vancouversun.com/Business/Social+housing+athletes+village+threatened+soaring+costs/1298671/story.html>) (retrieved February 18, 2009).
- Tjepkema, M. 2006. "Adult obesity." *Health Reports*. Statistics Canada, Catalogue 82-003 17(3): 9-25.

Tremblay, Mark, Michael Wolfson and Sarah Connor Gorber. 2007. "Canadian Health Measures Survey: Rationale, background and overview." *Health Reports*. Statistics Canada, Catalogue 82-003-S 18:7-19.

World Health Organization. 1995. *Physical Status: The Use and Interpretation of Anthropometry*. Report of the WHO Expert Committee (WHO Technical Report Series, No. 854). Geneva: World Health Organization.

World Health Organization. 2000. *Obesity: Preventing and Managing the Global Epidemic* (WHO Technical Report Series, No. 894) Geneva: World Health Organization.

## 6. Environmental Outcomes

### 6.1. Environmental Bundle 1. Land Use for Leisure

Land Use for Leisure combines the following indicators which, taken together, reflect changes in land use and urban outdoor areas in the Games Era. This bundle also details the various government initiatives promoting sustainable land use, and public open spaces to enhance community well-being.

#### 6.1.1. Indicators

##### *En6 Land Use Changes*

En6 is an indicator that tracks land use changes in the host region. It measures the pressures put on the surrounding environment by the expanding human population and by economic activities. Dimensions used are land use categories (e.g., urban, industrial, commercial, agricultural, etc.). The report below documents changes over time to determine if efforts to limit urban sprawl have been effective, and to track changes in land use before and during the Games era.

##### *En10 Public Open-Air Leisure Areas*

This indicator represents urban outdoor areas (i.e., parks, gardens, trails) developed for the public to engage in leisure activity (walking, relaxation, sport, etc.). Dimensions include square kilometres of green space and number of parks. The following analyzes changes in public open-air leisure areas before and during the Games era.

##### *En7 Protected Sites*

This indicator represents the national and regional natural, historical and cultural areas that are protected. Dimensions include provincial and national parks, heritage sites, and marine protected areas, etc.

#### 6.1.2. Open-Air Leisure Areas

This bundle documents two different contexts: 1) a vast array of national and regional protected sites, open spaces, and leisure opportunities, and 2) concentrated efforts by the Lower Mainland city, municipal, and provincial governments to modify urban, industrial, and forested areas so they can be used for community economic development, and as leisure spaces during the Games era. These initiatives directly impact En6 and En10 indicators which measure land use changes and urban outdoor areas used for leisure activities.

Canada has approximately 610,000 km<sup>2</sup> of strictly protected sites. This includes two National Marine Conservation Areas (Saguenay-St. Lawrence Marine Park and Fathom Five National Marine Park). The combined, area of these protected sites is slightly larger than France (545,630 km<sup>2</sup>).

British Columbia's total land area is 950,000 km<sup>2</sup>. This is approximately one-third larger than Alberta's total land area of 642,317 km<sup>2</sup>. Alberta has a relatively small amount of its total land area designated as provincial parks, 2,208 km<sup>2</sup> (or 0.3 percent), but nearly 10 percent of its land (62,933 km<sup>2</sup>) is designated as national parks (see Table 18). By contrast, British Columbia has a

much larger amount of its total land area designated as provincial parks, 130,900 km<sup>2</sup> (nearly 14 percent), but only 0.5 percent (4831.62 km<sup>2</sup>) is designated as national parks. In addition, British Columbia has approximately 120,000 km<sup>2</sup> of World Heritage sites (13 percent of its territory), while Alberta has a little more than half of that at 62,906 km<sup>2</sup> (about 10 percent of its territory). Overall, B.C. has more than a quarter of its territory (nearly 27 percent) designated as provincial or national parks and World Heritage Sites, in comparison to a fifth of Alberta's territory (nearly 20 percent).

The Olympic Games has provided an opportunity for protecting land and fostering community development in the Whistler region. On December 15, 2008, the Resort Municipality of Whistler (RMOW) was authorized to enter a Limited Partnership Agreement with the Squamish and Lil'wat Nations for the Cheakamus Community Forest. This is a long-term initiative to co-manage 36,000 ha of forestland surrounding the municipality. The initiative features an ecosystem-based management that allows for timber harvesting without compromising the forest ecosystems or undermining other tourism, recreation or cultural initiatives.

The lower mainland of B.C. struggles to find new open-air leisure spaces. While the Metro Vancouver population increased by 5 percent between 2001 and 2006, the total public open-air leisure (POAL) area did not change (see Table 19). Thus there was about a 5 percent decrease in the amount of public open-air leisure space per person (from 981m<sup>2</sup> to 934 m<sup>2</sup>). The consistency in the size of the POAL area was due to the static definition of the Metro Vancouver Green Zone.<sup>32</sup> Comparatively speaking, Metro Vancouver appears to be lagging behind the provincial capital Victoria. Between 2001 and 2006, the population of the Capital Region District (CRD) increased by 4.5 percent (from 340,588 to 355,871). During the same period, however, the total public open-air leisure area increased by 37 percent (from 263.32km<sup>2</sup> to 360.11km<sup>2</sup>). Thus, in the CRD, as the population increased, the public open-air leisure area per person increased by nearly a third (from 772.13m<sup>2</sup> to 1011.9 m<sup>2</sup>).

Efforts have been made to increase public open-air leisure area in Metro Vancouver. One such effort, *A Bylaw to Authorize the Dedication of Land as Regional Park* (GVRD's Bylaw No. 1061,2007), allows for the acquisition of different plots of land to be dedicated as regional parks. These parks will provide many opportunities for leisure activity. Another effort is the *Regional Parks and Greenways Plan (RPGP)*, part of the Greater Vancouver Regional District's (GVRD) *The Sustainable Region Initiative*. RPGP was designed to increase green spaces and natural places. One of the goals of the RPGP is to investigate opportunities for development of integrated recreation and tourism strategies to support the 2010 Olympics. Metro Vancouver will work with municipalities and businesses to coordinate development and integration of recreation and tourism strategies in the region. The GVRD has passed a Bylaw to Adopt the Financial Plan for the Years 2008-2 012 (By-law No. 1070, 2007) that mandates that GVRD

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<sup>32</sup> The origins of the Green Zone are in the Livable Region Strategic Plan (LRSP). Adopted in 1996 by Metro Vancouver and modified as the Sustainable Region Initiative, it is the region's current growth strategy. It seeks to protect the green zone, build complete communities, achieve a compact metropolitan region and increase transportation choice. Protecting the green zone is a strategy for documenting and valuing natural assets, such as agricultural land and parks. This strategy is supported by a policy discussion document called the Green Zone. According to the Green Zone policy, approximately 70 percent (199,500 ha) of the region is physically comprised of these natural assets. For example, approximately 30 percent of the Green Zone (or 58,000 ha) is agricultural land, including land within the Agricultural Land Reserve (land zone for agricultural use only). In terms of protection, the Green Zone notes that approximately 40 percent (80,000 ha) is already protected within the region's watersheds, parks and conservation lands. The purpose of the Green Zone is to help protect the remaining 60 percent, including the 46,000 ha of Crown forestry lands and municipal golf courses.

adopt a five year financial plan to make regional parks its largest expenditures, with the greatest increases in 2010 and 2011.

Despite these efforts, with the increase in population in Metro Vancouver, the amount of leisure space person decreased between 2001 and 2006. This lag is brought in sharp contrast by the fact that a similar increase in population occurred in the CRD during that period, but the areas devoted to public open-air leisure increased by more than a third to produce a rise in such areas per person (see Table 19).

One of the essential reasons for this relative decrease in public open-air leisure areas in Metro Vancouver is partly definitional and partly due to the basic geographical differences between Metro Vancouver and the Capital Regional District. Metro Vancouver has less available space for devoting larger public areas to open-air leisure use. Public parks that have an area less than 0.25 km<sup>2</sup> (25 ha) are not included in the Public Open-Air Leisure Areas indicator. If the indicator was adjusted to allow for smaller parks, it is possible that Metro Vancouver could (at least partly) offset the decrease public open-air leisure area per person by the addition of many smaller parks.

### 6.1.3. Land Use Changes

Metro Vancouver differentiates between eighteen categories of land use (Metro Vancouver 2006). Five of these categories did not change at all in size or as a share of the total Metro Vancouver area between 2001 and 2006 (see Table 20). These five are: 1) land for *Harvesting and Research* (forested lands harvested/devoted for research use); 2) the *Port Uplands* (the region's port lands, i.e., Vancouver Port, Fraser River Port, North Fraser Port and Vancouver International Airport); 3) the *Protected Watershed* (all Metro Vancouver watersheds); 4) the *Transportation, Communication and Utilities* land (airports, ferry terminals, railyards, shipping ports, electrical sub-stations, electrical sub-stations, liquid waste treatment facilities, landfill sites, major transportation and utility corridors); and 5) *Road and Lane Right-of-Way*.

Another four categories saw a decrease in absolute area, but since they are all relatively small, their percentage share of the total Metro Vancouver land area (283,180 ha) remained more all less the same, all within 1.3 percentage points. These are 1) Agriculture (lands that are cultivated or contain agricultural production facilities such as greenhouses and barns; lands in the provincial Agricultural Land Reserve that do not have a recreational, industrial, commercial, institutional, transportation, or communication and utility land use) – which decreased only marginally; 2) Residential Rural use (single detached dwellings on larger than 0.5 ha lots, with no apparent agricultural production and are outside of the Agricultural Land Reserve) – which decreased by 6.2 percent but only 0.2 percentage points of the total Metro Vancouver area; 3) Open and Undeveloped land (areas with no visible development, vacant urban land and forested or vegetated areas not identified as parks or agriculture) – which decreased by nearly 13 percent or 1.3 percentage points of the total Metro Vancouver area; and, 4) land for Industrial-Extractive use (peat extraction, gravel pits and rock quarries) which decreased by 44 percent, but is also one of the smallest categories, and thus decreased only by 0.2 percentage points of the total Metro Vancouver area.

Five categories increased in absolute size but did not change as a proportion of the total Metro Vancouver are at all. These are: 1) land for Commercial use (retail, office, personal service,

hotels, motels); 2) Institutional land (educational institutions, hospitals, correctional facilities, churches and cemeteries); 3) land for Residential-Commercial/Mixed use; 4) land for High-Rise apartments (more than 5 stories); and 5) land for Low-Rise apartments (less than 5 stories). Of these, the largest increase was in High-Rise apartments land area which was increased by more than 25 percent.

Three land use categories that increased both in absolute terms and as a share of the total Metro Vancouver area were: 1) Industrial use (processing, manufacturing, warehousing and wholesaling); 2) Recreation and Protected Natural Areas (local, regional, and provincial parks, ecological reserves and wildlife management areas and recreational facilities such as golf courses, ski areas, exhibition grounds and community centres); and 3) Residential Single Detached and Duplex, and Residential Townhouses (which increased the most, by nearly 18 percent, but by only 0.2 percentage points of the total area).

As shown in Table 20, the data is consistent with some urban sprawl in Metro Vancouver between 2001 and 2006 as reflected in the 13 percent decrease in Open and Undeveloped Land (which, however, saw its share of the total fall by only 1.3 percentage points). Overall, of the 18 land use categories, 8 categories were subject to change in their share of the total land area of Metro Vancouver between 2001 and 2006. Of these 8 categories, 6 changed by less than 1 percentage point in their share of the total land area. The remaining two categories changed by only 1.3 percentage points (the decrease in Open and Undeveloped Land, and the increase in Recreation and Protected Natural Areas). It is difficult to distinguish any potential Olympic Games impact that can be linked to those changes, since it is impossible to hypothesize whether such developments would have occurred in the absence of upcoming Games or not and what their extent would have been in that case. In other words, it is possible that the observed changes (e.g., decline in agricultural lands and rural dwellings, increase of residential apartments and townhouses, etc.) are all a part of a typical city evolution. At the same time, some catalyzing effect of the selection of the city as an Olympic host cannot be excluded, especially in the increase in Recreation Areas (which could potentially be Olympic venues).

#### **6.1.4. Attributing Impacts to 2010**

To summarize, B.C. has a relatively large portion of its territory assigned to environmental protection/recreation, 7 percentage points larger than that of the neighbouring province of Alberta. This difference is mainly due to B.C.'s larger share of land devoted to provincial parks (13.8 percent in B.C., 0.3 percent in Alberta) and world heritage sites (12.6 percent in BC, 9.8 percent in Alberta) which offsets Alberta's higher percentage of land used for national park territory (0.5 percent for B.C., 9.8 percent in Alberta). In general, changes to protected areas happen relatively infrequently, therefore it is not surprising that neither the Olympic Games, nor anything else has impacted on their size.

It is also unlikely that the relative reduction in public open-air leisure areas between 2001 and 2006 in Metro Vancouver is due to the Olympic Games. Since the total of public open-air leisure areas remained the same, only the population increased, the Games could have affected the indicator only indirectly through the population change. While this is possible (but not very likely), a similar population change in CRD produced a very different situation. Therefore, the relative decrease of public open-air leisure areas in Metro Vancouver appears to be

predominantly due to the absolute area remaining the same, and not to the rise in population (and therefore not directly caused by the Olympic Games). The only possible alternative for the Olympic Games to have affected the indicator then is by redirecting resources that could have been used to enlarge the public open-air leisure areas (e.g., through building more sports venues and facilities at the expense of areas classifiable as intended for public open-air leisure). While possible, this alternative remains a hypothesis since data are not readily available to evaluate. This alternative also ignores the geographical limitations pertaining to Metro Vancouver discussed above. By and large, we can conclude that the Games has had little to no impact on land use for open-air leisure in the host region between 2001 and 2006, at least in the specific ways land use for leisure is defined.

Through our analysis of En6 Land Use Change, En7 Protected Sites and En10 Public Open-Air Leisure Areas, we were not able to detect much (if any) impact of the upcoming Olympic Games in terms of land use, at least in this pre-Games stage. The only somewhat possible impact is in the 6 percent increase in Recreation (and Protected Natural) areas land use category (possibly linkable to venues construction).

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## References

Greater Vancouver Regional District. 1999. “*Livable Region Strategic Plan.*” (<http://www.metrovancouver.org/PLANNING/DEVELOPMENT/STRATEGY/Pages/LivableRegionStrategicPlan.aspx>) (retrieved March 17, 2009)

## 6.2. Environmental Bundle 2. Transportation and Well-Being

Transportation and Well-Being combine the following indicators and their impacts on host region and country in light of the 2010 Games. This bundle also details one of the most dominant issues in the region in the lead up to the Games. We emphasize the outcomes for the environment although transportation is an obvious determinant of well-being for local residents.

### 6.2.1. Indicators

#### *En 11 Transport Networks*

This indicator is used to measure local transportation priorities as revealed in changes in transport networks. En11 reports on dimensions such as roads, cycle paths, pedestrian streets and public transport. The following will analyze changes or increased development for each type.

#### *En 12 Daily Travelling Distance*

This indicator represents the mobility of citizens living in the geographical area. Dimensions include average daily number of trips, average distance travelled and transportation mode employed. The following will analyze changes in daily travelling distance before and during the Games era. Quality of life and environmental well-being are key criteria.

### *En13 Traffic Congestion*

This indicator is used to measure the duration and extent of vehicular congestion in the city and region. Variables include the duration, in hours per day, of very slow-moving and stationary traffic and the extent, in kilometres per day, of such slow or stationary traffic. The following will analyze the changes in congestion before and during the Games era.

#### **6.2.2. Projects, Investments and Context**

The Kyoto Protocol Implementation Act is a federal policy discussed in greater depth in Environmental Bundle 3 Air and Water (see Section 6.3). We use it here because it supports active and public transportation modes in order to reduce greenhouse gas emissions.

More directly related to the 2010 Games are the Olympic Line and the Canada Line. The Olympic Line is a City of Vancouver public transportation demonstration project that will operate for 60 days during the 2010 Winter Games. The Line will run between the Vancouver Athletes' Village and Granville Island demonstrating the viability of modern streetcars in a sustainable transportation network. It is anticipated that the Streetcar will decrease the number of private vehicles and buses. Bombardier Transportation will bring, operate and maintain two accessible streetcars on loan from Brussels, Belgium to Canada.

The *Canada Line Rapid Transit Project* is an automated rail-based rapid transit service connecting downtown Vancouver with central Richmond and the Vancouver International Airport. The Canada Line will provide an additional transportation capacity equivalent to 10 major road lanes and will serve the region for the next 50 to 100 years. Estimated capital cost is about \$1.9 billion in 2003 dollars. The Canada Line is funded by the Governments of Canada and British Columbia, the Cities of Vancouver and Richmond, the transportation authority, TransLink, and Vancouver Airport Authority. The Canada Line is *not* an Olympics project, but it will reduce private vehicle use during the Games.

The *Sea to Sky Highway Improvement Project* is a 5 year, \$600 million program of the BC Ministry of Transportation to improve the safety, reliability and capacity of the highway between West Vancouver and Whistler. This project is not an Olympic specific project as its improvement was already planned. However, it is scheduled for completion in fall 2009 and will enable safer and more reliable transportation during the 2010 Winter Games.

#### **6.2.3. Data Analysis: Indicator Evaluation Over Time**

##### *En11 – Transport Networks*

The growth in total length of the transportation infrastructure gives an indication of the amount of transport supply provided to a region. Within indicator En11, the dimensions of motorway and highway kilometres represent road capacity increase. The dimension of SkyTrain guideway length and transit bus service kilometres provides a representation of the supply of transit provided. These “supply” dimensions can be compared to the “demand” dimension of indicators En12 Daily Travelling Distance and En13 Road Congestion to provide a sense of transport performance.

The supply of road capacity is in response to both congestion levels and development. Because road infrastructure is expensive, and because there is the possibility that more people may travel

by road simply because there is more road to travel on, the benefits of additional road capacity could counter-act the benefits of travel time saving. Thus, the provision of road supply is typically in support of land development or other considerations, such as safety or the movement of goods.

Data on the supply of road was obtained from spatial datasets created by GIS Innovations. GIS Innovations maintains a current database of road networks for the whole of B.C. This database was used to query the total road-km and lane-km of both motorways<sup>33</sup> and highways.<sup>34</sup> The data for total road- and lane-km was determined for both the areas of City of Vancouver and Metro Vancouver for 2006 and 2007. As shown in Table 21, within the City of Vancouver, the increase of motorway road-km and lane-km was relatively marginal, at 0.3 percent. Also within the city, the highways road-km increased by 6.6 percent, while the highways lane-km increased by 9.5 percent. Considering this change was from 7.6 to 8.1 for highway road-km, and 16.9 to 18.5 for highway lane-km, this increase may be significant. Region-wide, the results were somewhat in reverse with motorway road- and lane-km growing at 2.1 percent, and the highway road- and lane-km grew at 0.3 percent and 0.1 percent, respectively.

Considering that the population growth rate between 2006 and 2007 was 1.7 percent for both the City of Vancouver and Metro Vancouver, the motorway road- and lane-km growth of 0.3 percent within the City of Vancouver was below the population growth. For Metro Vancouver, however, the motorway road- and lane-km growth was higher, at 2.1 percent. This is to be expected as the City of Vancouver is a fairly developed city with limited and fairly expensive land space available for roads, whereas in the region and, in particular, in suburban areas, this is less of a case. With the stark contrast in growth rates of motorway road capacity between the City of Vancouver and the Region, this indicator dimension may be useful in the detection of an impact due to the Olympic Games.

In terms of the supply of transit, two dimensions were considered: SkyTrain guideway length and bus transit service-km. Referring to Table 21, it can be seen that the length of guideway grew by 5.7 percent in the City of Vancouver from 2001 to 2007. Similarly, the guideway grew by 1.7 percent in Metro Vancouver. With the population growth rates of 6.8 percent and 6.9 percent in the same time period for the City and Metro Vancouver, respectively, the growth of the SkyTrain guideway length has somewhat kept pace at least within the City of Vancouver. The opening of the Canada Line will most likely affect these indicator dimensions, showing an impact that could be attributed to the Olympic Games.

Transit bus service-km is the total bus system-wide distance travelled. This is a fairly good indicator of transit service provision as it tends not to be volatile over the years and is a good measure to track in relation to population growth. Data showing the growth in the supply of transit bus service-km in Metro Vancouver can be seen in Table 22 and Figure 8.<sup>35</sup> The supply of transit service-km grew by 16.3 percent from 2004 to 2007, almost four times higher than the

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<sup>33</sup> Motorways comprise of the following road types as designated in the B.C. Digital Road Atlas, GIS Innovations: arterial, collector, local, lane, ramp, strata, restricted, service, and recreation.

<sup>34</sup> Highways comprise of highway and freeway road types, as designated in the BC Digital Road Atlas, GIS Innovations.

<sup>35</sup> Transit Bus Service-km data provided by TransLink.

regional population growth rate of 4.2 percent for that same time period. The annual growth rates of bus service-km were 4.4 percent, 5.5 percent and 5.5 percent, respectively, within this 3 year period, showing relative stability. Significant changes to these annual growth rates in 2010 may indicate an impact that can be attributed to the Games.

Overall, the supply of transit in terms of both infrastructure and services compared to the growth in supply of roads, as depicted by the indicator dimensions of En11, show that investments in sustainable transportation are being practiced within Metro Vancouver. However, the utilization of these investments will be analysed in the following indicators, En12 and En13.

#### *En12 Daily Travelling Distance*

En12 is an indicator that represents the amount of travelling within a region or city. The average length of travel, as well as the number of trips, provides an estimate of the total travel demand of a location. The data available for this indicator come from Statistics Canada, specifically from the *Journey to Work* survey which is conducted jointly with the 20 percent sample census survey every 5 years. These data represent travel demands for commuting to work, which typically accounts for one third of all trips within a region. Commuting distance is an indicator dimension that can indicate the quantity of travel per trip. Policies exist to reduce travel distances by encouraging people to work and shop closer to their residences. Reduced travel distances result in less energy used in transport, and in turn, lower emissions and reduced travel times.

Table 23 and Figure 9 show the changes in median commute distance between the Census years of 1996, 2001 and 2006. It can be seen that the median commute distance decreased steadily within Vancouver Census Metropolitan Area over the 10 year period. Similar patterns can be observed for the municipalities of Abbotsford and Victoria. However, with the exception of Montreal, it can be seen that distances typically increased in most of the cities outside of B.C. Overall, B.C., and Canada as a whole, showed increases in median commute distances.

Increases in commute distances typically indicate a phenomenon known as “urban sprawl” where the development of an urban region grows along its fringes. This growth is typically fuelled by less expensive housing. As employment is typically concentrated within the urban core, expansion of urban areas causes commute distances to increase over time. To counter-act such growth, policies are created to promote densification which increases the number of people living within the urban core. Policies are also created to increase mass transit services as an incentive to use more sustainable modes of transportation.

Commute distance provides just one indication of urban sprawl and sustainable transportation. Other indicators are the total trips made within a region, and the modes of transportation taken for these trips. The same Statistics Canada survey provides the number of total commuters travelling to their cities of employment across Canada. These trips are classified as modes of sustainable transportation,<sup>36</sup> car<sup>37</sup> or other<sup>38</sup>.

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<sup>36</sup> Includes transit, cycling and walking modes of transportation.

<sup>37</sup> Includes drivers and passengers.

<sup>38</sup> Corresponds to the remaining modes of transportation, such as motorcycle, taxi or "other modes," e.g. inline skating, snowmobile, etc.

The number of commuters travelling to the City of Vancouver grew by 4.9 percent between 2001 and 2006, as shown in Table 24. As the population growth for the City of Vancouver and Metro Vancouver was 4.8 percent and 4.9 percent, respectively, commuter travel growth is highly correlated to the growth of population. The City of Montreal had a slower commuter growth rate of 2.9 percent, whereas the City of Toronto had essentially no growth in commuters (see Figure 10). The Cities of Calgary and Edmonton both had growth rates in the 13-15 percent range, indicative of smaller and “younger” cities.

The growth of commuter trips provides an indication of overall growth in travel, however, whether this growth is positive or negative requires the consideration of the modes of transportation used. Table 24 shows the overall mode split of commuter trips. The highest number of commuters using sustainable transportation modes were those who were travelling to the cities of Toronto, Vancouver and Montreal. In 2006, sustainable transportation modes were used by 40 percent of the commuters in these cities. The Albertan cities of Calgary and Edmonton showed shares of sustainable transportation of 24.4 percent and 19.8 percent, respectively, approximately half of the three largest Canadian cities.

However, cities across Canada are adopting transportation policies, promoting increased transit use, walking and cycling. The data reveals that the policies are being adhered to as the use of sustainable transportation modes has increased between 2001 and 2006 for all cities shown in Table 24.

### *En13 Road Congestion*

The En11 indicator discussed above is an indicator of transport supply while En12 indicates the changes in travel demand. Another indicator of travel demand is En13 Road Congestion. The indicator dimension, as originally defined, calls for traffic speed data, recorded in terms of duration of hours per day within certain speed categories. Operating traffic speeds is a good indicator of congestion, as congestion is typically related to travel times, and speed is a good proportional indicator of travel times.

However, given the lack of data on traffic speeds, traffic volumes (flow) was used as a substitute indicator dimension. This is because traffic flow can be related to speed using what are referred to as “fundamental traffic flow diagrams” (Figure 11). In Figure 11, 1)  $u$  is speed,  $q$  is flow, and  $k$  is density; 2) the subscripts  $f$  is freeflow,  $o$  is optimal,  $m$  is maximum, and  $j$  is jam. The red dotted-line refers to the region of forced flow, whereas the dark solid line refers to the region of stable flow.

It can be seen from this diagram that during stable flow conditions, when the volume is low, the speeds are higher. As the volume approaches maximum volume ( $q_m$ ), the speed is at the “optimal speed” when the most vehicles are passed through a given point on the roadway. At this point, the addition of further vehicles into the traffic stream, or unstable reactions caused by drivers, will cause the traffic flow to become unstable, reducing the speed of flow as the traffic density increases towards jam density ( $k_j$ ).

Table 25, Table 26, and Table 27 show the total traffic volumes by day and by periods of the day across key traffic *screenlines*<sup>39</sup> (Figure 12) within Metro Vancouver from the 2004 Greater Vancouver Screenline Survey conducted by TransLink (Rock and Lim, 2006). Table 28 summarises the changes in traffic volumes across these screenlines between 1996<sup>40</sup> and 2004.

It is important to note that how people travel could have been significantly affected by various changes, such as demographic changes (population growth and how this growth is distributed in the population), changes to employment patterns, the effect of the aging population, and real estate prices. In the eight-year period between 1996 and 2004, the region's population grew by approximately 11.8 percent, or an additional 225,000 people. This growth did not occur evenly throughout the region but occurred mostly outside the core municipalities.

As shown in Table 27, during a typical 24-hour period the average growth in traffic across all screenlines<sup>41</sup> between 1996 and 2004 was 6.7 percent. This average growth in traffic is lower than the average growth of 11.8 percent in the regional population. A possible reason for the difference is that regional, or *inter*-municipal trips, may be decreasing, being replaced increasingly by local, or *intra*-municipal trips. This hypothesis is supported by data from past travel surveys, which show an increase in short-distance modes such as walking and cycling. Similarly, as congestion grows, some inter-municipal trips may be “forced” to become local trips, with less crossing of municipal boundaries and water crossings, which are typically the key congestion points in the region. For example, a possible scenario would be that shopping trips that used to be made across the region may now be done locally due to increasing congestion.

Figure 12 illustrates the pattern of growth of traffic across screenlines over the region. Starting from the urban core of Downtown Vancouver, where a negative growth of -4.9 percent was observed, to a region-high 23.1 percent increase across Pitt River, it can be seen that generally the growth of traffic increases as distance from the downtown core increases.

The negative growth of traffic into the downtown core can be mostly attributed to the increased transit service into the downtown peninsula drawing people from cars onto transit, as well as to the increased density of residential units in that area. Figure 13 shows where the traffic volumes over the Downtown Peninsula Screenline decreased over a 24-hour period. The pattern of traffic volumes crossing this Screenline could be monitored in future years to determine whether the Olympic Games had an impact on traffic volumes into and out of the downtown core.

#### **6.2.4. Attributing Impacts to 2010**

Current changes in the transportation system are not likely to reflect any impacts from the Games yet for two reasons. First, data for transportation indicators are for time periods closer to when the bid was won (2003). Second, large transportation impacts can typically take years to stabilize. However, these transportation indicators could be sensitive enough to measure changes

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<sup>39</sup> A traffic screenline is a conceptual boundary that is used to “capture” the total traffic flowing across it in both directions. The main use of screenlines is for monitoring of traffic demand across regional boundaries over time.

<sup>40</sup> For the purpose of analyzing traffic changes in the region, the 1996 Screenline Survey is used as the benchmark to compare the 2004 survey. This will provide a relatively long eight-year timeframe to ensure certainty in the changes identified.

<sup>41</sup> It should be noted that the screenlines largely only reflect inter-municipal travel – the survey does not record all travel in the region; it only records those trips that cross the screenlines shown in Figure 12.

when data is analysed 3-5 years after the Games. By that time it may be possible to tell if changes in the transportation system can be attributed to the Games.

The supply of transportation seems to be adhering to the sustainable transportation policies and plans that have been adopted by the region and cities over the years. Road supply has grown at a rate slower than population, whereas transit supply has exceeded population growth substantially. The mixture of this supply could indicate an impact due to the Games, especially rapid transit supply given that the Canada Line will come into effect just prior to the Games. Likewise, during the games there are planned changes to the transportation system and the monitoring of these changes during event times could determine an impact.

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## References

Rock, C. and C. Lim. 2006. "Summary and Results of the 2004 Greater Vancouver Screenline Survey." Report to the GVTA Board, May 1, 2006.

### 6.3. Environmental Bundle 3. Air and Water

*Air and Water* combines the following indicators, which together provide a snapshot of key environmental issues in light of the 2010 Games: air quality, greenhouse gas emissions and water consumption. As context indicators, this bundle measures some of the most newsworthy issues—air quality received a great deal of attention in Beijing during the Olympic Summer Games in 2008. The role of greenhouse gases in climate change is arguably the most dominant environmental issue in the world.

#### 6.3.1. Indicators

##### *En2 Public Water Supply*

This indicator represents the changes in the consumption of water provided by a public water distribution system. The dimension of water consumption is the net flow of water into and out of a municipality in the Greater Vancouver Water District (GVWD) over a number of years. The following will analyze any changes in water consumption before and during the Games era.

##### *En4 Greenhouse Gas Emissions*

This environmental indicator is intended to measure the emissions of six greenhouse gases (GHGs) that are linked to climate change. En4 reports on dimensions such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) among others. An analysis is conducted on changes in emissions before and during the Games era using a composite of these dimensions in the form of carbon dioxide equivalent (CO<sub>2</sub>e).

##### *En5- Air Quality*

This indicator is intended to measure the emission of pollutants that are linked to adverse air quality in urban areas. Dimensions include concentrations of inhalable particulate matter (PM<sub>10</sub>), sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and ozone (O<sub>3</sub>). An analysis is conducted on

changes in emissions before and during the Games era using a composite of these dimensions in the form of an index called the *Air Quality Health Index* (AQHI).

### 6.3.2. Policy Context Assessment

The United Nations Framework Convention on Climate Change (UNFCCC)<sup>42</sup> mandates Annex 1 Parties to submit an annual greenhouse gas (GHG) inventory report using the UNFCCC's guidelines. As Canada ratified the UNFCCC in December 1992 and the Kyoto Protocol to the UNFCCC ten years later, Environment Canada, on behalf of the Government of Canada, produces such reports every year since 1994 (Environment Canada, 2008).<sup>43</sup>

The Kyoto Protocol Implementation Act is a Government of Canada law requiring the Minister of the Environment to establish an annual Climate Change Plan and to make regulations respecting climate change. The National Round Table on the Environment and the Economy is required to advise the Minister on the effectiveness of the plans and to report on the progress of plan implementation. Because of the federal government's non-compliance with the Kyoto Protocol Implementation Act, a Judicial Review was filed with the Canadian Federal Court. However, in October 2008 the Court ruled that it is not an issue that the Courts can resolve.

Federally, the Clean Air Act (proposed initially in October 2006, but not yet in force) may decrease emissions in the future. The Clear Air Act would allow the government to move industry from voluntary compliance to strict enforcement in reducing GHG emissions between 45 percent and 65 percent from 2003 levels by 2050.

Prior to the Clean Air Act, Environment Canada's Office of Federal Environmental Stewardship published *Directions on Greening Government Operations* (1995), which provided government departments with a comprehensive approach to achieving sustainable operations. It required department agencies to meet or exceed federal environmental statutes and regulations (e.g., the Canadian Environmental Assessment Act). A more recent (2006) Policy on Green Procurement mandates that specific ministries will apply environmental performance considerations in its procurement process. Signatories include the Treasury Board of Canada Secretariat, Public Works and Government Services Canada, Environment Canada and Natural Resources Canada.

Although not related to the 2010 Games, the provincial government's *Climate Change Plan* (2008) aims to reduce greenhouse gas emissions in BC by 33 percent by 2020 (the target is 46 million tonnes). This is in addition to existing efforts to reduce greenhouse gas emissions. The Plan is based on a framework that incorporates four strategies for change: 1) entrench GHG targets in law; 2) targeted action in all sectors – transportation, buildings, waste, agriculture, industry, energy, and forestry; 3) help British Columbians adapt to climate change (e.g., research and development, technology, etc.); and 4) educate and engage British Columbians (e.g., consultations, dialogues, etc.). The BC Climate Action Secretariat is the central government agency responsible and accountable for meeting greenhouse gas reduction targets by coordinating activities across government and with stakeholders. *LiveSmart BC*, a component of the Climate Action Plan that supports individuals, families, communities, business and industry

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<sup>42</sup> Articles 4(1)(a) and 12(1)(a), and Decision 3/CP.5 (Environment Canada 2008).

<sup>43</sup> Environment Canada is federal government agency in charge of environmental policies and programs for the preservation and conservation of land and wildlife.

to make cleaner choices, received a Sustainability Star, which is awarded as part of a program created by VANOC to recognize the innovative efforts Vancouver 2010 and its many partners and sponsors are taking to be environmentally, economically and socially sustainable. This initiative has the potential to affect trends in GHGs in B.C. in upcoming years.

### 6.3.3. Data Analysis: Indicator Evaluation Over Time

#### *En4 Greenhouse Gas Emissions*

En4 analysis is based on data presented in the 2008 National Inventory Report (NIR). We will supplement the conclusions reached in this report by discussing the possible association between changes in GHG emissions and the selection of Vancouver as an Olympic Games Host City in 2003.

The National Inventory monitors the following GHGs emissions included in the En4 indicator dimensions: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulphur hexafluoride (SF<sub>6</sub>), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). Since the emission levels of such gasses fluctuate wildly from year to year, short-term reporting fails to exhibit a definite trend. Therefore, reporting change for the 5-year period between 2001 and 2006 *by GHG* is not informative. For this reason we include Table 29 for completion and reference purposes, but warn against focusing on change in GHG emissions by gas. The total emissions and their breakdown by industry are significantly more informative (and important) as they reflect the economic and public sectors that are responsible for these emissions.

The largest contributor to GHG emissions by far is *energy*. Energy comprises emissions from stationary combustion sources,<sup>44</sup> transportation<sup>45</sup> and fugitive sources<sup>46</sup>. The rest of the contributors of GHGs are *industrial processes* (emissions from the production of mineral products, the chemical industry, metal production, the consumption of halocarbons and SF<sub>6</sub> in refrigeration units, fire extinguishers, aerosol cans, semiconductors, etc., and other undifferentiated production); *solvent and other product use* (emissions resulting from the use of N<sub>2</sub>O as anaesthetic and propellant); *agriculture* (emissions from enteric fermentation, manure management and direct N<sub>2</sub>O emissions by agricultural soils like synthetic fertilizer, crop residue, irrigation, etc.); and *waste* (emissions resulting from solid waste disposal on land, wastewater handling and waste incineration). *Land Use, land-use change and forestry* are an additional GHG contributor *and remover* at the same time (emissions or removals from forest land, cropland, grassland, wetlands, and settlements) but the practice as per national methodology is to exclude it from the totals (Environment Canada, 2008).

Table 30 and Table 32 and their corresponding figures (Figure 14 and Figure 15) present the total GHG emissions by industry for every year between 2000 and 2006 in kt CO<sub>2</sub> equivalent in

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<sup>44</sup> Stationary combustion sources include emissions from fuel consumed by electricity and heat generation, fossil fuel industries (petroleum refining and upgrading, and fossil fuel production), mining and oil and gas extraction, manufacturing industries, construction, commercial and institutional industries and establishments, personal residences and agriculture and forestry (Environment Canada 2008).

<sup>45</sup> Transportation includes emissions from fuel consumed by domestic aviation, road transportation, railways, domestic marine, off road transportation and pipeline transportation of crude oil, natural gas and others (Environment Canada 2008).

<sup>46</sup> Fugitive sources include emissions from the intentional or unintentional release of GHG from coal mining and oil and natural gas exploration, production, transportation and distribution (Environment Canada 2008).

Canada and B.C. Using CO<sub>2</sub> equivalents allows the units of measurement of the different GHGs to be standardized and makes them comparable as well as meaningful from a macro perspective. The emission total for each gas type can be converted to a CO<sub>2</sub> equivalent quantity based on the relative global warming potential (GWP) values adopted by the Intergovernmental Panel on Climate Change (IPCC).<sup>47</sup> As an example, carbon dioxide is assigned a base GWP value of 1, methane has a GWP of 21. The equivalent essentially expresses all the GHGs in terms of CO<sub>2</sub>e emissions harmful to the environment in order to enable the calculation of totals.

Table 30 shows national GHG emissions for 2000-2006. Since the GHG emission levels from Energy are overwhelmingly larger than any of the other sectors, the bottom half of Figure 14 shows the rest of the sectors excluding energy to make them more visible. Overall, the total GHG emissions in Canada marginally increased by about 0.4 percent from 2000 to 2006. This figure, however, disguises the mild fluctuations of the annual trend – decreasing for the first two years, then increasing by about 3 percent in 2003, and slightly more in 2004, then declining in the last two years to the level in 2006 that was 0.4 percent higher than the 2000 levels. In terms of industry, energy is the largest driver of the 2003 increase, specifically stationary combustion sources. Although energy emissions decreased slightly in 2004, industrial processes and agriculture emissions peaked in that year, making 2004 the year with the largest amounts of emissions produced nationally.

These trends were mostly mirrored in B.C. during that period (see Table 31 and Figure 15). After decreasing from 2000 to 2002, the total GHG emissions rose in 2003 to 2000 levels, and then rose an additional 7 percent in 2004, then declining afterwards. In 2006, the total GHG emissions in B.C. were still 1.6 percent higher than in 2000. For both B.C. and Canada as a whole, the energy sector was largely responsible for the increase, distantly followed by industrial processes and agriculture. The biggest difference between B.C. and Canada is that energy emissions in B.C. peaked in 2004 (by 7 percent over 2000 and 2003 levels) when they were decreasing in Canada. Another interesting regional difference is the relative quantity of GHG emissions from waste. B.C.'s waste emissions were larger than both those from agriculture and from industrial processes, while in Canada, waste was the second smallest contributor to GHG emissions. Over time however, waste emissions in Canada appear to have marginally increased, while B.C.'s emissions from waste seem to have been decreasing since 2004.

It is difficult to assess with sufficient precision whether any of these trend fluctuations have been affected by the selection of Vancouver as a host to the 2010 Winter Olympic Games in 2003. There are two reasons for this. First, both the national and provincial trends in GHG emissions seem fairly stable over the period (five years is too short a period for trends to manifest in any significant way). Second, for Canada as a whole, the peak in GHG emissions in the 2003-2004 period, according to the 2008 NIR, appears to be driven predominantly by stationary combustion sources (as a part of the energy sector), specifically by electricity and heat generation, fossil fuel industries, and by oil and mining and gas extraction. It is extremely unlikely (though not

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<sup>47</sup> From Environment Canada 2008: "The concept of "global warming potential" (GWP) has been developed to allow scientists and policy-makers to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. By definition, a GWP is the time-integrated change in radiative forcing due to the instantaneous release of 1 kg of the gas expressed relative to the radiative forcing from the release of 1 kg of CO<sub>2</sub>. In other words, a GWP is a relative measure of the warming effect that the emission of a radiative gas (i.e. a GHG) might have on the surface troposphere. The GWP of a GHG takes into account both the instantaneous radiative forcing due to an incremental concentration increase and the lifetime of the gas." 100-year GWP is recommended by the IPCC and the factors use are shown in Table 1-1 GWPs and Atmospheric Lifetimes of Environment Canada 2008.

completely impossible) that the announcement of Vancouver as the 2010 Olympic Games host city had much impact on this. Other factors such as the state of the national and global economy are much more likely to have caused the GHG emissions' rise in 2003/2004.

At the same time, the situation in B.C. is slightly different. Transport's fossil fuel consumption was the largest GHG emissions contributor and the main driving force behind the 2004 GHG emissions peak, with the fossil fuel industries adding their highest emissions levels that same year. Once again, the association with the Olympic Games is tenuous.

Finally, it is curious to note that GHG emissions from construction in B.C., although negligible compared to the other GHG contributors, have been continuously increasing since 2001. In 2006 they were nearly 60 percent higher than their 2000 level. Of all the observed changes, this increase in construction seems most plausibly to have been impacted by Vancouver's selection as a host city in 2003 – there was an 11 percent increase in construction-related GHG emissions in 2003 over the previous year, followed by an additional 23 percent in 2004.

To conclude, the GHG emission trends have been comparatively stable between 2000 and 2006, with a relative peak in 2003/2004 followed by a decline in both B.C. and Canada as whole. Although the timing coincides with Vancouver's selection as a host city, this is unlikely to have affected GHG emission trends (though it is possible that the Games made a small indirect contribution).

#### *En5 – Air Quality*

Indicator En5 reflects the air quality measured at thirteen air quality monitoring stations (ten within Metro Vancouver, two within the Squamish-Lillooet Regional District, and one in the Fraser Valley Regional District at the Abbotsford Airport). Measurements of emissions of nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>) and particulate matter (PM<sub>10</sub> or PM<sub>2.5</sub>) were converted to a value based on Canada's Air Quality Health Index (AQHI). The AQHI is a tool that has been developed by Health Canada and Environment Canada, in collaboration with the provinces and key health and environment stakeholders.<sup>48</sup> The use of an AQHI is a way of transforming complex air quality measurements into a single number or descriptive term that represents health risks from the quality of air. The AQHI ranges from 1 (low health risk) to 10 (very high health risk). Table 33 lists and describes the ranges of AQHI.

As historical AQHI values at the thirteen monitoring station locations were not available, they had to be computed from historical records of raw emissions sampled data at these locations. The raw data were acquired from B.C. Ministry of Environment's Data Archive, comprising of data representing hourly average readings. The thirteen monitoring stations were chosen as a result of having sensors that measured NO<sub>2</sub>, O<sub>3</sub> and at least one of PM<sub>2.5</sub> or PM<sub>10</sub>. Where both PM<sub>2.5</sub> and PM<sub>10</sub> data were available, PM<sub>2.5</sub> was used as recommended by the developers of the AQHI (Stieb et al 2008). The resulting dataset obtained from the B.C. Ministry of Environment was contained in a matrix of 46 x 75,983 cells, or a total of approximately 3.5 million data values.

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<sup>48</sup> More details about the AQHI are available at <http://www.airhealthbc.ca/index.htm>.

As per Stieb et al (2008), in order to account for volatile fluctuations in the data, a 3-hour rolling average was used to compute 22 hourly-average values for each emission-type per day. From these measurements, the AQHI was calculated. The maximum AQHI was then identified for each day. However, in cases where data were missing (due to sensor malfunction or maintenance), no maximum AQHI was calculated for days where less than sixteen 3-hour rolling averages for each emission type existed. The Annual Average Daily Maximum AQHI was then computed by taking the average of all daily maximum AQHI calculations. The number of days per year that a daily maximum AQHI existed for each location was noted. This provides a sense of reliability of the resulting annual estimate based on the number of samples used to compute that estimate.

Table 34 lists the summary of data on Annual Average Daily Maximum AQHI values by monitoring station location for every year between 2000 and 2007. Figure 16, which plots the data in a graph (excluding the Vancouver International and Abbotsford Airports)<sup>49</sup>, reveals a relative peak in AQHI in 2003/2004 comparable to the peak in GHG emissions discussed above.

Apart from this observation, the data show two more or less distinct patterns. The AQHI values of nine Metro Vancouver stations (upper portion of the graph, Figure 16) reveal a generally constant trend (subject to year by year fluctuations) within 3-6 units. The trend seems to be towards an overall lower AQHI, with all nine stations registering lower AQHI in 2007 than in 2000, except at Kitsilano.<sup>50</sup> At the same time, the AQHI values of two stations, in Whistler and Squamish, exhibit a different, strongly upward trend with large fluctuations. All in all, in 2007 the AQHI in Squamish was 66 percent higher than its 2002 value (though only 16 percent higher than its 2000 value). In Whistler the AQHI in 2007 was 170 percent higher than in 2002. While Squamish remains the most unpolluted place in terms of air quality, even with that large an increase in AQHI, however, Whistler's AQHI in 2007 was the highest registered ever in any of the stations.

These two distinct trends lead us to conclude that: 1) for Metro Vancouver (excluding Whistler and Squamish) there is no substantial Olympic Games impact yet (with the possible exception of the Games helping to promote a turn to a generally cleaner environment), and 2) Whistler and Squamish (a municipality located on the road to Whistler) are experiencing an increasingly higher AQHI values post-2003 (i.e., since the selection of Vancouver/Whistler as host). The particular Whistler/Squamish trend is most likely attributable to increased construction and other activities oriented towards preparing the region for the Games in 2010, possibly in particular the Sea to Sky Highway Improvement project. Although this construction is not considered a "Games project," it was expedited by the Games (the highway upgrade would have occurred over a longer period if Vancouver was not the 2010 Host City). Therefore, the Games may have had an indirect negative impact on air quality in Whistler/Squamish.

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<sup>49</sup> These were excluded since the data revealed that AQHI tends to fluctuate too much at places such as airports.

<sup>50</sup> The Kitsilano monitoring station reveals a somewhat particular overall trend, with generally high, not-fluctuating yearly values; its 2007 AQHI index is also marginally higher than its 2000 index. This idiosyncrasy can be explained by the fact that Kitsilano is located on the waterfront which is in the proximity of a freight ship parking area for the Port Metro Vancouver's Center terminal (emissions from freight shipping is one of the major sources of air pollutants in the region).

### *En2 Public Water Supply*

En2 is an indicator that represents the degree to which access to clean and safe water is provided in order to meet water consumption demands in terms of annual water flow. The annual water flow reported here, based on Metro Vancouver's Water Consumption Statistics Report, refers to the net flow of water into and out of a municipality in the Greater Vancouver Water District (GVWD).<sup>51</sup> Consumption is calculated by the subtraction of outflow from inflow at the entry and exit of each municipal water sub-system. The consumption includes all residential and non-residential customers plus the leaks in the municipality water main system.

Table 35 presents the absolute water flow/consumption by Metro Vancouver's Olympic municipalities (i.e., the municipalities hosting Olympic events) over the 1989-2007 period. The long-trend presented in Figure 17 suggests that, overall, water consumption has been more or less stable. The water consumption pattern of the different Olympic municipalities is also mostly stable, with Vancouver exhibiting the strongest fluctuations.

Considering only the most recent 2000-2007 period, Vancouver's water consumption has been on the decline, along with North Vancouver and West Vancouver, with Richmond and the University Endowment Lands remaining mostly unchanged.

Taking into account population increase, Table 36 shows the water flow/consumption per capita in the same municipalities over the same period. Figure 18 reveals that, on the whole, the water consumption per person has been actually decreasing over the years, presenting a downward overall trend coupled with a lot of short-term fluctuations.

Focusing only on the most recent period of 2000 to 2007, West Vancouver exhibits the lowest per capita water consumption and the steepest decline since 2003. North Vancouver, though using more water per capita, also shows a post-2003 decline, as does the City of Vancouver but by a lower rate. The total water flow consumed by GVWD has also been marginally decreasing since 2004.<sup>52</sup>

This decrease might be explained by several factors, also applicable to the decrease in GHG emissions discussed above. First, the reduction in water usage may be a result of the population (and businesses) becoming more conscious of the environment—a global trend in most developed countries in the world. The increasing popularization of the idea of climate change/global warming and the population's carbon footprint (e.g., through films like Al Gore's *The Inconvenient Truth* (2006), etc.) could have affected people's perceptions. This may cause them to change their priorities and lifestyle choices making them "greener." Choosing to save/not waste a natural resource like water could be a part of that change. To the same effect, Metro Vancouver and B.C. Hydro (one of the largest power utilities in Canada, providing electricity to British Columbia) have launched campaigns promoting conservation over the past decades (e.g., Power Smart program, Energy Star program, watering restrictions, low flow fixtures, etc.). Increased promotion in the past five years could possibly account for these

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<sup>51</sup> GVWD is based on the Metro Vancouver area but does not completely coincide with it. The difference is attributed to the fact that water pipes run only in specific geographical locations (i.e., there are parts of Metro Vancouver where water is not being delivered).

<sup>52</sup> Considering the fact that the older the pipes in the water delivery system, the more leakage is expected to occur, it is possible that the net (i.e., not due to leaks) water consumption might have been reduced even further.

decreases in water consumption. Considering the differences within GVWD municipalities, it is possible that some geographical locations have been more affected than others by such perceptions and behaviour changes (i.e., to save water and use it more efficiently). This may be due to differences in the demographic characteristics of the resident population (e.g. relatively younger, wealthier, etc.) which would explain the biggest drop in water consumption displayed by West Vancouver and North Vancouver.

Second, in general, water usage depends heavily on the weather, specifically the amount of rain. While rainfall would hardly affect water for drinking/cooking consumption, it does affect other household uses (e.g., watering lawns, gardens, etc.). Thus, years with abundant/heavy rainfall usually register lowered water consumption. At the same time, 'drier' years see an increase in water use restrictions which limit the non-essential water consumption. Comparing annual rainfall and water use restrictions data to data on water consumption should allow for assessing whether any decrease in water consumption is due to larger availability of rainwater, to water use restriction, or to other factors.

#### **6.3.4. Attributing Impact to 2010**

The decreasing trends in environmental indicators in B.C. after 2003/2004 (GHG emissions and water usage) and in the B.C. municipalities discussed above excluding Whistler and Squamish (AQHI) together suggest a move towards more environmentally friendly practices and greater acceptance of the idea of sustainable development. These trends are likely to have existed even in the absence of the 2010 Games. Therefore, it is difficult to isolate the impact that the Olympic Games may have had on these trends. Nevertheless, the Games may have been an added contributor to these trends to a certain extent, by stimulating pro-environmental awareness and practices, directly or indirectly. On the other hand, the increase in AQHI in places like Whistler and Squamish possibly reveals a negative impact of the Games likely tied to increased construction activities. It is possible that this impact might be temporary, to disappear once construction activities are over.

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## **References**

Air Quality B.C. 2009. (<http://www.airhealthbc.ca/scalemessaging.htm>)

Environment Canada. 2008. *A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act.*

## 7. Economic Outcomes

### 7.1. Economic Bundle 1. Economic Activity

Economic Activity is a bundle that combines four indicators regarding job creation, government spending, employment, business development and export-import activity. Collectively, they explain economic changes in the region, province and country in light of the 2010 Games.

#### 7.1.1. Indicators

##### *Ec23 Economic Role of the State*

Economic Role of the State is an economic indicator used to represent the government's contribution to the gross domestic product (GDP) in terms of spending and revenue. Changes in the proportions of spending and revenue will be used to analyze the impact of the Games on the economic role of the state.

##### *Ec2 Employment Indicators*

Employment Indicators is an economic indicator used to represent the employment situation of the host province and country. Ec2 dimensions include employment and unemployment rates, percentage of employed women and net migration rate. Changes in these dimensions are used to analyze the impact of the Games on employment.

##### *Ec3 Size of Companies*

Size of companies is an economic indicator used to represent the concentration of large, medium, small or micro-companies. Changes in the concentration of companies are used to analyze the impact of the Games on business developments.

##### *Ec20 Dynamics of Service Activities*

Dynamics of Service Activities is an economic indicator used to measure the net export and import of services in the host country. This dimension is the export-import ratio in relation to the GDP. The ratio reveals the difference between services exported and imported.

#### 7.1.2. Policy Assessment in Context

Relevant investments, programs and other initiatives that are discussed in the Economic Bundle include: the *South East False Creek Olympic Village Community Benefits Agreement, 2010 Business Summits, 2010 Commerce Centre* and *Shared Legacies Agreement*.

The *South East False Creek Olympic Village Community Benefits Agreement* (2007) is an initiative that implements part of the Inner City Inclusivity Commitment Statement of the 2010 Olympic bid. The Inner City Inclusivity Commitment Statement is comprised of 14 issue-oriented commitment areas and 37 commitments to “maximize the opportunities and mitigate potential impacts in Vancouver’s inner-city neighbourhoods from hosting the 2010 Winter Games.”<sup>53</sup> The Inner-City specifically refers to three Vancouver neighbourhoods, but the

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<sup>53</sup> The Inner-City Inclusivity Statement is available at:  
<http://www.vancouver2010.com/dl/00/34/95/-/34952/prop=data/1vz8hos/34952.pdf>.

commitments are broader in geographic scope. Business Opportunities is one category of commitment, the vehicle for its implementation is included in the South East False Creek Olympic Village Community Benefits Agreement. This agreement provides the following: 1) 100 entry level jobs for qualified and trained inner city residents; 2) \$15 million goods and services to be procured for the inner city and; 3) \$750,000 legacy fund by Millennium, a private developer, for training and employment support to inner city residents and businesses. The Fall 2008 edition of the Inner-City Connector newsletter, published by Building Opportunities with Business,<sup>54</sup> reported that the Community Benefits Agreement has resulted in 77 inner city residents being hired onto the Vancouver Olympic Village site, and \$24.5 million worth of procurement from inner city suppliers and supporters.

2010 Business Summits is a 2007 initiative by the Government of B.C. (i.e., Olympic Secretariat) to host two 2010 Business Summits. The first, held in February 2007, was a joint Tourism B.C. 2010 and Aboriginal Business Summit. It brought together First Nations, Inuit and Métis business and community leaders to identify the opportunities that will be generated by the 2010 Winter Games. The second, held in February 2008, was a 2010 Business Summit. Its objective was to stage a national scale business summit aimed at connecting businesses with the opportunities associated with the 2010 Olympic and Paralympic Winter Games.

The 2010 Commerce Centre is an initiative of the B.C. 2010 Olympic and Paralympic Winter Games Secretariat (a BC provincial agency). It was created to connect B.C. businesses to Olympic opportunities. Planning started in 2004, with the Centre's doors opening in May 2007. The 2010 Commerce Centre serves as a portal to information, resources and procurement opportunities related to the Games (estimated at \$4 billion in 2004), and is intended to facilitate business connections between B.C. companies, national and international companies.

In addition, the Games have created an opportunity entitled the *Shared Legacies Agreement*. This long-term policy was implemented by the Resort Municipality of Whistler and Government of B.C. in 2002. This government initiative outlines specific legacy commitments to the Squamish and Lil'wat First Nations in exchange for these two communities supporting use of Crown land to build the necessary Olympic infrastructure in Whistler. The B.C. Government identified 300 acres of Crown land for the First Nations to pursue economic development opportunities, \$2.3 million for a skills and legacy training project, and \$3 million towards the construction of a recently opened Squamish Lil'wat Cultural Centre. The agreement also contains provision for moving 50 houses from the Olympic villages to Squamish and Lil'wat First Nations.

### **7.1.3. Data Analysis: Indicator Evaluation Over Time**

#### *Ec23 Economic Role of the State*

Ec23 is an indicator that measures the economic role of the state in terms of public spending and tax revenue. Table 39 lists spending and revenue for B.C. between 2001 and 2007 and their proportion of GDP, along with those for Alberta and Canada for the purposes of comparison.

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<sup>54</sup> Building Opportunities with Business (BOB) is a non-profit organization based in Vancouver whose goal is to support local business development and increase job opportunities for inner-city residents.

Examining the B.C. data, Table 39 shows that between 2001 and 2007, there has been a 21 percent increase in public spending and a 29 percent increase in tax revenue (in constant dollars). At the same time, there has been an overall reduction of both as a proportion of the GDP, meaning that the GDP has increased even more. The trends presented in Table 39 are summarized in Figure 19, Figure 20 and Figure 21. Figure 19 reflects the spending and revenue of B.C., Alberta and Canada between 2001 and 2007 as a proportion of the GDP; while Figure 20 shows the budget balance of the two provinces and the country in that period.

It is clear that the trends revealed in the B.C. data are replicated for Alberta and Canada as a whole. Public spending and tax revenue are rising (Figure 21), however both are a declining proportion of GDP. In addition, there are largely positive (and for the most part increasing) budget balances.

A couple of things are interesting to note. First, B.C.'s spending and revenue do not appear to exhibit any particular exception to the general national trend, i.e., there is no discernable effect of the Olympic Games post-2003. Second, BC's budget deficit between 2002 and 2004 turned into a budget surplus post-2004. Therefore, since a portion of Olympic Games expenditures is part of government spending,<sup>55</sup> they do not appear to be adversely impacting BC's budget proportionately to the GDP of the province. Third, and most noteworthy, is that the largest budget deficit was in 2002-2003, the time period when the bidding and, presumably spending, to win the bid to host the Games had reached its culmination. At the same time, both Canada and Alberta have experienced similar (albeit smaller) changes to their budget deficit trend-wise, signifying a specific situation with the national (possibly global) economy.

To summarize, it appears that the selection of Vancouver as a host-city and the upcoming Games have not affected the spending and revenue of the province. The hypothesis that the pre-selection spending was high at least partly due to Games is consistent with the data, but the Games cannot be isolated as a definite cause for the budget deficit as both Alberta and Canada as a whole demonstrate a generally similar trend. Thus we conclude that BC government spending could have been partly affected by Vancouver's candidacy but it was not affected by the city becoming a Games host, at least relative to a wider ranging set of positive economic developments.

### *Ec2 Employment Indicators*

Employment is one of the key factors characterizing economic activity of a region. Table 37 presents four employment-related dimensions:

- The global activity rate or the number of persons over 15 years of age who are employed or seeking employment (i.e., who are *active*), as a fraction of the total population);
- The unemployment rate (the number of unemployed divided by the active population as defined above);
- The fraction of women in the active population, and;

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<sup>55</sup> Only a portion of the Games budget is from the B.C. Government. The Canadian Government also contributes funding. However, a majority of Games operation funding comes from non-public sources.

- The net migration rate (the migration balance divided by the resident population).

The global activity rate essentially represents the fraction of the population who either are or want to be employed (i.e., the labour force) divided by the source population. The inclusion of those who want to be employed distinguishes the global activity rate from the employment rate (i.e., number of actually employed over the labour force). Thus, the global activity rate constitutes the size of the potential labour force as a proportion of the population. Table 37 shows that between 2001 and 2006 the global activity rate increased very marginally in B.C., as it did in the neighbouring province of Alberta and in Canada as a whole.<sup>56</sup> B.C.'s global activity rate is comparable to that of Canada as whole. Their activity rates are approximately 6-8 percentage points below that of Alberta and the US. Alberta exhibits about the same activity rate as the U.S. does.

The unemployment rate (the fraction of people in the labour force who wish to work but do not have jobs) fell in B.C. by 2.5 percentage points between 2001 and 2006. In 2006, B.C.'s unemployment rate was slightly below that of Canada as a whole. In comparison, Alberta's unemployment rate had increased slightly (by half a percentage point in 2006) but was still lower than B.C.'s unemployment rate.

The percentage of women in the labour force was fairly constant between 2001 and 2006 across all the provinces, with the exception of Alberta where it increased by almost 5 percentage points. For both B.C. and Canada, the increases in the participation of women in the labour force were marginal, while in the U.S. the participation of women in the labour force declined over the same period. In 2006, the percentage of women in the labour force in B.C. was slightly lower than for Canada as a whole. This was also the case in 2001.

Immigration to B.C. is quite high and contributes significantly to the potential labour force. Although the net migration rate declined in B.C. between 2001 and 2006, it was still more than 10 percentage points higher than Alberta's and about 5 percentage points higher than for Canada in 2006. On the other hand, the net migration rate increased in both Alberta and Canada in the same time period.

In summary, it appears that B.C. is quite comparable to Canada in terms of global activity rate and the percentage of women in the labour force. However, in terms of unemployment, B.C.'s unemployment rate was higher than the national average in 2001 and became lower than the national average in 2006. For the same period, the net migration rate for B.C. remained higher than in Canada. Except for the decrease in the net migration rate, the direction of changes over time in B.C. is also in keeping with the direction of changes taking place in Canada as a whole.

Several factors can explain B.C.'s decrease in net migration rate. First, comparing only two points in time can be misleading since the 2001 number could be an outlier (i.e., exceptionally high) for that one year only. The decrease might represent a change towards a more "natural" level and not indicative of a declining trend. Second, the net migration rate might be interpreted as an indication of the relative attractiveness of a destination. Relative attractiveness is characteristically the combination of a multitude of aspects migrants typically consider when

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<sup>56</sup> A lower global activity rate could reflect a) higher proportion of independently wealthy individuals, b) earlier age of retirement, and or c) older resident population, etc.

making a decision to migrate. Many of those have nothing to do with employment (although availability of employment is definitely one of them). Third, such an interpretation is rendered even more difficult by considering that migration is affected to a large extent by the economic/political conditions in the places from which people emigrate.

To summarize, most of the changes taking place in BC between 2001 and 2006 described above are consistent with the changes occurring nationally. Of the four dimensions of employment presented in Table 37, only the decreasing unemployment rate could be potentially linked to the upcoming Olympic Games with any reasonable likelihood. A plausible hypothesis is that more employment opportunities were created because Vancouver and the region were selected as Olympic Games host. At the same time, many other (economic) factors could have contributed to or solely caused the same result. Conclusions about how the Games affected the decline in the unemployment rate up to 2006 may be drawn with greater certainty with the help of additional data.

### *Ec3 Size of Companies*

The size and number of enterprises in a region can be used as a reflection of the vibrancy of economic activity in that region. Table 40 presents indicator Ec3, listing the number of companies by size in Metro Vancouver and B.C., along with comparative numbers for the Greater Toronto Area (GTA) and Ontario as well as the Squamish-Lillooet Regional District (where Whistler is located) in 2001 and 2006.

Between 2001 and 2006, the total number of companies in Metro Vancouver and B.C. increased by 17.2 percent and 16.2 percent respectively. In comparison, in the GTA and Ontario, the number of companies increased by 14 percent and 16.9 percent, respectively. The rise in number of enterprises in Canada as a whole was 10 percent.

In terms of size, the distribution of companies remains relatively uniform across time periods. In Metro Vancouver specifically, more than half the companies are listed as being of *indeterminate* size;<sup>57</sup> about forty percent have up to 19 employees, about 4 percent have between 20 and 49 employees, and about 3 percent are large enterprises with more than 50 employees.

While the size of companies appears to remain consistent over time, overall, the Metro Vancouver data reveal an increase in the number of companies between 2001 and 2006 which is greater than the respective increase in the GTA. Figure 22 plots this gap between the GTA and Metro Vancouver numbers in the two years, 2001 and 2006. Except for companies of indeterminate size, Figure 22 shows that the gap in the number of companies has narrowed between 2001 and 2006.<sup>58</sup> Thus, the number of companies in Metro Vancouver (and to a lesser extent, in B.C.) grew faster than it did in GTA (and Ontario). Although data from only two time points does not allow us to determine whether there is a trend and whether there is any change in the trend before and during the Games era, there is still evidence of increased business growth and development relative to the major business center of the country, the GTA. This is

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<sup>57</sup> The establishments in the “indeterminate” category do not maintain an employee payroll, but may have a workforce which consists of contracted workers, family members or business owners. However, the Business Register does not have this information available, and has therefore assigned the establishments to an “Indeterminate” category. This category also includes employers who did not have employees in the last 12 months.

<sup>58</sup> Note that a negative gap (as in companies of 1 to 19 employees) represents a case where Metro Vancouver’s numbers are larger than the GTA’s.

specifically true for the Squamish-Lillooet region with an astonishing 36 percent rise in number of companies in this time period.

There are (at least) two factors that can potentially explain this growth in the number of companies. First, generally the more economically advanced a region is, the lower its pace of growth. The reason is that less developed regions presents more business opportunities; the corollary being that, with further development, the pace of growth eventually tapers off. Metro Vancouver could have had more “room” for growth than the GTA, and the Squamish-Lillooet case bolsters this hypothesis. Second, the number of companies could have increased due to an upsurge of economic activity due to the upcoming Games (and again the Squamish-Lillooet case serves as an excellent example). In all likelihood, the absolute and relative growth of the number of companies in Metro Vancouver and Squamish-Lillooet is caused in part by a combination of these two factors, possibly with the Olympic Games as the driving cause.

#### *Ec20 Dynamic of Service Activities*

The economic attractiveness of the country as a whole is also reflected by indicator Ec20, which measures two dimensions. First, Ec20 indicates whether or not a country is a net exporter or importer of services (see the following paragraph for examples). Second, Ec20 measures the relative significance of the net balance of services as a proportion of the GDP. Table 38 reveals that, unlike the U.S., Canada is a net service importer. In 2006, Canadian service import exceeded export by almost three times the amount it did in 2001. The ratio of the net balance of services rose by a half percentage point between 2001 and 2006, from 0.6 percent to 1.1 percent respectively. In comparison, the proportion of the net balance of services of the GDP in the U.S. remained the same throughout that period, and equal to that of Canada in 2001, namely 0.6 percent (the difference being that the U.S. is a *net exporter* of services unlike Canada).

Canada being a net importer of services essentially means that Canadians purchase more services abroad than foreign nationals do in Canada (e.g., more Canadian tourists visit other countries than foreign tourists visit Canada; more Canadians use, for example, American banks, than Americans use Canadian banks, etc.). The larger negative net balance for Canada in 2006 may be indicative of a trend or a one-time event in that particular year that was influenced by macroeconomic fluctuations and the state of the global economy. For example, one reason for the negative net balance could be that in 2006, the Canadian dollar was particularly strong (expensive) relative to the U.S. dollar, thus making Canada an unattractive place in terms of foreign tourist spending. Table 38 does not fully capture the intricacies of the net balance of service changes during the Olympics era. Future research would need to differentiate among the service sectors that are candidates for change during the Olympics era (e.g., tourism as fraction of services).

#### **7.1.4. Attributing Impact to 2010**

Overall, the major findings of the current analysis regarding the Games’ impact on economic activity can be summarized as follows. First, in terms of employment, it is plausible that the unemployment rate in B.C. has been affected by the selection of Vancouver as host and the upcoming Games in 2010 through an upsurge in employment opportunities. Second, it is impossible to ascertain the impact of the Games on the net service balance of the country (the indicator is not sensitive enough to capture it), but at this point, it appears there appears to be no

impact. Third, in terms of government spending and revenue, there appears to be no post-2003 impact of the Games on the balance of the budget though it is somewhat plausible, but not realistic, that bid-era spending contributed to the deficit at that time. Fourth, the selection of Vancouver (and Whistler) as the host of the next Winter Olympic Games likely contributed to the increase in number of companies in Metro Vancouver and the Squamish-Lillooet region.

Please see Section 8 for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## **7.2. Economic Bundle 2. Tourism**

*Tourism* is portrayed by a combination of international events hosted in the region, the number of tourists, hotels and similar establishments as well as accommodation occupancy rates. The impact analysis combines these indicators in a bundle to describe the tourism sector in the host region in light of the 2010 Games. This bundle details one of the key economic impacts of the Games.

### **7.2.1. Indicators**

#### *Ec12 Hosting of International Events*

Hosting of International Events is an economic indicator that represents the rate at which international events are hosted in the host country and region. The dimension is the number of international events hosted at the city level by time period. Changes in this indicator highlight changes in the attractiveness of the region and country for international meetings and conferences as well as sightseeing during the Games era.

#### *Ec9 Tourist Nights*

Tourist Nights is an economic indicator that represents the number of tourists in the host region. Changes in this indicator detail the rise or fall of the number of tourists in hotels and similar accommodation before, during and after the Games.

#### *Ec7 Accommodation Infrastructure*

Accommodation Infrastructure is an economic indicator that reports the number of hotels and similar establishments and their capacity in terms of guest beds. Changes in Ec7 will be used to analyze the evolution of hotels and similar establishments during the Games era.

#### *Ec8 Accommodation Occupancy Rate*

Accommodation Occupancy Rate is an economic indicator that measures the occupancy rate of tourist establishments by guest capacity (i.e., rooms). Changes in Ec8 dimensions will be used to analyze how well the existing tourist establishment capacity meets demand before, during and after the Games.

### **7.2.2. Policy Assessment**

This section describes the many investments made by different levels of government in a concerted effort to use the 2010 Games as leverage for economic opportunities in the tourism sector.

*Athletes' Village Loan Authorization Bylaw No. 1831* is a 2008 bylaw enacted by the Resort Municipality of Whistler that authorizes the municipality to borrow up to \$100 million for up to five years to build the Athletes' Village in Whistler for the 2010 Games.

*Investing in the Dream: 2010 Winter Games Budget* is short-term plan (2008 to 2010) that outlines information regarding the Resort Municipality of Whistler's budget considerations for the planning and staging of the 2010 Games. The Resort Municipality of Whistler will receive \$87.8 million in cash investments for initiatives that will benefit the community during and following the Games (e.g., showcasing the entire region as a tourist attraction including international tourists).

*2010 International Media Centre (BCIMC)* is a short-term initiative by the BC 2010 Winter Games Secretariat to create a Media Centre for "unaccredited media" during the Games. The Centre will showcase all of B.C.'s communities and regions as attractive locations for tourism and investment as well as strengthen international awareness of B.C. as Canada's Pacific Gateway. Programming will occur at the centre and throughout Robson Square in Vancouver to bring attention to B.C.'s athletes, artisans and other performers and unique business and communities, through special events, displays and celebrations.

Also put into place at UBC's Robson Square is the *British Columbia Showcase*. This state-of-the-art reception and event facility will profile B.C. and solidify the Province's international business image as Canada's Pacific Gateway.

*B.C. Regional Innovation Chair in Tourism and Sustainable Rural Development* (2008) is an initiative by the Government of B.C. with the mandate to provide the knowledge to increase the benefits of the 2010 Winter Games in smaller communities and help them expand their economic base. The Chair will help showcase rural B.C. to tourists who come for the 2010 Games. The Chair is held at Vancouver Island University in Nanaimo and supports a research program. The Province provided \$1.25 million from the Leading Edge Endowment Fund to endow the Chair.

*Share the Excitement!* (2008) is a Government of B.C. (i.e., Tourism B.C.) effort to help communities market their excitement and pride as hosts for the Games. It is a marketing campaign to ensure sustained tourism beyond the 2010 Games.

The Vancouver Convention Centre Expansion (VCEC) Project is a long-term multi-million dollar investment (beyond 2010) among the Governments of B.C. and Canada and Tourism Vancouver. The tripling of the convention centre's existing capacity is anticipated to help generate an additional \$107 million annually in delegate spending. The VCEC will house the designate broadcast centre of the accredited 2010 Olympic Games media.

### **7.2.3. Data Analysis: Indicator Evaluation Over Time**

#### *Ec7 Accommodation Infrastructure*

The changes in the number of hotels and similar establishments and the number of beds in Metro Vancouver and B.C. between 2001 and 2007 suggest that, while B.C.'s tourist accommodation infrastructure has grown, that of Metro Vancouver has somewhat decreased. Table 41 shows that all types of hotels and motels in Metro Vancouver have declined in number and in the number of beds available in them. Overall, in 2007, there were nearly 5 percent fewer tourist establishments

but only 2.3 percent fewer beds than there were in 2001 (indicating that in 2007 there were 2.7 percent more beds per establishment than in 2001).

In B.C. as a whole, however, both the number of establishments and beds increased in the same period, if only by a little. In 2007, there were about 1 percent more establishments in B.C. than there were in 2001, and about 4 percent more beds (suggesting an increasing rate of beds per establishment much like in Metro Vancouver). In B.C., the only types of establishment that registered a negative change for the period were that of motels and fishing lodges (though, curiously, the number of beds in fishing lodges increased).

Taken together, the data for Metro Vancouver and B.C. indicate that the accommodation infrastructure in B.C. excluding Metro Vancouver has augmented by a larger extent than the extent to which the infrastructure of Metro Vancouver has shrunk, but the total changes observed are nevertheless generally small. In any event, the data suggest no impact of the upcoming Olympic Games yet.

#### *Ec8 Accommodation Occupancy Rate*

The Ec8 indicator of Accommodation Occupancy Rate measures the ratio of the number of occupied rooms to the total number of rooms available as hotel accommodation. Table 42 shows that between 2003 and 2007, the occupancy increased in Metro Vancouver by more than half the number of rooms (i.e., 3,445 more rooms) while the total number of rooms available rose by 27 percent (i.e., 3,297 more rooms). Thus, the occupancy rate increased by nearly 11 percentage points, from 53.7 percent in 2003 to 64.5 percent in 2007. In B.C., the rise in occupancy and in total rooms available were comparably similar (though occupancy increased more than availability), raising the occupancy rate only marginally, by 2.1 percentage points. In Canada, the occupancy and availability increased by the same rate, bringing no change to the occupancy rate. Overall, the occupancy rates, while starting relatively similar in 2003 across all three locations, exhibited no change in Canada as a whole, a marginal increase in B.C., and sizably larger increase in Metro Vancouver.

Although this increase suggests both higher accommodation capacity and greater tourist volume for Metro Vancouver over the four-year period, a comparison with the Greater Toronto Area (GTA) reveals that this higher accommodation occupancy rate in Metro Vancouver in 2007 is not unique to the Olympic region. Between 2003 and 2007, the occupancy in the GTA increased by more than half (as it did in Metro Vancouver). At the same time however, the total number of available rooms increased by only 14 percent. The combined number for the GTA thus is a nearly 20 percentage points increase in the occupancy rate from 2003 to 2007, although the GTA in 2007 still had a lower occupancy rate than Vancouver (but only marginally). Table 42 clearly indicates that the greater increase in the occupancy rate of the GTA relative to Metro Vancouver is predominantly due to the relatively smaller increase in the total number of rooms available. Consider this: in 2003, the GTA had 75 percent more occupied rooms than did Metro Vancouver and in 2007 the number for occupied beds was already 79 percent. At the same time, the total number of rooms in the GTA in 2003 was almost twice the number of Metro Vancouver but in 2007 it had fallen to only 80 percent more than the Metro Vancouver's capacity.

Given these calculations and comparisons, we can conclude that: 1) although hotel accommodation usage increased by more than half in Metro Vancouver from 2003-2007, it

increased even more in the GTA, therefore suggesting no (strong) Olympic Games impact in/specific to the host region, 2) the occupancy rate in Metro Vancouver increased by about 11 percentage points (less than it did in the GTA, which increased by 17 percentage points reflecting the increase in occupied rooms), plus, Metro Vancouver's occupancy rates were higher than GTA in both years, and 3) in the same time period, the total number of rooms in Metro Vancouver increased almost twice the rate it did in the GTA (27 percent versus 14 percent respectively).

Point number 3 is a significant finding. Despite the fact that the tourist volume to Metro Vancouver itself does not appear to have increased significantly *relative to the GTA*, the availability of tourist accommodation in Metro Vancouver has risen considerably after 2003 (i.e., the beginning of the Games era). It appears that, so far, being selected host has not affected tourism volume (as reflected in the number of occupied rooms) in any exceptional or unique way—although we cannot completely exclude the Games as impacting on the increase in occupied rooms. The Games era seems to have most certainly affected the total room availability after 2003 and, arguably, the increase in total number of rooms is a part of the process of preparing the city for welcoming the enormous amount of visitors expected during the Games themselves.<sup>59</sup>

### *Ec12 Hosting of International Events*

Although the research is unable to conclude with certainty that the increase in occupancy after 2003 was due to the upcoming Olympic Games specifically, indicator Ec12 brings evidence that city visits/tourism did increase between 2001 and 2007. Furthermore, Table 43 presents data on the international events that have taken place in Vancouver in the periods 2001/02 and 2006/07, one a year before the selection of the city as an Olympic Games host, the other three years after, which is plenty of time to strategically plan for an increase.

There was a rise of approximately 46 percent in events hosted in the city between 2001/02 and 2006/07. The types of events have changed too. The largest category of international events used to be classified as *economic* by Tourism Vancouver. In 2001/02, half of the events in that period were classified as economic. This trend can be seen to have changed in 2006/07, as economic events fell to only slightly more than a third of all events with an increase in *social* and *confidential* events.<sup>60</sup> Social events increased from 30 percent to 41 percent and confidential events rose from 2 percent to 17 percent of the totals in the respective years. At the same time, events categorized as “other” fell from 12 percent in 2001/02 to less than 2 percent in 2006/07.

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<sup>59</sup> In light of the Ec7 data discussed previously, the data for Ec8 reveals a potentially problematic concern which, however, we cannot address without additional data on number of establishments and beds in 2003. The potential problem stems from the observations that in metro Vancouver 1) there were *fewer* tourist establishments and beds in them in 2007 than in 2001 (Table 41), and 2) the available rooms *increased* by nearly 30 percent between 2003 and 2007 (Table 42). There are two possible explanations that could reconcile these observations. First, it there might have been a huge dip in the number of establishments in or before 2003, so that any subsequent increase in establishments would be large enough to explain the 30 percent increase in rooms between 2003 and 2007. Second, establishments with fewer rooms might have been replaced by establishments with more rooms (i.e., there could have been more rooms in fewer establishments). The first hypothesis, while possible, seems unlikely to the extent that there seems to be no reason for large enough disappearance of establishments. The second hypothesis cannot sufficiently explain why, if there were more rooms in 2007 than there were in 2003, there were fewer beds in 2007 than there were in 2001 (unless, hypothesis one were true). Considering this, and without data to permit us verification one way or another, we remain suspicious of the Ec8 data (sourced by Smith Travel Research, as opposed to Ec7's data provided by B.C. Stats) and advise due caution regarding the suggested analysis outcomes pertaining to Ec8.

<sup>60</sup> Confidential and other events were classified as such by Tourism Vancouver.

In terms of absolute change, the largest contributor by far to the total increase in events was the category of confidential events, which rose more than thirteen times from only 5 events in 2001/02 to 66 events five years later. This increase, along with the doubling of social events in 2006/07, is more than enough to offset the nearly 70 percent decrease in “other” events.

Finally, while 2001 and 2002 had almost the same number of events in all categories but “other,” 2007 reveals a decrease in both economic and social events as well as in “other,” but shows a rise in the event category Olympic and Paralympic as well as in confidential events. These year-to-year changes are likely due to temporary fluctuations; therefore, focusing on the between-periods comparison seems more fruitful. Thus, the overall increase of nearly 50 percent in events between years 2001/02 and 2006/07 can be considered encompassing of the changes that have taken place since the election of Vancouver as a host city in 2003. It appears that the city is becoming more attractive as a destination for international conferences, conventions and meetings. It is plausible that to a certain extent this rising popularity is due to the greater exposure of Vancouver in connection to the upcoming Games.

#### *Ec9 Tourist Nights*

Despite that, there exists further evidence that tourism in Vancouver itself might not have yet fully reacted to the upcoming Games, as presented in Table 44. This table represents indicator Ec9 or Tourist Nights data, which measures the number of overnight tourists to Vancouver at several data points between 1998 and 2006, as well as comparable data on Calgary and Toronto.

This table shows that, between 1998 and 2006, overnight tourists (i.e., those who spent at least one night) in Vancouver increased by more than 10 percent. In terms of place of origin, the distribution of tourists remained relatively stable during that period, with about 30 percent of tourists coming from within B.C., about 28 percent coming from other parts of Canada and the remaining 42 percent coming from abroad. The different types of tourists based on origin increased at a different pace, however, with domestic tourists (both from B.C. and the rest of Canada) increasing by about 13.5 percent compared to foreign tourists increasing by 6.3 percent between 1998 and 2006. In the latest available two-year period, 2004-2006, the distribution is even more skewed, with B.C. tourists to Vancouver increasing by less than 3 percent, non-B.C. Canadian tourists rising by more than 7 percent, and foreign tourists actually declining by 2 percent.

In comparison, Calgary, a previous Winter Olympic Games Host City, saw an overall decline in tourism between similar years, 1998 and 2004, by almost a quarter. Overall, during this similar time period, Alberta tourists to Calgary had decreased by more than 30 percent, non-Alberta Canadian tourists' numbers fell by 5 percent and foreign visitors declined by more than 20 percent during that five-year period. In terms of composition, the 2000s brought about a decline in the proportion of Alberta tourists to Calgary and a respective increase in Canadian tourists from outside the province, with foreign tourists remaining essentially the same fraction of the total.

This comparison between Vancouver and Calgary shows that between approximately 1998 and 2006, tourists tended to favour Vancouver as a tourist destination. It is within the realm of possibility to attribute part of that effect to the upcoming Olympic Games, especially in light of increased international media attention. It is also plausible that Vancouver has become more

“known” in the minds of potential visitors and is more easily identifiable as tourist and/or business destination compared to Calgary. Marketing initiatives to promote tourism may also be having a positive effect on tourism to Vancouver.

Compared with Toronto, however, the number of tourists visiting Toronto (see Table 44) between 2002 and 2006 increased more than it did in Vancouver between a similar period 2001 and 2006 (by 5.5 percent and 4.1 percent respectively). In terms of composition, domestic tourists (those from within Canada) comprised about 65 percent of all tourists to Toronto, while in Vancouver they were 58 percent. For the last two-year period (2004 to 2006) available, domestic tourists increased by almost 5 percent in Vancouver while they rose by more than 8 percent in Toronto; foreign tourists to Vancouver declined by 2 percent while foreign visitors to Toronto rose by 4.6 percent. In summary, it appears that Toronto has experienced a larger influx of tourists than Vancouver in the recent period. Importantly, the rate of tourism increase in Toronto is greater: the difference in the number of tourists between Vancouver and Toronto is rising, from Toronto having 16.6 percent more tourists than Vancouver in 2004, to having 21.2 percent more tourists than Vancouver in 2006.<sup>61</sup>

#### **7.2.4. Attributing Impacts to the 2010 Games**

Given the greater rise in overnight tourists in Toronto compared to Vancouver, we can conclude that any potential effect of the upcoming Games on the number of tourists actually visiting Vancouver at this post-2003 but pre-2010 stage does not overcome Toronto’s advantage as a preferred touristic destination according to the data. The fact that the greatest increase in tourists for the 1998-2006 period in Vancouver actually occurred before 2003 (for the 1998-2001 period tourists increased by more than 6 percent, mostly due to a rise in international visitors of nearly 9 percent) bears further evidence that the Olympic Games do not appear to have affected the number of tourists to Vancouver yet. Despite data reliability concerns, the analysis of occupancy rate is in accordance with this finding. There is a possibility, however, that the available accommodation in terms of rooms in Metro Vancouver has increased since the selection of Vancouver as a Host City in 2003 (more than in any of the compared geographical locations), although the number of tourist accommodation establishments (and beds in them) in 2007 seems to be still lower than in 2001.

Overall, our analysis suggests that Vancouver seems to enjoy increasing popularity as a place to host international events and that most likely this is due, at least partly, by the upcoming Olympic Games. In terms of number of tourists, Metro Vancouver does not appear to have experienced a unique place-specific influx of tourists that has not happened anywhere else. Finally, there is some indication that tourist accommodation has increased since 2003 but data issues preclude confirming that with any level of certainty.

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<sup>61</sup> Keeping in mind that the numbers for Vancouver and for Toronto are from different years, comparing the difference in total tourists in the earlier period, although technically incorrect, still gives some idea about the situation in the previous period. With the underlying assumption that Vancouver 2002 is similar to Vancouver 2001 in terms of tourists, comparing Vancouver 2001 and Toronto 2002 shows that there were 19.9 percent more tourists to Toronto than to Vancouver in the pre-2003 period, therefore the difference of 16.6 percent in 2004 actually registers a decrease – i.e., there could have been an in-surge of tourists to Vancouver right after the announcement of Vancouver as a host city which has brought the ‘regular’ difference down. Regardless, the numbers for 2006 reveal that the gap has widened once again, and even more than in the pre-2003 period, rendering any possible Olympic Games effect on number of tourists very short-term and transient.

Please see Section 8 next for a quantified summary evaluation the Olympic Games impact on the indicators discussed in this bundle.

## 8. Summary and Conclusions

The impact of the upcoming Olympic Games on the context indicators under study is quantitatively summarized in Table 45. The table presents the specific indicators and bundles of indicators (e.g., Socio-Cultural Bundle 1) within their respective sustainability sphere. These bundles are combined to offer an overall pre-event OGI outcome. The Attribution Box Score features three ratings that quantitatively evaluate the indicators, bundles, spheres and OGI. The first is an *impact score*, reflecting the direction of impact (a positive or negative impact) and the strength of the impact as assessed by our analysis. The second is *reliability weight*, which is a measure of reliability of our data. The third is *conclusivity*, which is an estimation of our level of confidence in the reported outcomes. It should be noted that the impact scores, reliability weights and the levels of conclusivity are given by indicator only and then mathematically aggregated to yield attribution scores for bundles, spheres and, finally, for OGI overall.

The impact score scale ranges from -2 to 2, where:

- 2 Represents a positive impact; i.e., there is a definite change in the indicator that is most likely due to the Games.
- 1 Represents a slight positive impact; i.e., there is a weak positive impact, reasonably likely due to the Games.
- 0 Represents no impact. This score is used in two cases: when there is no change in the indicator, or when there is change that cannot be attributed to the Games with any acceptable level of certainty (i.e., although in some cases impact is statistically possible, the lack of impact is equally as likely).
- 1 Represents a slight negative impact; i.e., it is possible that there is a weak negative impact, reasonably likely due to the Games.
- 2 Represents a negative impact; i.e., there is a definite change in the indicator that is most likely due to the Games.

The reliability weights range from 20 percent to 100 percent. They reflect our assessment of the data in both quality and availability and are used in the calculation of bundle, sphere and overall OGI impact. Using reliability weights allows us to correct for overestimating impact due to imperfect data. The reliability threshold ratings are as follows:

- 100% Very reliable data: comes from an official source (e.g., a Statistics Canada report) and has sufficient longitudinal data.
- 80% Reliable data: official data with some issues (e.g., data from multiple sources, data for only two points in time, differing time points for indicator dimensions, etc).
- 60% Somewhat reliable data: data with potential problems (some concerns with data source, or representativeness of the data in terms of indicator specification).

40% Questionable data: inconsistencies are present in the data, and/or further investigation is pending.

20% Unreliable data: circumstantial/descriptive data that cannot be quantitatively analyzed.

Generally, a reliability weight of 1 was reserved for a “perfect” or “ideal” data score which served as a measuring stick to all other data (similar to a “6” in figure skating).

*Conclusivity* uses a binary rating (either 0 or 1) and reflects whether or not we feel that the outcome/conclusion of impact can be trusted. As with the reliability weights, conclusivity addresses data issues or indicator specifications which prevent us from reaching a final conclusion about impact. A conclusivity rating of 0 means that no conclusion was reached after analyzing a particular indicator.<sup>62</sup> (Mathematically, a conclusivity score of 0 removes the impact score of that indicator from further aggregation. This is a conservative solution that precludes biasing the overall impact.) A conclusivity rating of 1 means that some conclusion is offered (i.e., we feel confident enough to offer a conclusion). It should not be interpreted as a “100 percent certainty” in that conclusion (which is impossible to reach given the methodological nature of our analysis).<sup>63</sup>

As an example, in Table 45 indicator Ec3 Size of Companies is given an impact score of 1, a reliability weight of 0.8 and a conclusivity score of 1. This can be interpreted in the following way. “For indicator Ec3 we find some positive change that can be attributed to the upcoming Olympic Games. We base this assessment on data that we feel are mostly reliable, and we are generally confident about our conclusion regarding impact (with the added caveat that nothing is *absolutely* certain).”

A summary of our analysis of the Olympic Games impact on the three sustainability spheres and the overall OGI outcome is presented in Table 46. Thus our overall conclusion about the impact of the upcoming Olympic Games (based on a selection of indicators from the three spheres) is *that there has been a very slight positive Games impact (0.4), based on somewhat reliable to reliable data (72 percent reliable), and on 83 percent general conclusivity of the constituent indicators.*

The Games have had at least some impact on each of the three spheres in this pre-event phase. The Games have had a weak positive impact on the social-cultural sphere. Data for the socio-cultural indicators are the most unreliable of all spheres, but still allow for a sufficiently conclusive analysis. For the environmental sphere, reliable data attests that indicators in this sphere have been mostly unaffected, or minimally affected in a negative way (again, with sufficient conclusivity). Finally, the Games appear to have had a marginally positive impact on the economic sphere; however, this conclusion is based on somewhat reliable data that is inconclusive in 30 percent of the cases.

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<sup>62</sup> In practical terms, this means that either further data or re-specification of the indicator could be used to resolve the problem; but at the current stage assessing OGI for that indicator is impossible.

<sup>63</sup> As we have noted throughout, we offer and discuss hypotheses which are more likely or less likely to be true; our analysis cannot prove/refute anything in the statistical sense.

Overall, as a pre-event outcome, it is concluded that the Olympic Games impact was found to be slightly positive, mostly due to the economic and socio-cultural spheres.

## Glossary of Terms

Hierarchy			
Level	Key Concept	Definition	Example
a	<i>Goal/OGI Assessment</i>	To measure the impact of the Games. This measurement will be further defined and substantiated by the other key concepts down the hierarchy, so their definitions are critical.	“Positive Impact”
b	<i>Sustainability Spheres</i>	The 3 sustainability spheres are Socio-Cultural, Economic, and Environmental. The choice of these 3 spheres reflect societal and OGI values.	“Environmental”
c	<i>Indicator Bundles</i>	Sets of similar indicators can be summarized or reduced in order to be useful and usable for the impact analysis	“Land Use Bundle”
d	<i>Indicators</i>	General concepts that represent the initiatives or areas that are valued by society.	“En 6: Land Use Changes”
e	<i>Indicator Dimensions</i>	The actual measures that describe an Indicator. Dimensions are variables that require the collection or assembly of data – the fundamental elements of indicators.	“Commercial Land Use Change”
f	<i>Data Value</i>	The actual data value that is an instance of the indicator dimension substantiated and defined by specific parameters and descriptive metadata.	“29.6 km <sup>2</sup> ”; “1.0%”
g	<i>Data Parameters</i>	Parameters describe the scope and attributes of data, specifically the time period (temporal) and geographic scope (spatial), as well as units of measurement. Data parameters are important in the comparability of data values, typically differentiated by a single parameter (i.e. temporal parameter for longitudinal studies).	“2006, GVRD region, area in km <sup>2</sup> , % of total regional area”
h	<i>Metadata</i>	Descriptive information to substantiate Data Values and provide the means to assess quality, statistical significance, and documentation for consistency assurance in source and methodology. Examples of metadata are source description, frequency of renewal or update, and other indications in the adequacy for the analyses for which they are applicable.	“Data provided by Joe Smith (555-555-5555).”

## Tables

Table 1: Data Summary: Socio-Cultural Indicators

Count	Sphere	Sphere ID	IndicatorName	Baseline Data Available	Pre-Games Data Available	Data Source & Methodology Consistency	Report Analysis	1- Pager	Quant.	Qual.	Analysis NOT Possible	No Useful Data	Methodology Inconsistent	Baseline Error - Cannot Fix
1	Socio-Cultural	So 1	Political Representation	✓	✓	✓	✓	✓	✓		✓	✓		
2	Socio-Cultural	So 2	Legislative activity	✓							✓			
3	Socio-Cultural	So 3	Pressure Groups	✓	✓						✓		✓	
4	Socio-Cultural	So 4	Community Centres and Associations	✓	✓	✓					✓		✓	
5	Socio-Cultural	So 5	Minorities	✓	✓	✓		✓	✓		✓			
6	Socio-Cultural	So 6	Poverty and Social Exclusion	✓	✓						✓			✓
7	Socio-Cultural	So 7	Educational level	✓	✓	✓					✓			✓
8	Socio-Cultural	So 8	Crime Rates	✓	✓	✓		✓	✓		✓			
9	Socio-Cultural	So 9	Health	✓	✓	✓		✓	✓		✓			
10	Socio-Cultural	So 10	Nutrition	✓	✓	✓		✓	✓		✓		✓	
11	Socio-Cultural	So 11	Cultural activities	✓	✓	✓					✓		✓	
12	Socio-Cultural	So 12	Sport and Physical Activities	✓	✓	✓		✓	✓		✓			
13	Socio-Cultural	So 13	School Sports	✓	✓	✓				✓	✓			
14	Socio-Cultural	So 14	Available Sports Facilities	✓	✓	✓					✓			
15	Socio-Cultural	So 15	Exclusion, Discrimination, Racism and Violence in Sport	✓	✓	✓					✓			
16	Socio-Cultural	So 16	Top-level Sportsmen and Women	✓	✓	✓		✓	✓		✓			
17	Socio-Cultural	So 17	Professional Leagues	✓	✓	✓					✓			
18	Socio-Cultural	So 18	World and Continental Championships	✓	✓	✓					✓			
19	Socio-Cultural	So 19	Results at the Olympic and Paralympic Games and World Championships	✓	✓	✓		✓	✓		✓			
20	Socio-Cultural	So 20	National Anti-doping Controls	✓	✓	✓					✓			
21	Socio-Cultural	So 21	Media specialising in sport	✓	✓	✓					✓		✓	
22	Socio-Cultural	So 22	Sports broadcasting	✓	✓	✓					✓		✓	
23	Socio-Cultural	So 23	Information media	✓	✓	✓					✓		✓	
24	Socio-Cultural	So 24	Information and Communications Technology	✓	✓	✓					✓		✓	
25	Socio-Cultural	So 31	Homeless, low-rent Market and Affordable Housing	✓	✓	✓			✓		✓			
26	Socio-Cultural	So 43	Host City's Media Image	✓	✓	✓				✓	✓			
27	Socio-Cultural	So 44	Perceptions about People with Disabilities in Society	✓	✓	✓				✓	✓			
28	Socio-Cultural	So 45	Support Network for Disabled People	✓	✓	✓					✓			
29	Socio-Cultural	So 46	Professional Sport Education for People with Disabilities	✓	✓	✓					✓			
30	Socio-Cultural	So 48	Accessibility of Public Services	✓	✓	✓					✓			
<b>Count:</b>				<b>27</b>	<b>25</b>	<b>12</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>5</b>	<b>14</b>	<b>5</b>	<b>7</b>	<b>2</b>
				<b>90%</b>	<b>83%</b>	<b>40%</b>	<b>33%</b>	<b>20%</b>	<b>37%</b>	<b>17%</b>	<b>47%</b>	<b>17%</b>	<b>23%</b>	<b>7%</b>

<sup>1</sup> Special issues with data/methodology/sources preclude a analysis.

<sup>2</sup> Analysis constitutes of qualitative special expert report or qualitative description of changes in the indicator.

Table 2: Data Summary: Environmental Indicators

Count	Sphere	Sphere ID	IndicatorName	Baseline Data Available	Pre-Games Data Available	Data Source & Methodology Consistency	Report Analysis	1-Pager	Quant.	Qual.	Analysis NOT Possible	No Useful Data	Methodology Inconsistent	Baseline Error - Cannot Fix
1	Environmental	En 1	Renewable Fresh Water Use	✓	✓	✓	✓		✓		✓			
2	Environmental	En 2	Public Water Supply	✓	✓	✓	✓		✓					
3	Environmental	En 3	Water Quality	✓	✓	✓	✓		✓					
4	Environmental	En 4	Greenhouse Gas Emissions	✓	✓	✓	✓		✓					
5	Environmental	En 5	Air Quality	✓	✓	✓	✓		✓					
6	Environmental	En 6	Land Use Changes	✓	✓	✓	✓		✓					
7	Environmental	En 7	Protected Sites	✓	✓	✓	✓		✓					
8	Environmental	En 8	Threatened Species	✓	✓	✓	✓		✓					
9	Environmental	En 9	Housing Areas	✓	✓	✓	✓		✓					
10	Environmental	En 10	Public Open-air Leisure Areas	✓	✓	✓	✓		✓					
11	Environmental	En 11	Transport Networks	✓	✓	✓	✓		✓					
12	Environmental	En 12	Daily Travelling Distance	✓	✓	✓	✓		✓					
13	Environmental	En 13	Road Congestion	✓	✓	✓	✓		✓					
14	Environmental	En 14	Energy Consumption by Source	✓	✓	✓	✓		✓		✓			
15	Environmental	En 15	Energy Consumption by Use	✓	✓	✓	✓		✓		✓			
16	Environmental	En 16	Energy Self-sufficiency	✓	✓	✓	✓		✓		✓			✓
17	Environmental	En 17	Raw Material Consumption	✓	✓	✓	✓		✓					
18	Environmental	En 18	Solid Waste Treatment	✓	✓	✓	✓		✓		✓			
19	Environmental	En 19	Wastewater Treatment	✓	✓	✓	✓		✓		✓			
20	Environmental	En 20	Olympic Induced Housing	✓	✓	✓	✓		✓		✓			
21	Environmental	En 21	Indoor Air Quality	✓	✓	✓	✓		✓		✓			
22	Environmental	En 22	New Waste and Wastewater Treatment Facilities	✓	✓	✓	✓		✓		✓			
				<b>Count:</b>	<b>21</b>	<b>15</b>	<b>10</b>	<b>6</b>	<b>14</b>	<b>2</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>1</b>
				<b>Percentage:</b>	<b>95%</b>	<b>68%</b>	<b>45%</b>	<b>27%</b>	<b>64%</b>	<b>9%</b>	<b>27%</b>	<b>9%</b>	<b>14%</b>	<b>5%</b>

Table 3: Data Summary: Economic Indicators

Count	Sphere	Sphere ID	Indicator Name	Baseline Data Available	Baseline+1 Data Available	Data Source & Methodology Consistency	Report Analysis	1- Pager	Quant.	Qual.	Analysis NOT Possible	No Useful Data	Methodology Inconsistent	Baseline Error - Cannot Fix
1	Economic	Ec 1	Employment by Economic Activity	✓	✓	✓	✓	✓	✓					
2	Economic	Ec 2	Employment Indicators	✓	✓	✓	✓		✓					
3	Economic	Ec 3	Size of Companies	✓	✓	✓	✓		✓					
4	Economic	Ec 4	Quality Management of Companies	✓	✓	✓			✓		✓			
5	Economic	Ec 5	Motor Vehicle Population	✓	✓	✓			✓					
6	Economic	Ec 6	Public Transport	✓	✓	✓	✓		✓					
7	Economic	Ec 7	Accommodation Infrastructure	✓	✓	✓	✓		✓					
8	Economic	Ec 8	Accommodation Occupancy Rate	✓	✓	✓	✓		✓					
9	Economic	Ec 9	Tourist Nights	✓	✓	✓	✓		✓					
10	Economic	Ec 10	Airport Traffic	✓	✓	✓	✓		✓					
11	Economic	Ec 11	Foreign Organisation Establishments	✓	✓	✓			✓		✓			
12	Economic	Ec 12	Hosting of International Events	✓	✓	✓	✓		✓					
13	Economic	Ec 13	Wages	✓	✓	✓			✓					
14	Economic	Ec 14	Gini Income Distribution Index	✓	✓	✓	✓		✓					
15	Economic	Ec 15	Consumer Price Index	✓	✓	✓	✓		✓					
16	Economic	Ec 16	Price Indexes	✓	✓	✓	✓		✓					
17	Economic	Ec 17	Hotel Price Index	✓	✓	✓	✓		✓					
18	Economic	Ec 18	Real Estate Market	✓	✓	✓	✓		✓					
19	Economic	Ec 19	Economic Balance (Import / Export)	✓	✓	✓	✓		✓					
20	Economic	Ec 20	Dynamics of Service Activities	✓	✓	✓	✓		✓					
21	Economic	Ec 21	Investment Risks	✓	✓	✓	✓		✓					
22	Economic	Ec 22	Foreign Direct Investment	✓	✓	✓	✓		✓					
23	Economic	Ec 23	Economic Role of the State	✓	✓	✓	✓		✓					
24	Economic	Ec 24	Structure of Public Spending	✓	✓	✓	✓		✓					
25	Economic	Ec 25	Structure of Fiscal Revenue	✓	✓	✓	✓		✓					
26	Economic	Ec 26	Public Debt	✓	✓	✓	✓		✓					
27	Economic	Ec 27	Jobs created in Olympic and Context Activities	✓	✓	✓	✓		✓		✓			
28	Economic	Ec 44	Employability of People with Disabilities	✓	✓	✓	✓		✓		✓			
				<b>Count:</b> 28	<b>Count:</b> 25	<b>Count:</b> 24	<b>Count:</b> 9	<b>Count:</b> 16	<b>Count:</b> 24	<b>Count:</b> 1	<b>Count:</b> 3	<b>Count:</b> 3	<b>Count:</b> 0	<b>Count:</b> 0
				<b>Percentage:</b> 100%	<b>Percentage:</b> 89%	<b>Percentage:</b> 86%	<b>Percentage:</b> 32%	<b>Percentage:</b> 57%	<b>Percentage:</b> 86%	<b>Percentage:</b> 4%	<b>Percentage:</b> 11%	<b>Percentage:</b> 11%	<b>Percentage:</b> 0%	<b>Percentage:</b> 0%

Table 4: Indicator Data Summary by Sustainability Sphere

	<b>Total Count</b>	<b>Baseline Data Available</b>	<b>Pre-Games Data Available</b>	<b>Data Source &amp; Methodology Consistency</b>	<b>Report Analysis</b>	<b>One- pager</b>	<b>Analysis Not Possible</b>
Socio-Cultural Indicators	30	27	25	12	10	6	14
Percent		90%	83%	40%	33%	20%	47%
Environmental Indicators	22	21	20	15	10	6	6
Percent		95%	91%	68%	45%	27%	27%
Economic Indicators	28	28	25	24	9	16	3
Percent		100%	89%	86%	32%	57%	11%
<b><i>All Indicators Total</i></b>	<b><i>80</i></b>	<b><i>76</i></b>	<b><i>70</i></b>	<b><i>51</i></b>	<b><i>29</i></b>	<b><i>28</i></b>	<b><i>23</i></b>
<b><i>Percent</i></b>	<b><i>100%</i></b>	<b><i>95%</i></b>	<b><i>88%</i></b>	<b><i>64%</i></b>	<b><i>36%</i></b>	<b><i>35%</i></b>	<b><i>29%</i></b>

Table 5: Canadian Medals Won at Olympic Winter Games, Totals and Changes, 1998 to 2006

Year	City	Gold Medals	Silver Medals	Bronze Medals	Total Medals	Change in Medals from Previous
1988	Calgary	0	2	3	5	+1
1992	Albertville	2	3	2	7	+2
1994	Lillehammer	3	6	4	13	+6
1998	Nagano	6	5	4	15	+2
2002	Salt Lake City	7	3	7	17	+2
2006	Turin	7	10	7	24	+7

Table 6: (So19) Results at Olympic Winter Games 1998-2006, Canada

	Medals by female athletes	Number of female athletes	Medals by male athletes	Number of male athletes	Medals total	Athletes total	Medals per female athlete	Medals per male athlete	Total medals per athlete	Number of sport discipl.	Medals per discipl.	Pop., mln.	Medals per million people	Rank by total medals
Turin 2006	16	88	8	107	24	195	0.182	0.075	0.123	15	1.60	33	0.727	3
Salt Lake City 2002	9.5 <sup>1</sup>	66	7.5 <sup>1</sup>	91	17	157	0.144	0.082	0.108	<i>DAAA</i>	<i>DAAA</i>	31	0.548	4
Nagano 1998	8	64	7	90	15	154	0.125	0.078	0.097	12	1.25	28	0.536	4

<sup>1</sup> In 2002, Canada won a mixed-pairs figure skating competition, hence the one medal divided in half by the two genders

Table 7: (So16) Number of Top Level Athletes<sup>1</sup> in Olympic and Paralympic Games, 2001-2007

	2001-2002	2003-2004	2006-2007
Summer	254	250	252
Winter	135	113	168

Source: Athlete Assistance Program.

<sup>1</sup> Top Level is defined as placing in Top 16.

Table 8: (So9) Birth and Death Rates, Vancouver 2001-2007

	2001	2002	2003	2004	2005	2006	2007
Birth rate (per 1,000 persons)	9.89	9.62	9.53	9.44	9.45	9.55	9.57
Death Rate (per 1,000 persons)	6.56	6.63	6.35	6.28	6.18	6.12	6.15

Source: BC Stats.

Table 9: (So9) Birth, Death and Infant Mortality Rates, British Columbia 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Birth rate (per 1,000 persons)	10.03	9.90	9.70	9.70	9.60	9.55	9.66
Death Rate (per 1,000 persons)	6.77	6.92	6.98	7.02	7.07	7.07	7.08
Infant Mortality Rate (per 1,000 live births)	<i>DNAA</i>	4.1	4.6	4.2	4.3	4.5	<i>DNAA</i>

Source: BC Stats (<http://www.bcstats.gov.bc.ca>) and StatsCanada (for infant mortality rate)

Table 10: (So9) Birth, Death and Infant Mortality Rates, Alberta 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Birth rate (per 1,000 persons)	12.90	12.98	12.94	13.29	13.29	13.20	13.91
Death Rate (per 1,000 persons)	6.05	6.09	6.13	6.16	6.13	6.10	6.13
Infant Mortality Rate (per 1,000 live births)	<i>DNA</i>	5.6	7.3	6.6	5.8	6.8	<i>DNA</i>

Source: BC Stats (<http://www.bcstats.gov.bc.ca>) and StatsCanada

Table 11: (So9) Birth, Death and Infant Mortality Rates, Canada 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Birth rate (per 1,000 persons)	10.8	<i>11.2</i>	<i>11.1</i>	10.6	10.6	10.7	10.9
Death Rate (per 1,000 persons)	7.2	6.0	7.5	7.2	7.2	7.0	7.1
Infant Mortality Rate (per 1,000 live births)	<i>5.1</i>	5.2	5.4	5.3	5.3	5.4	4.7
Life expectancy at birth (years)	<i>79.4</i>	<i>79.6</i>	<i>79.7</i>	<i>79.8</i>	<i>80</i>	<i>80.1</i>	<i>80.2</i>

Source: StatsCanada and CIA Factbook (the figures in italic).

Table 12: (So9) Birth, Death and Infant Mortality Rates, US 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Birth rate (per 1,000 persons)	14.2	14.2	14.1	14.1	14.1	14.1	14.1
Death Rate (per 1,000 persons)	8.7	8.7	8.7	8.4	8.3	8.3	8.3
Infant Mortality Rate (per 1,000 live births)	6.8	6.8	6.7	6.8	6.6	6.5	6.4
Life expectancy at birth (years)	77.1	77.3	77.4	77.1	77.4	77.7	77.9

Source: CIA Factbook.

Table 13: (So10) Mean Daily Caloric Intake (kcal), BC 2002-2004, Alberta 2004 and Canada 2004, Adults 19+

Age	BC 2002		BC 2004		Alberta 2004		Canada 2004	
	Men	Women	Men	Women	Men	Women	Men	Women
19-30	2883	1971	2957	1919	2591	1917	2737	1902
31-50	2624	1812	2908	1966	2464	1769	2510	1850
51-70	2324	1669	2373	1668	2042	1631	2204	1969
71+	2013	1508	1964	1563	1805	1423	1871	1507
<i>Average</i>	<i>2461</i>	<i>1740</i>	<i>2550.5</i>	<i>1779</i>	<i>2330.5</i>	<i>1807</i>	<i>2225.5</i>	<i>1685</i>

Table 14: (So10) Differences in Mean Daily Caloric Intake (kcal), Between BC 2004 and BC 2002, Alberta 2004 and Canada 2004, Adults 19+

Age	BC 2004 - BC 2002		BC 2004		BC - Alberta 2004		BC - Canada 2004	
	Men	Women	Men	Women	Men	Women	Men	Women
19-30	74	-52	-	-	366	2	220	17
31-50	284	154	-	-	444	197	398	116
51-70	49	-1	-	-	331	37	169	-301
71+	-49	55	-	-	159	140	93	56
<i>Average</i>	<i>89.5</i>	<i>39</i>	-	-	<i>325</i>	<i>94</i>	<i>220</i>	<i>-28</i>
<i>Change</i>	<i>3.5%</i>	<i>2.2%</i>	-	-	<i>14.6%</i>	<i>5.6%</i>	<i>9.4%</i>	<i>-1.6%</i>

Table 15: (So10) Consumption of Key Foods, BC and Canada, 2004

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	Vegetables and Fruit	Milk products	Meat & alt.	Grain Products
BC	4.59 serv.	2.25 serv.	148 grams	6.44 serv.
Canada	5.16 serv.	1.52 serv.	203 grams	5.64 serv.

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Table 16: (So31) Low-rent Market and Affordable Housing, Vancouver, Metro Vancouver and Canada, 2001-2006

	Vancouver		Metro Vancouver		Canada	
	2001	2006	2001	2006	2001	2006
Prevalence of low income, singles	43.1%	44.2%	39.8%	40.3%	30.8%	37.1%
Prevalence of low income, seniors	15.8%	8.9%	22.7%	14.5%	15.0%	35.0%
Number of affordable housing and social housing units	20, 133	23,623	47,220 <sup>1</sup>	47,857	-	-
Number of affordable housing and social housing units per 1,000 pop.	35.6	39.4	22.3 <sup>1</sup>	21.8		
Number of affordable housing and social housing units, build during the specified period	593 in 2001-04	357 in 2005-08	-	-	-	-

<sup>1</sup>2002 number.

Table 17: (So31) Homeless, Vancouver and Metro Vancouver, 2002-2009

	Vancouver			Metro Vancouver		
	2002	2005	2008	2002	2005	2008
Number of homeless people	628	1,291	1,576	1,121	2,174	2,660
Number of homeless per 1,000 pop.	1.09	2.18	2.56	0.53	1.00	1.17
Percent of homeless with physical disabilities	-	-	-	15%	21% <sup>1</sup>	31%
	2002	2003	Feb. 2009	2002	2003	Feb. 2009
Number of places in homeless shelters	559	748	1,137	682	990	1,420
Number of homeless per place in shelter	1.12	-	1.39	1.64	-	1.87

<sup>1</sup> 2006 number.

Table 18: (En7) Protected Areas in km<sup>2</sup>, BC and Alberta, 2006

Area in km <sup>2</sup>	BC	Alberta
Provincial Parks	130,900	2,208
% of total	13.8%	0.3%
National Parks	4,831.62	62,933
% of total	0.5%	9.8%
World Heritage Sites	120,000	62,905.93
% of total	12.6%	9.8%
<i>Total Protected Areas</i>	<i>255731.62</i>	<i>128046.93</i>
% of total	<i>26.9%</i>	<i>19.9%</i>
Total BC Land area	950,000	642,317

Table 19: (En10) Public Open-Air Leisure (POAL) Areas, Metro Vancouver and Capital Region District, 2001 and 2006

	<u>Metro Vancouver</u>			<u>CRD</u>		
	2001	2006	<i>change</i>	2001	2006	<i>change</i>
Population	2,092,902	2,199,121	5.1%	340,588	355,871	4.5%
Total POAL Area (km <sup>2</sup> )	2055.2	2055.2	0.0%	263.3	360.1	36.8%
POAL Area per person (m <sup>2</sup> )	981.9	934.5	-4.8%	773.1	1,011.9	30.9%

Table 20: (En6) Land Use Changes, Metro Vancouver, 2001-2006

Land Use Category	2001		2006	
	Land Area (ha)	Share of Total	Land Area (ha)	Share of Total
Agricultural	54,580	19.3%	53,620	18.9%
Commercial	2,790	1.0%	2,960	1.0%
Harvesting and Research	8,660	3.1%	8,660	3.1%
Industrial	6,300	2.2%	6,430	2.3%
Industrial - Extractive	1,000	0.4%	560	0.2%
Institutional	4,470	1.6%	4,630	1.6%
Open and Undeveloped	29,790	10.5%	25,960	9.2%
Port Uplands	2,050	0.7%	2,050	0.7%
Protected Watershed	46,690	16.5%	46,690	16.5%
Recreation and Protected Natural Areas	63,300	22.4%	67,180	23.7%
Residential - Commercial/Mixed	350	0.1%	390	0.1%
Residential - High-rise Apartment	300	0.1%	380	0.1%
Residential - Low-rise Apartment	1,620	0.6%	1,650	0.6%
Residential - Rural	8,600	3.0%	8,070	2.8%
Residential - Single Detached & Duplex	27,510	9.7%	28,460	10.1%
Residential - Townhouse	1,820	0.6%	2,140	0.8%
Transportation, Communication and Utility	4,130	1.5%	4,130	1.5%
Road and Lane Right-of-Way	19,220	6.8%	19,220	6.8%
<i>Total</i>	<i>283,180</i>	<i>100.0%</i>	<i>283,180</i>	<i>100.0%</i>

Source: Metro Vancouver Generalized Land Use (2001, 2006).

Table 21: (En11) Transport Networks - Supply of Infrastructure

Road Supply (Km)	City of Vancouver		Metro Vancouver	
	2006	2007	2006	2007
Motorways				
Road-km	1,638.9	1,644.1	9,097.3	9,285.2
Lane-km	3,509.7	3,520.8	18,655.3	19,040.6
Highways				
Road-km	7.6	8.1	404.6	405.7
Lane-km	16.9	18.5	899.8	900.7
Sky Train (Km)	2001	2007	2001	2007
Motorways				
Guideway-km	14.1	14.9	47.6	48.4
Track-km	28.2	29.8	95.2	96.8

Source: BC Digital Road Atlas, GIS Innovations

Table 22: (En11) Transport Networks (Supply of Infrastructure and Services)<sup>1</sup>

Mode	Transit Supply (Transit Service Km)			
	2004	2005	2006	2007
<b>CMBC</b>				
Conventional Bus Diesel	54017445	55228360	55730323	54441714
Community Shuttle Diesel	3664934	5682472	7391367	7959052
SeaBus Diesel	142121.4	141908.7	141532.6	144355
Total Diesel	57824500.4	61052740.7	63263223	62545121
VTC/OTC Trolley <sup>2</sup>	10892336	10689048	10841715	11680877
POCO - CNG	75582	142828	1661681	5820698
<i>Total Kilometres</i>	<i>68792418</i>	<i>71884617</i>	<i>75766619</i>	<i>80046696</i>
<b>West Vancouver</b>				
Conventional Bus Diesel	2222399	2218544	2319362	2350000
Community Shuttle Diesel	0	58299	187826	186800
<i>Total Kilometres</i>	<i>2222399</i>	<i>2276843</i>	<i>2507188</i>	<i>2536800</i>
<b>Total Transit Service</b>				
Conventional Bus Diesel	56239844	57446904	58049685	56791714
Community Shuttle Diesel	3664934	5740771	7579193	8145852
SeaBus Diesel	142121.4	141908.7	141532.6	144355
Total Diesel	60046899.4	63329583.7	65770411	65081921
VTC/OTC Trolley <sup>2</sup>	10892336	10689048	10841715	11680877
POCO - CNG	75582	142828	1661681	5820698
<b><i>Total KM - all transit vehicles</i></b>	<b><i>71014817</i></b>	<b><i>74161460</i></b>	<b><i>78273807</i></b>	<b><i>82583496</i></b>

<sup>1</sup> Actual includes kilometres incurred due to operator training, special events and maintenance/warranty work.(i.e. more than just revenue kms)

<sup>2</sup> OTC replace by VTC in late 2006

Table 23: (En12) Median Commute Distance (km) for Select Metropolitan Areas, 1996-2006

Geographic Area	1996	2001	2006
Vancouver CMA	7.7	7.6	7.4
Abbotsford CMA	-	7.7	7.3
Victoria CMA	4.7	4.7	4.6
Toronto CMA	9.3	9.2	9.4
Calgary CMA	7.5	7.7	8.2
Montreal CMA	8.2	8.0	8.1
Edmonton CMA	7.6	7.6	7.8
BC	6.4	6.4	6.5
Canada	7.0	7.2	7.6

Source: StatsCan Census Journey to Work data (distances are approximate and for auto drive mode). Applies to population age 15 years and older with usual place of work; 20 percent of all residents.

Table 24: (En12) Total Commuters per Day by Place of Work and Means of Transportation for Select Metropolitan Areas, 2001, 2006

	<u>Total Commuters</u>		<u>Sustainable Transportation<sup>1</sup></u>				<u>Car</u>		<u>Other<sup>2</sup></u>	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
Vancouver	290,295	304,440	35.7%	42.9%	63.4%	56.0%	0.9%	1.1%		
Toronto	1,252,860	1,251,070	41.1%	43.0%	58.2%	56.2%	0.7%	0.8%		
Calgary	431,740	498,030	22.1%	24.4%	77.1%	74.7%	0.7%	0.9%		
Montreal	912,895	939,390	39.2%	40.5%	60.3%	58.8%	0.5%	0.7%		
Edmonton	333,795	378,190	17.5%	19.8%	81.8%	79.4%	0.7%	0.8%		

Source: StatsCan Census Journey to Work data.

Distances are approximate and for auto drive mode. Applies to population age 15 years and older with usual place of work.

<sup>1</sup> Includes public transit, walking, and bicycling.

<sup>2</sup> Corresponds to the remaining modes of transportation, such as motorcycle, taxi or "other modes", such as inline skating, snowmobile, etc.

Table 25: (En13) Screenline Count Totals, 24 Hour, Peak Periods and Off-Peak Periods, 1996 (Automatic Counts)

	24 Hour		AM Peak Period		Mid-Day		PM Peak Period		Off-Peak				
	Both Dir.	Both Dir.	In-Bound	Out-Bound	Both Dir.	In-Bound	Out-Bound	Both Dir.	In-Bound	Out-Bound			
Region-wide	2,991,461	539,876	339,061	200,815	1,003,667	511,723	491,944	677,548	290,266	387,282	1,774,037	864,077	909,960
Hwy 99													
North	10,641	1,900	1,179	721	3,639	1,953	1,686	2,560	1,193	1,367	6,181	2,972	3,209
Burrard													
Inlet	186,694	37,851	23,652	14,199	60,350	31,861	28,489	42,410	17,895	24,515	106,433	51,670	54,763
Down-town													
Peninsula	420,216	67,099	44,461	22,638	144,218	75,865	68,353	91,190	39,229	51,961	261,927	128,453	133,474
Boundary													
Road	364,294	62,425	37,849	24,576	122,141	62,257	59,884	81,546	37,209	44,337	220,323	107,217	113,106
North													
Road	293,639	57,844	40,632	17,212	93,980	47,772	46,208	64,029	24,059	39,970	171,766	81,218	90,548
North													
Arm	339,064	65,053	34,784	30,269	113,004	56,673	56,331	77,972	38,069	39,903	196,039	97,447	98,592
South/Main													
Arm	369,650	76,281	52,912	23,369	115,101	59,229	55,872	82,710	31,119	51,591	210,659	101,351	109,308
Pitt													
River	63,884	12,137	8,843	3,294	18,693	9,627	9,066	14,269	4,863	9,406	37,478	17,127	20,351
200th													
Street	230,303	35,863	21,603	14,260	84,955	42,748	42,207	53,952	23,341	30,611	140,488	68,317	72,171

Table 26: (En13) Screenline Count Totals, 24 Hour, Peak Periods and Off-Peak Periods, 2004 (Automatic Counts)

	24 Hour		AM Peak Period		Mid-Day		PM Peak Period		Off-Peak				
	Both Dir.	Both Dir.	In-Bound	Out-Bound	Both Dir.	In-Bound	Out-Bound	Both Dir.	In-Bound	Out-Bound			
Region-wide	3,191,974	567,973	351,306	216,667	1,083,903	554,755	529,148	719,097	312,818	406,279	1,904,904	943,814	961,090
Hwy 99													
North	12,077	2,044	1,237	807	4,319	2,274	2,045	2,892	1,295	1,597	7,141	3,403	3,738
Burrard													
Inlet	199,094	38,116	22,586	15,530	66,557	34,816	31,741	44,228	19,811	24,417	116,750	57,430	59,320
Down-town													
Peninsula													
Boundary	399,832	64,454	41,546	22,908	138,774	72,471	66,303	87,615	38,460	49,155	247,763	123,129	124,634
Road													
North	366,229	62,684	36,507	26,177	121,008	61,574	59,434	80,909	37,539	43,370	222,636	110,884	111,752
Road	323,952	63,051	44,128	18,923	103,974	53,306	50,668	72,707	26,690	46,017	188,194	90,978	97,216
North													
Arm	354,220	63,360	34,019	29,341	120,083	60,722	59,361	77,152	38,467	38,685	213,708	107,991	105,717
South/Main													
Arm	401,227	75,171	49,361	28,810	128,806	66,718	62,088	89,729	34,632	55,097	236,327	115,289	121,038
Pitt													
River	78,633	14,824	11,008	3,816	24,108	12,249	11,859	19,395	6,526	12,869	44,414	21,292	23,122
200th													
Street	270,549	44,238	25,841	18,397	99,625	49,588	50,037	63,526	28,456	35,070	162,785	81,232	81,553

Table 27: (En13) Difference Between 2004 and 1996 Screenline Count Totals, 24 Hour, Peak Periods and Off-Peak Periods (Automatic Counts)

	24 Hour		AM Peak Period		Mid-Day		PM Peak Period		Off-Peak				
	Both Dir.	Both Dir.	In-Bound	Out-Bound	In-Bound	Out-Bound	In-Bound	Out-Bound	In-Bound	Out-Bound			
Region-wide	200,513	28,097	12,245	15,852	80,236	43,032	37,204	41,549	22,552	18,997	130,867	79,737	51,130
Hwy 99													
North	1,436	144	58	86	680	321	359	332	102	230	960	431	529
Burrard													
Inlet	12,400	265	-1,066	1,331	6,207	2,955	3,252	1,818	1,916	-98	10,317	5,760	4,557
Down-town													
Peninsula													
Boundary	-20,384	-2,645	-2,915	270	-5,444	-3,394	-2,050	-3,575	-769	-2,806	-14,164	-5,324	-8,840
Road													
North	1,935	259	-1,342	1,601	-1,133	-683	-450	-637	330	-967	2,313	3,667	-1,354
Road													
North	30,313	5,207	3,496	1,711	9,994	5,534	4,460	8,678	2,631	6,047	16,428	9,760	6,668
Arm													
South/	15,156	-1,693	-765	-928	7,079	4,049	3,030	-820	398	-1,218	17,669	10,544	7,125
Main													
Arm	31,577	-1,110	-3,551	5,441	13,705	7,489	6,216	7,019	3,513	3,506	25,668	13,938	11,730
Pitt													
River	14,749	2,687	2,165	522	5,415	2,622	2,793	5,126	1,663	3,463	6,936	4,165	2,771
200th													
Street	40,246	8,375	4,238	4,137	14,670	6,840	7,830	9,574	5,115	4,459	22,297	12,915	9,382

Table 28: (En13) Changes in AM and PM Peak In-Bound and Out-Bound Traffic Volumes Over Screenlines Between 1996 and 2004

	AM Peak		PM Peak	
	In-Bound	Out-Bound	In-Bound	Out-Bound
Region-wide	3.6%	7.9%	7.8%	4.9%
Hwy 99 North	4.9%	11.9%	8.5%	16.8%
Burrard Inlet	-4.5%	9.4%	10.7%	-0.4%
Downtown Peninsula	-6.6%	1.2%	-2.0%	-5.4%
Bound-ary Road	-3.5%	6.5%	0.9%	-2.2%
North Road	8.6%	9.9%	10.9%	15.1%
North Arm	-2.2%	-3.1%	1.0%	-3.1%
South/Main Arm	-6.7%	10.4%	11.3%	6.8%
Pitt River	24.5%	15.8%	34.2%	36.8%
200th Street	19.6%	29.0%	21.9%	14.6%



Table 30: (En4) Greenhouse Gas Emissions, Canada 2000-2006

	2000	2001	2002	2003	2004	2005	2006
	(kilotonnes CO <sub>2</sub> equivalent)						
Energy	587,000	582,000	588,000	609,000	604,000	596,000	583,000
Industrial Process	51,100	49,800	49,700	51,200	55,300	54,800	54,400
Solvent & Other Product Use	240	210	170	220	210	180	320
Agriculture	60,000	59,000	58,000	61,000	63,000	63,000	62,000
Waste	20,000	20,000	20,000	20,000	20,000	21,000	21,000
Land Use, Land-use Change and Forestry	- 98,000	- 88,000	51,000	12,000	41,000	- 8,400	31,000
<b>Total</b>	<b>718,000</b>	<b>710,000</b>	<b>717,000</b>	<b>741,000</b>	<b>743,000</b>	<b>734,000</b>	<b>721,000</b>

Source: Environment Canada, 2008  
 Data are developed, compiled, and reported annually by the Greenhouse Gas Division of Environment Canada in accordance with the requirements of the United Nations Framework Convention on Climate Change (UNFCCC). Data represent CO<sub>2</sub> equivalents on the basis of their global warming potential (GWP). Totals do not include GHGs attributed from Land Use, as per national methodology.

Table 31: (En4) Greenhouse Gas Emissions, BC 2000-2006

	2000	2001	2002	2003	2004	2005	2006
	(kilotonnes CO <sub>2</sub> equivalent)						
Energy	51,400	51,800	50,400	52,100	56,200	55,200	53,700
Industrial Process	3,880	2,910	2,820	2,960	3,150	3,020.00	2,750
Solvent & Other Product Use	32	28	22	29	28	24	43
Agriculture	2,400	2,500	2,500	2,600	2,700	2,700	2,400
Waste	3,500	3,600	3,600	3,600	3,500	3,400	3,400
<b>Total</b>	<b>61,300</b>	<b>60,800</b>	<b>59,300</b>	<b>61,300</b>	<b>65,600</b>	<b>64,400</b>	<b>62,300</b>

Source: Environment Canada, 2008  
 Data are developed, compiled, and reported annually by the Greenhouse Gas Division of Environment Canada in accordance with the requirements of the United Nations Framework Convention on Climate Change (UNFCCC). Data represent CO<sub>2</sub> equivalents on the basis of their global warming potential (GWP).

Table 32: (En4) Greenhouse Gas Emissions, Energy Breakdown, BC 2000-2006

Energy	2000	2001	2002	2003	2004	2005	2006
Stationary Combustion Sources	22,500	22,600	21,000	21,500	24,200	23,900	22,700
Electricity and Heat	2,480	3,070	1,180	1,330	1,850	1,470	1,470
Fossil Fuel Industries	4,100	3,500	4,400	5,800	7,800	8,300	7,400
Mining & Oil and Gas Extraction	316	232	270	155	491	297	735
Manufacturing Industries	7,190	7,400	6,500	6,590	6,450	6,050	5,260
Construction	75.2	70	73.1	81.1	99.8	106	110
Commercial & Institutional	3,380	3,430	4,120	3,420	3,490	3,360	3,330
Residential	4,600	4,500	4,300	4,100	3,900	4,300	4,400
Agriculture & Forestry	313	353	124	80	67	66	66
Transport	24,000	23,000	24,000	25,000	26,000	25,000	24,000
Fugitive Sources	5,270	5,730	5,850	5,740	6,100	6,210	6,500
<b>Total</b>	<b>51,400</b>	<b>51,800</b>	<b>50,400</b>	<b>52,100</b>	<b>56,200</b>	<b>55,200</b>	<b>53,700</b>

Source: Environment Canada, 2008

\*Data are developed, compiled, and reported annually by the Greenhouse Gas Division of Environment Canada in accordance with the requirements of the United Nations Framework Convention on Climate Change (UNFCCC). Data represent CO<sub>2</sub> equivalents on the basis of their global warming potential (GWP). Totals do not include GHGs attributed from Land Use, as per national methodology.

Table 33: (En5) Air Quality Health Index - Scale and Messages

AQHI Levels of Risk	Value	Accompanying Health Messages	
		At Risk Population	General Population
Low Health Risk	1-3	Enjoy your usual activities. Follow your doctor's advice for exercise.	Ideal conditions for outdoor activities.
Moderate Health Risk	4-6	If you have heart or breathing problems, and experience symptoms, consider reducing physical exertion outdoors or rescheduling activities to times when the index is lower. Follow your doctor's usual advice about managing your condition.	No need to modify your usual outdoor activities, unless you experience symptoms.
High Health Risk	7-10	Children, the elderly and people with heart or breathing problems should reduce physical exertion outdoors or reschedule activities to times when the index is lower, especially if they experience symptoms. If you have heart or breathing problems, follow your doctor's usual advice about managing your condition.	Anyone experiencing discomfort such as coughing or throat irritation should consider reducing physical exertion outdoors or rescheduling strenuous activities to periods when the index is lower.
Very High Health Risk	Above 10	Children, the elderly and people with heart or breathing problems should avoid physical exertion outdoors. If you have heart or breathing problems, follow your doctor's usual advice about managing your condition.	Everyone should consider reduce physical exertion outdoors or reschedule strenuous activities to times when the index is lower, especially if they experience symptoms.

Source: Air Health B.C., 2009.

Table 34: (En5) Air Quality Health Index in 13 BC Municipalities, 2000-2007

Station Location Name	2000	2001	2002	2003	2004	2005	2006	2007
Abbotsford Airport - Walmsley Road			4.9	0.2	3.3	0.5	1.3	3.7
Burnaby Kensington Park	5.6	4.2	4.9	4.5	5.5	5.0	4.6	4.2
Burnaby South	5.8	5.1	4.8	4.8	6.0	5.1	4.5	4.5
Langley Central	4.4	3.1	3.6	4.1	4.2	3.2	4.2	3.6
North Vancouver Mahon Park	5.8	4.3	6.3	4.6	5.5	4.8	4.7	4.0
Pitt Meadows Meadowlands Elementary School	5.5	3.4	3.8	3.8	3.9	3.5	4.3	3.4
Port Moody Rocky Point Park	5.3	3.8	3.6	4.4	5.8	4.4	4.4	4.0
Richmond South	5.9	5.6	4.4	4.5	5.6	4.5	5.0	4.4
Squamish	3.1		2.1	0.9	2.9	2.7	3.5	3.6
Surrey East	5.6	3.7	3.6	4.4	5.0	3.6	4.2	3.9
Vancouver International Airport #2	6.3	5.7	4.7	5.4	6.7	1.3	4.5	4.6
Vancouver Kitsilano	5.9	5.0	5.6	5.7	5.5	5.7	5.6	6.0
Whistler Meadow Park			2.4	0.2	4.9	3.3	4.6	6.5

Table 35: (En2) Metro Vancouver Annual Water Flow (millions of litres/year)

Municipality	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Vancouver	128,480	131,765	128,480	123,370	117,895	118,625	121,910	123,735	124,100	131,765
West Vancouver	8,760	8,760	8,760	8,395	9,490	9,490	10,220	9,125	8,760	9,490
North Van. Dist.	21,170	22,630	18,980	16,790	16,425	17,155	17,520	17,885	18,615	20,075
Richmond	34,310	33,580	33,945	33,215	33,945	35,405	36,865	36,865	36,135	39,420
UEL	7,300	6,935	6,935	7,300	6,935	6,935	7,300	7,300	6,935	6,935
<i>[total of these]</i>	<i>200,020</i>	<i>203,670</i>	<i>197,100</i>	<i>189,070</i>	<i>184,690</i>	<i>187,610</i>	<i>193,815</i>	<i>194,910</i>	<i>194,545</i>	<i>207,685</i>
<b>Total GVWD</b>	<b>374,125</b>	<b>390,915</b>	<b>381,790</b>	<b>374,490</b>	<b>365,000</b>	<b>379,235</b>	<b>392,375</b>	<b>392,375</b>	<b>387,995</b>	<b>420,115</b>

*(continued)*

Municipality	1999	2000	2001	2002	2003	2004	2005	2006	2007
Vancouver	125,925	126,655	124,830	133,225	132,860	131,035	128,845	125,195	120,815
West Vancouver	8,030	7,665	8,760	8,030	8,760	7,300	6,570	6,935	5,110
North Van. Dist.	18,250	17,885	18,615	19,710	18,250	18,250	17,155	17,520	15,330
Richmond	38,325	38,325	40,515	40,150	39,785	39,785	39,055	41,610	39,420
UEL	6,935	6,205	5,840	6,205	5,840	5,840	5,840	5,840	5,110
<i>[total of these]</i>	<i>197,465</i>	<i>196,735</i>	<i>198,560</i>	<i>207,320</i>	<i>205,495</i>	<i>202,210</i>	<i>197,465</i>	<i>197,100</i>	<i>185,785</i>
<b>Total GVWD</b>	<b>404,055</b>	<b>404,420</b>	<b>405,880</b>	<b>426,320</b>	<b>427,415</b>	<b>433,620</b>	<b>420,480</b>	<b>424,860</b>	<b>406,975</b>

Table 36: (En2) Metro Vancouver Annual Water Flow per Capita (thousands of litres/year)

Municipality	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Vancouver	271.50	275.63	264.56	249.51	235.03	231.42	232.53	230.63	227.55	239.38
West Vancouver	223.34	221.59	220.69	207.95	232.71	228.69	244.21	215.88	204.71	221.06
North Van. Dist.	279.71	295.69	246.09	212.94	204.01	209.50	213.58	214.40	220.18	236.05
Richmond	281.61	266.20	260.99	246.80	243.89	246.02	246.93	238.31	226.41	241.50
UEL	1,753.96	1,594.99	1,529.55	1,536.52	1,438.80	1,407.84	1,448.99	1,068.03	953.26	943.92
Total GVWD	252.57	257.13	243.57	230.95	219.61	221.33	221.65	216.49	209.41	222.58

(continued)

Municipality	1999	2000	2001	2002	2003	2004	2005	2006	2007
Vancouver	226.13	224.92	219.20	231.45	227.78	221.96	215.59	206.29	197.45
West Vancouver	186.64	178.14	202.64	185.54	201.70	168.48	148.90	156.48	115.88
North Van. Dist.	213.97	209.29	216.69	229.25	210.52	211.24	198.37	201.57	176.30
Richmond	230.57	227.75	236.22	231.05	225.95	223.43	216.02	227.19	211.22
UEL	934.26	792.87	747.19	793.88	707.62	703.61	679.07	539.19	411.07
Total GVWD	213.64	207.55	204.73	212.74	210.56	211.28	201.73	200.42	189.36

Table 37: (Ec2) Employment Indicators, BC, Alberta, Canada and the U.S.A, 2001 and 2006

	BC		Alberta		Canada		US	
	2001	2006	2001	2006	2001	2006	2001	2006
Global Activity Rate	65.2%	65.7%	73.1%	74.0%	66.4%	66.9%	73.1%	72.0%
Women in the Active Population	59.6%	60.8%	63.0%	67.7%	60.5%	61.8%	67.1%	66.1%
Unemployment Rate	8.5%	6.0%	3.7%	4.2%	7.4%	6.6%	4.7%	4.6%
Net Migration Rate	16.1%	12.3%	-0.1%	1.8%	7.4%	7.8%	4.6%	4.0%

Table 38: (Ec20) Dynamics of Service Activities, Canada and U.S.A., 2001 and 2006

	<u>Canada</u>		<u>U.S.</u>	
	2001	2006	2001	2006
Net balance of services (in the country's currency, mln.)	-5.0	-13.4	64.4	80.0
GDP (mln.)	896.5	1,201.0	10,075.9	13,132.9
Ratio of net balance of services to GDP	0.6%	1.1%	0.6%	0.6%

Table 39: (Ec23) Public Spending and Tax Revenue (millions of dollars) in BC, Alberta and Canada, 2001-2007

Year	BC			Alberta			Canada		
	Public spending	Proportion of GDP	Tax revenue	Spending	Proportion of GDP	Tax revenue	Spending	Proportion of GDP	Tax revenue
2001	27914	20.9%	28067	20671	13.9%	28594	184612	16.7%	193825
2002	29256	21.2%	27007	23504	16.2%	23078	184941	16.0%	192288
2003	28586	19.6%	26382	21427	12.5%	24471	189249	15.6%	190914
2004	28728	18.2%	28186	22519	11.8%	27098	197272	15.3%	199398
2005	28885	17.1%	32351	25082	11.4%	30324	207128	15.1%	212244
2006	30779	16.8%	34249	28232	11.8%	36915	215205	14.8%	224746
2007	33688	17.5%	36284	30548	11.8%	39407	223852	14.6%	231222
2008	36137	DNAA	36980	34661	DNAA	39582	237021	DNAA	250782

Table 40: (Ec3) Number of Enterprises by Size in Region, Province, Country, 2001 and 2006

Size (Number of employees)	Metro Vancouver		Squamish Lil'wat		BC		Canada		GTA		Ontario	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
Indeterminate	82,665	104,005	1,384	2,284	148,878	187,269	1,076,302	1,255,404	104,928	130,740	400,062	511,169
Percent of total	51.0%	54.7%	46.9%	56.9%	48.7%	52.7%	50.9%	54.0%	57.4%	62.8%	53.9%	58.9%
1 to 19	68,106	74,006	1,336	1,481	136,967	146,182	900,970	920,033	63,384	63,092	287,664	297,590
Percent of total	42.0%	38.9%	45.2%	36.9%	44.8%	41.2%	42.6%	39.6%	34.7%	30.3%	38.7%	34.3%
20 to 49	6,969	7,300	149	169	12,445	13,631	84,869	91,640	8,142	8,063	32,531	35,154
Percent of total	4.3%	3.8%	5.0%	4.2%	4.1%	3.8%	4.0%	3.9%	3.5%	3.1%	3.0%	2.8%
50+	4,395	4,762	85	82	7,179	7,996	54,461	58,466	6,312	6,392	22,337	23,875
Percent of total	2.7%	2.5%	2.9%	2.0%	2.4%	2.3%	2.6%	2.5%	3.5%	3.1%	3.0%	2.8%
<i>Total number of enterprises</i>	<i>162,135</i>	<i>190,073</i>	<i>2,954</i>	<i>4,016</i>	<i>305,469</i>	<i>355,078</i>	<i>2,116,602</i>	<i>2,325,543</i>	<i>182,766</i>	<i>208,287</i>	<i>742,594</i>	<i>867,788</i>

Table 41: (Ec7) Accommodation Infrastructure - Establishments and Beds, Metro Vancouver and B.C., 2001 and 2007

	<u>Number of Establishments</u>			<u>Number of Beds</u>			<u>Beds per</u>
	2001	2007	Change	2001	2007	Change	<u>Establishment</u>
							Change
<i>Metro Vancouver</i>							
Hotels Total	183	179	<b>-2.2%</b>	24,580	23,982	<b>-2.4%</b>	-0.3%
151+ Rooms	53	50	<b>-5.7%</b>	15,238	14,510	<b>-4.8%</b>	0.9%
76-150 Rooms	59	57	<b>-3.4%</b>	6,354	6,116	<b>-3.7%</b>	-0.4%
1-75 Rooms	71	72	<b>1.4%</b>	2,988	3,356	<b>12.3%</b>	10.8%
Motels	45	39	<b>-13.3%</b>	1,743	1,708	<b>-2.0%</b>	13.2%
Miscellaneous <sup>1</sup>	40	37	<b>-7.5%</b>	1,828	1,821	<b>-0.4%</b>	7.7%
<i>Total</i>	<i>268</i>	<i>255</i>	<i><b>-4.9%</b></i>	<i>28,151</i>	<i>27,511</i>	<i><b>-2.3%</b></i>	<i>2.7%</i>
<i>B.C.</i>							
Hotels Total	681	705	<b>3.5%</b>	57,288	59,024	<b>3.0%</b>	-0.5%
250+ Rooms	36	34	<b>-5.6%</b>	14,316	13,365	<b>-6.6%</b>	-1.2%
151-250 Rooms	48	49	<b>2.1%</b>	8,885	9,272	<b>4.4%</b>	2.2%
76-150 Rooms	180	194	<b>7.8%</b>	18,497	19,963	<b>7.9%</b>	0.1%
1-75 Rooms	417	428	<b>2.6%</b>	15,590	16,424	<b>5.3%</b>	2.6%
Motels	859	766	<b>-10.8%</b>	22,280	21,032	<b>-5.6%</b>	5.9%
Fishing lodges	168	159	<b>-5.4%</b>	1,859	1,958	<b>5.3%</b>	11.3%
Vacation Rentals	406	421	<b>3.7%</b>	7,978	9,206	<b>15.4%</b>	11.3%
Miscellaneous <sup>1</sup>	359	450	<b>25.3%</b>	7,611	9,494	<b>24.7%</b>	-0.5%
<i>Total</i>	<i>2,473</i>	<i>2,501</i>	<i><b>1.1%</b></i>	<i>97,016</i>	<i>100,714</i>	<i><b>3.8%</b></i>	<i>2.6%</i>

<sup>1</sup> Miscellaneous includes guest ranches; outfitting, adventure hunting and other types of outdoor adventure; lodges that cater to skiers, hikers, etc.; beds and breakfasts; and houseboats. Also includes universities, farms, etc that rent rooms whose primary activity is not renting rooms.

Source: B.C. Stats

Table 42: (Ec8) Accommodation Occupancy Rate, Metro Vancouver, GTA, B.C. and Canada, 2003 and 2007

	<u>Metro Vancouver</u>			<u>GTA</u>			<u>B.C.</u>			<u>Canada</u>		
	2003	2007	Change	2003	2007	Change	2003	2007	Change	2003	2007	Change
Occupied												
Rooms	6,547	9,992	52.6%	11,434	17,870	56.3%	12,192	15,939	30.7%	74,857	90,270	20.6%
Total												
Rooms	12,192	15,489	27.0%	24,380	27,878	14.3%	22,747	28,616	25.8%	142,856	172,271	20.6%
<b>Occupancy</b>												
<b>Rate</b>	<b>53.7%</b>	<b>64.5%</b>	<b>10.8 pts</b>	<b>46.9%</b>	<b>64.1%</b>	<b>17.2 pts</b>	<b>53.6%</b>	<b>55.7%</b>	<b>2.1 pts</b>	<b>52.4%</b>	<b>52.4%</b>	<b>0</b>

Source: Canadian Lodging Outlook HVS International - Canada (Smith Travel Research 2003, 2007).

Table 43: (Ec12) Hosting of International Events, Vancouver 2001-2007

Event Type	2001	2002	Total 2001/02	2006	2007	Total 2006/07	Total Change
Economic	69	68	<b>137</b>	80	59	<b>139</b>	1.5%
Social	40	41	<b>81</b>	97	66	<b>163</b>	101.2%
Environment	6	5	<b>11</b>	6	6	<b>12</b>	9.1%
Political	0	0	<b>0</b>	0	0	<b>0</b>	-
Olympic	3	1	<b>4</b>	0	4	<b>4</b>	-
Paralympic	0	0	<b>0</b>	0	1	<b>1</b>	100.0%
Confidential	3	2	<b>5</b>	30	36	<b>66</b>	1220.0%
Other	21	11	<b>32</b>	7	3	<b>10</b>	-68.8%
<i>Total</i>	<i>142</i>	<i>128</i>	<i><b>270</b></i>	<i>220</i>	<i>175</i>	<i><b>395</b></i>	<i><b>46.3%</b></i>

Table 44: (Ec9) Tourists to Vancouver, Calgary, and Toronto, 1998-2006

Coming from:	Vancouver				Calgary <sup>1</sup>		Toronto <sup>2</sup>	
	1998	2001	2004	2006	1998	2001	2004	2006
BC or AB, respectively <sup>3</sup>	2,364,684	2,508,391	2,613,992	2,685,193	3,200,000	2,700,000	2,200,000	-
Percent of total	30.1%	30.0%	30.7%	30.9%	59.0%	52.4%	52.5%	-
Other Canada	2,209,801	2,261,858	2,338,148	2,506,060	1,400,000	1,600,000	1,330,000	-
Percent of total	28.1%	27.1%	27.4%	28.8%	26.0%	31.0%	31.7%	-
<i>Canada total</i>	<i>4,574,485</i>	<i>4,770,249</i>	<i>4,952,140</i>	<i>5,191,253</i>	<i>4,600,000</i>	<i>4,300,000</i>	<i>3,530,000</i>	<i>6,510,000</i>
<i>Percent of total</i>	<i>58.2%</i>	<i>57.1%</i>	<i>58.1%</i>	<i>59.7%</i>	<i>84.6%</i>	<i>83.5%</i>	<i>84.2%</i>	<i>65.2%</i>
International	3,290,980	3,576,904	3,571,164	3,499,672	840,000	850,000	660,000	3,490,000
Percent of total	41.8%	42.9%	42.0%	40.3%	15.4%	16.5%	15.8%	34.9%
<b>Total</b>	<b>7,865,465</b>	<b>8,347,153</b>	<b>8,523,304</b>	<b>8,692,925</b>	<b>5,440,000</b>	<b>5,150,000</b>	<b>4,190,000</b>	<b>9,990,000</b>
								<b>9,850,000</b>
								<b>10,540,000</b>

<sup>1</sup> Numbers of tourists to Calgary are approximations due to rounding.

<sup>2</sup> Toronto tourists are classified as domestic versus international in the source document.

<sup>3</sup> B.C. for Vancouver, Alberta for Calgary.

Table 45: Summary of Olympic Games Impact Attribution, by Bundle and Indicator

	Attribution Box Score		
	Impact Score	Reliability Weight	Conclusivity
<b>Pre-Event Socio-Cultural OGI</b>	<b>0.9</b>	<b>0.6</b>	<b>0.9</b>
<b>Socio-Cultural Bundle 1. Progress in Elite Amateur Sport in Canada</b>	<b>2</b>	<b>0.8</b>	<b>1</b>
So19 Results at Olympic/Paralympic Games and World Championships	2	0.8	1
So16 Top-level Sportsmen and Women	2	0.8	1
<b>Socio-Cultural Bundle 2. Health and Physical Activity</b>	<b>0</b>	<b>0.5</b>	<b>1</b>
So9 Health	0	0.8	1
So10 Nutrition	0	0.6	1
So13 School Sports	0	0.2	1
<b>Socio-Cultural bundle 3. Host City Image: Select Foci</b>	<b>-0.5</b>	<b>0.4</b>	<b>0.7</b>
So31 Homeless, Low-rent Market and Affordable Housing		0.4	0
So43 Host City Media Image	-1	0.6	1
En24 Olympic Induced Housing	1	0.2	1
<b>Pre-Event Environmental OGI</b>	<b>-0.1</b>	<b>0.9</b>	<b>0.9</b>
<b>Environmental Bundle 1. Land Use for Leisure</b>	<b>0</b>	<b>0.9</b>	<b>1</b>
En6 Land-Use Changes	0	1	1
En10 Pubic Open-Air Leisure (POAL) Areas	0	0.8	1
En7 Protected Sites	0	1	1
<b>Environmental Bundle 2. Transportation and Well-Being</b>	<b>0</b>	<b>0.8</b>	<b>0.7</b>
En11 Transport Networks	0	0.8	1
En12 Daily Travelling Distance		0.8	0
En13 Traffic Congestion	0	0.8	1
<b>Environmental Bundle 3. Air and Water</b>	<b>-0.3</b>	<b>0.9</b>	<b>1</b>
En2 Public Water Supply	0	1	1
En4 Greenhouse Gas Emissions	0	1	1
En5 Air Quality	-1	0.8	1
<b>Pre-Event Economic OGI</b>	<b>0.5</b>	<b>0.7</b>	<b>0.8</b>
<b>Ec Bundle 1. Economic Activity</b>	<b>0.3</b>	<b>0.8</b>	<b>0.8</b>
Ec2 Employment Indicators	0	0.8	1
Ec3 Size of Companies	1	0.8	1
Ec23 Economic Role of the State	0	1	1
Ec20 Dynamics of Service Activities		0.6	0
<b>Ec Bundle 2. Tourism</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>
Ec7 Accomodation Infrastructure	0	0.8	1
Ec8 Accommodation Occupancy Rate		0.4	0
Ec9 Tourist Nights	0	0.6	1
Ec12 Hosting of International Events	2	0.8	1
<b>Overall Pre-Event OGI Outcome<sup>1</sup></b>	<b>0.4</b>	<b>0.7</b>	<b>0.8</b>

<sup>1</sup> The quantitative Overall Pre-Event OGI Outcome does not include the following four indicators: **Ec44 Employability of People with Disabilities, So44 Perceptions about People with Disabilities in Society, So46 Professional Sport Education for People with Disabilities and So48 Accessibility of Public Services**. These four indicators *could not be quantitatively analyzed* due to lack of data but were *qualitatively addressed* in the Report in the form of expert opinion. As such, no quantitative attribution score evaluation is offered for them.

Table 46: Summary of Olympic Games Impact Attribution

	Attribution Box Score		
	Impact Score	Reliability Weight	Conclusivity
Pre-Event Socio-Cultural OGI	0.9	58%	89%
Pre-Event Environmental OGI	-0.1	89%	89%
Pre-Event Economic OGI	0.6	70%	71%
<b>Overall Pre-Event OGI Outcome</b>	<b>0.4</b>	<b>72%</b>	<b>83%</b>

Impact Score Ranges
2 positive impact
1 slightly positive impact
0 neutral/no impact
-1 slightly negative impact
-2 negative impact

## Figures

Figure 2: Percentage of Canadians Living in Cities (1901-2006)

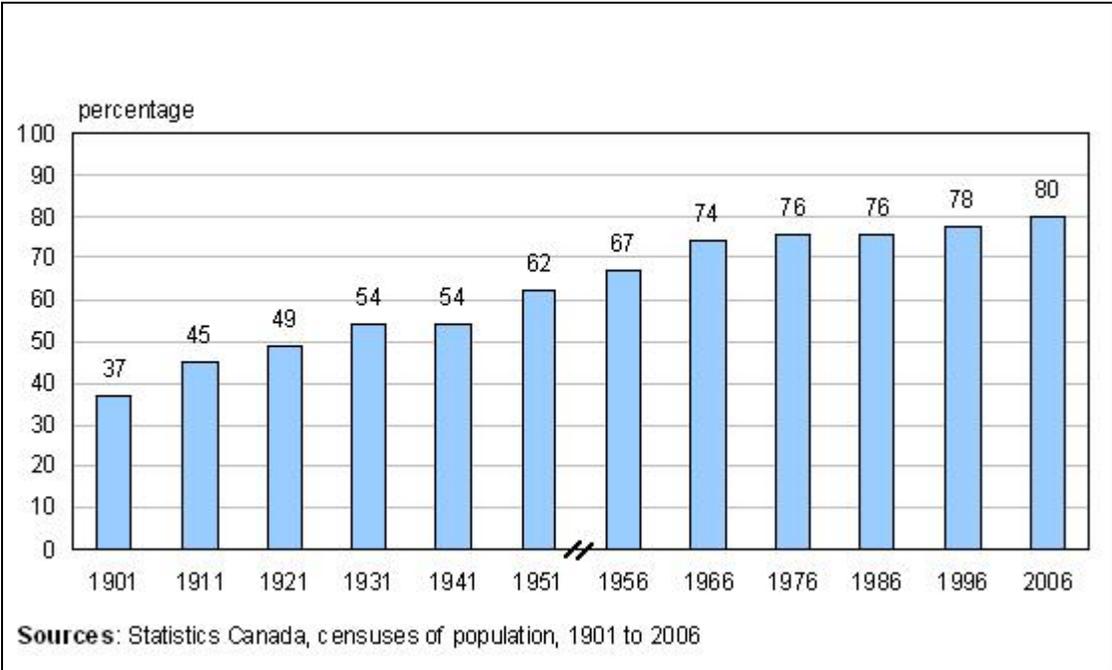


Figure 3: Greater Vancouver Regional District Boundaries

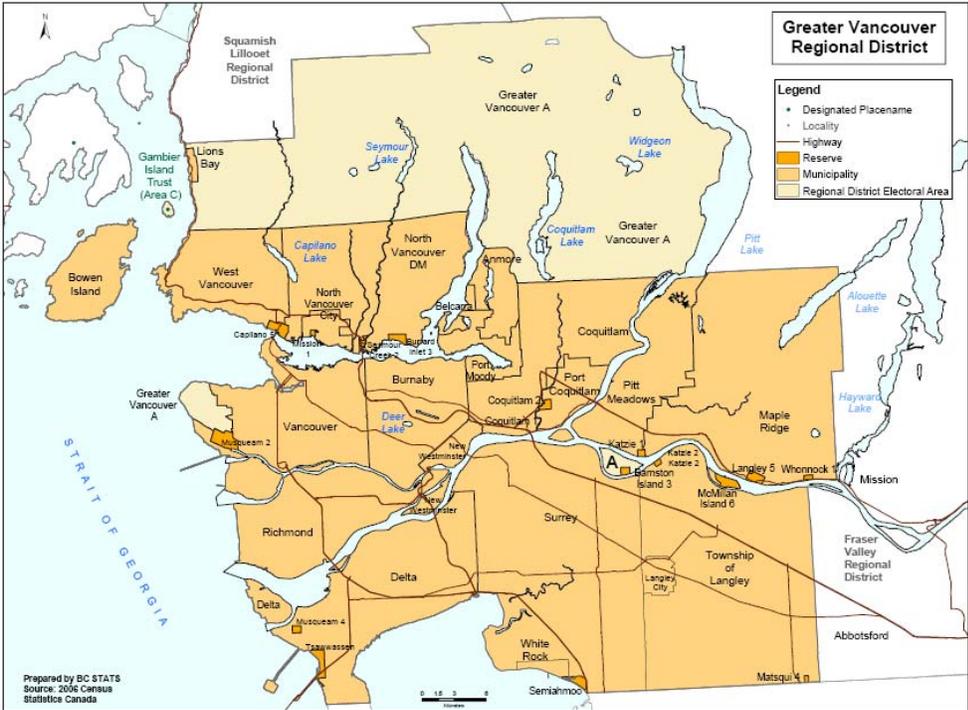


Figure 4: Squamish-Lillooet Regional District

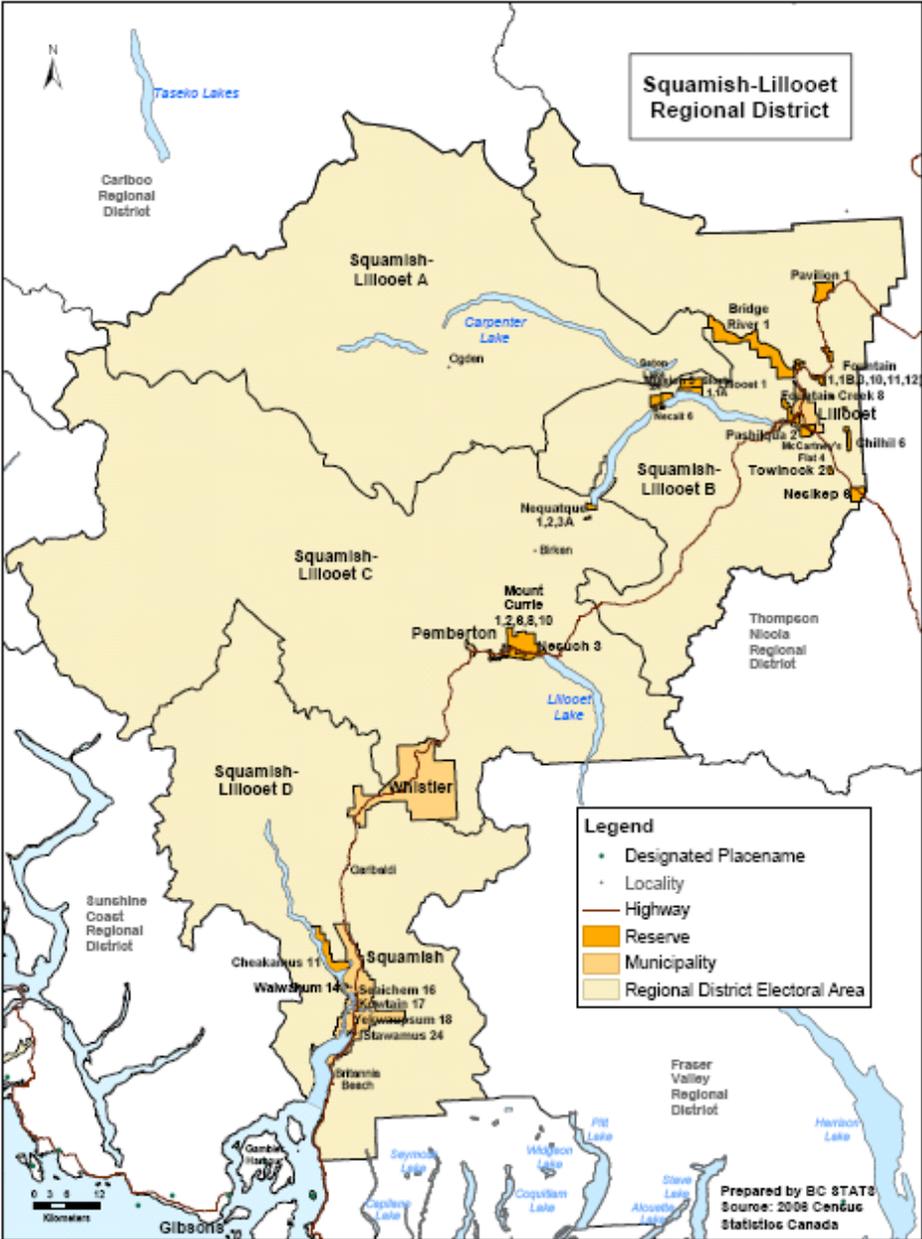


Figure 5: (So9) Birth and Death Rates, Vancouver 2001-2007

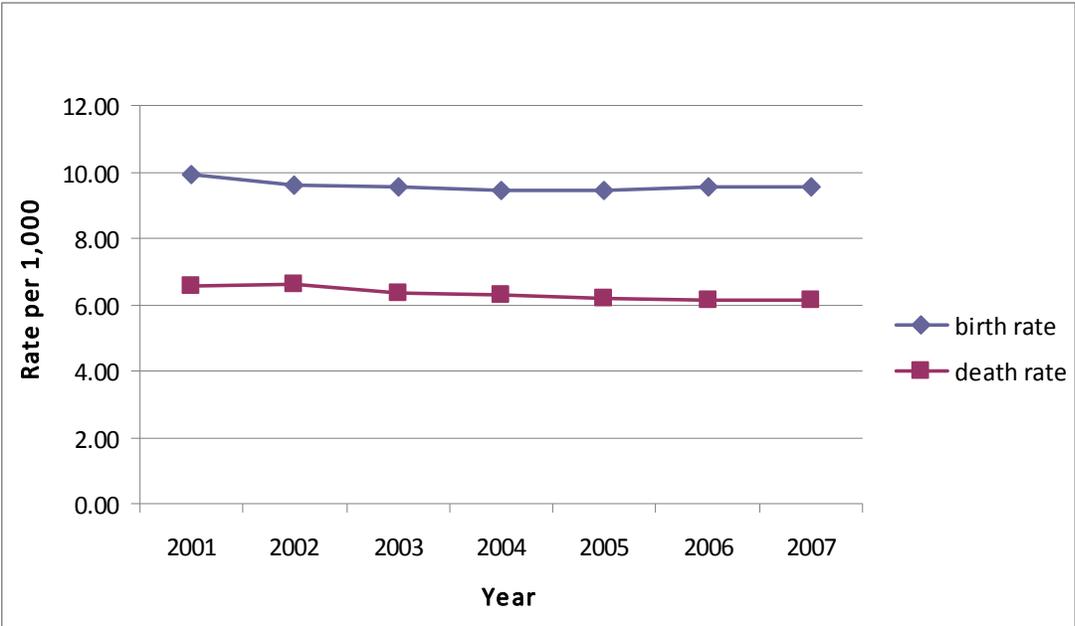


Figure 6: (So9) Birth and Death Rates, BC and Alberta, 2000-2006

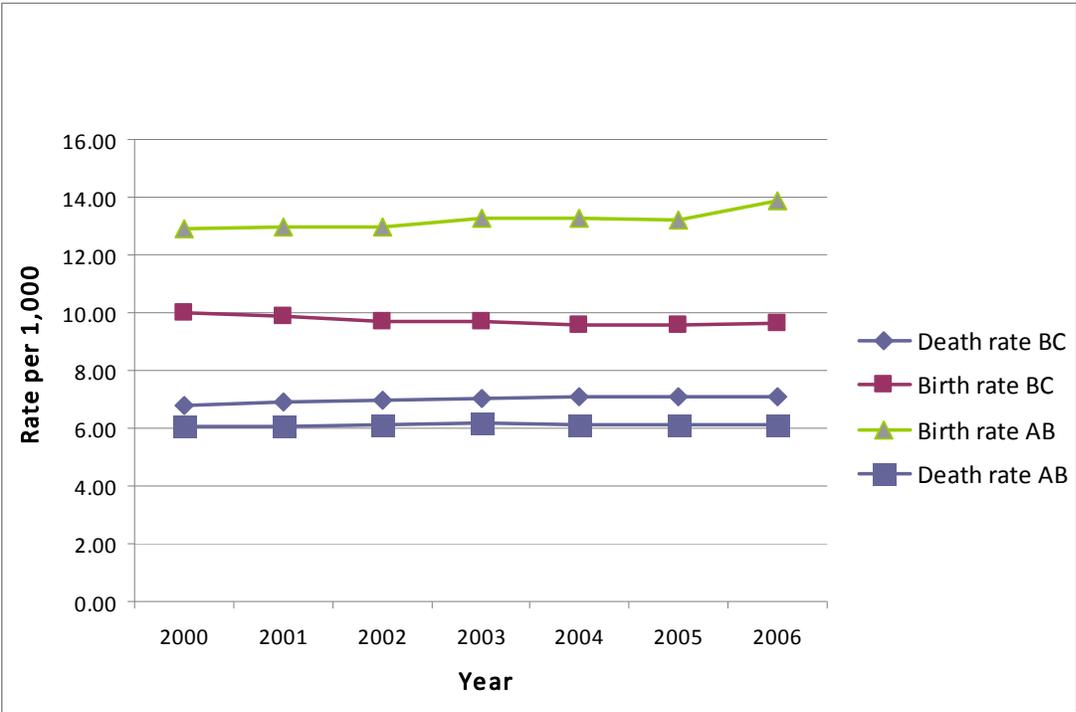


Figure 7: (So9) Birth and Death Rates, Canada and the US, 2000-2006

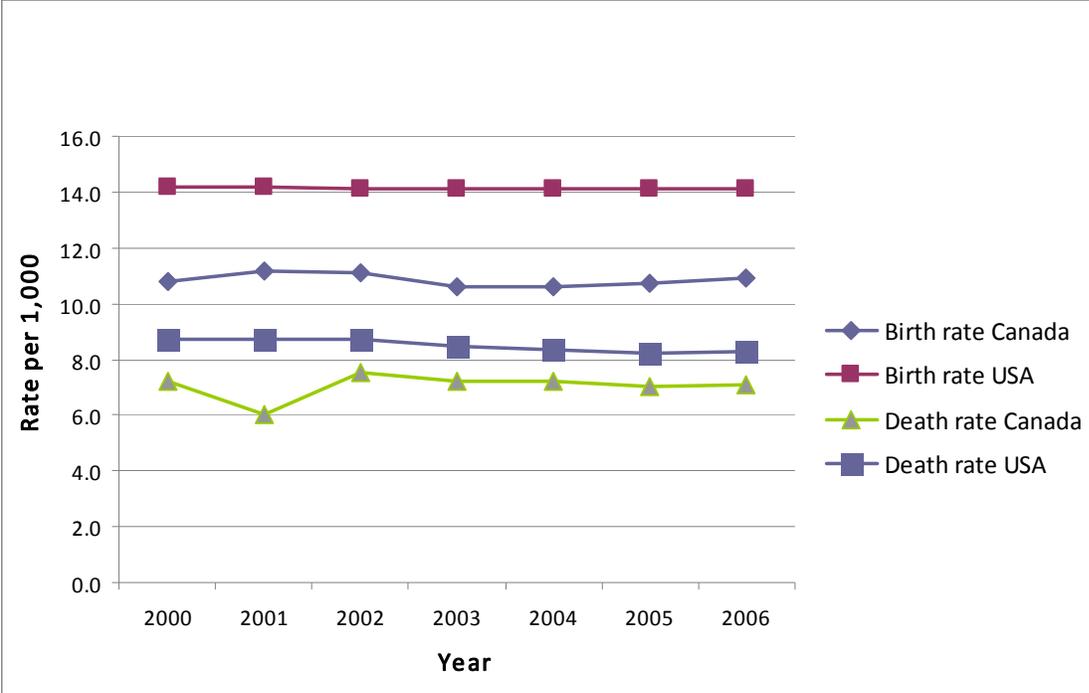


Figure 8: (En11) Annual Transit Supply (km)

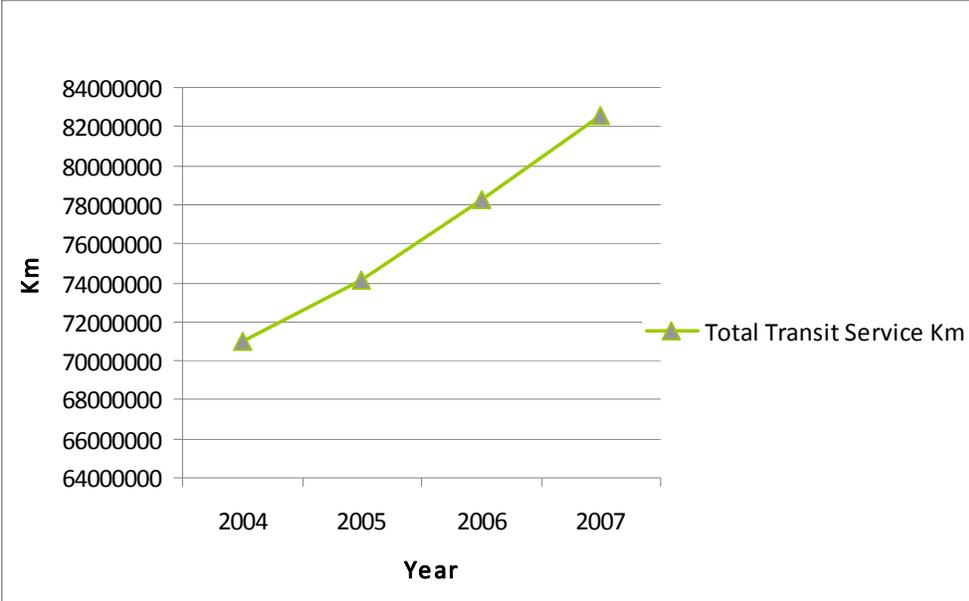


Figure 9: (En12) Median Commute Distance, Vancouver, BC and Canada, 1996-2006

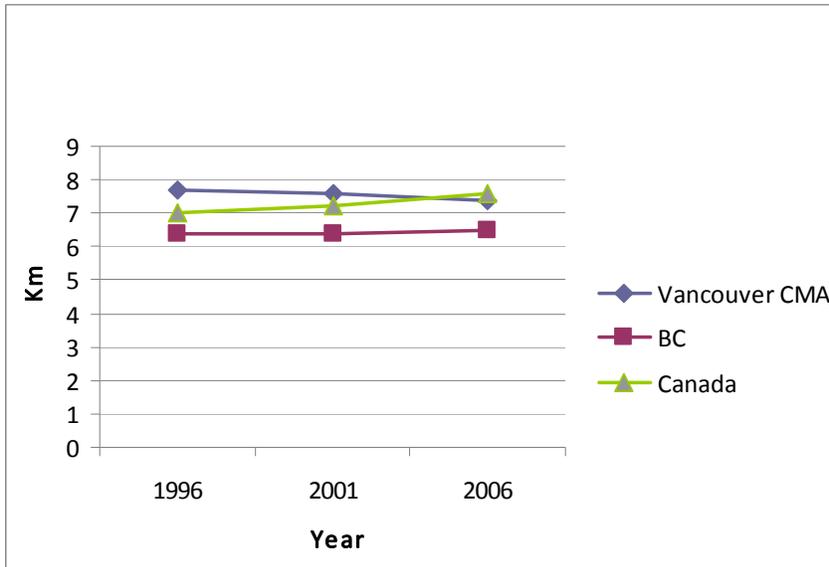


Figure 10: (En12) Total Commuters by Day by Place of Work, 2001, 2006

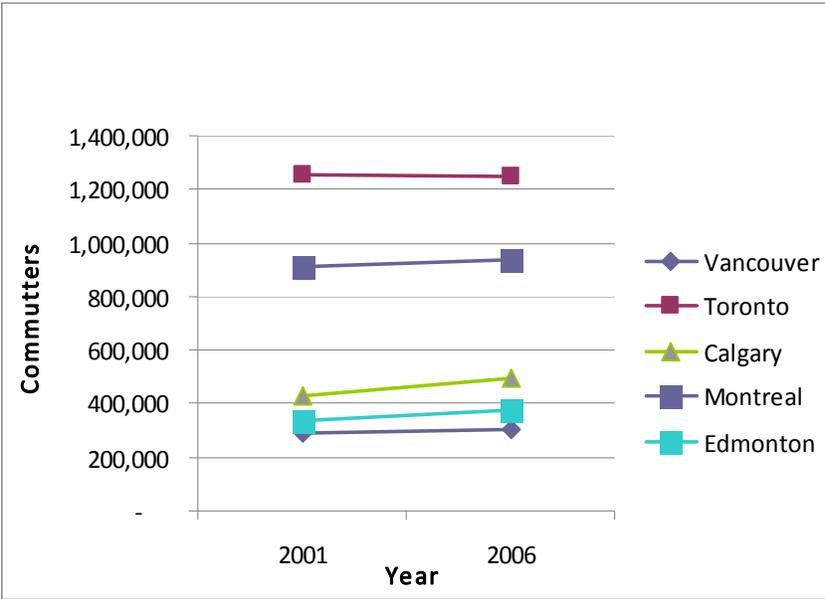


Figure 11: Traffic Speed-Flow Relationship

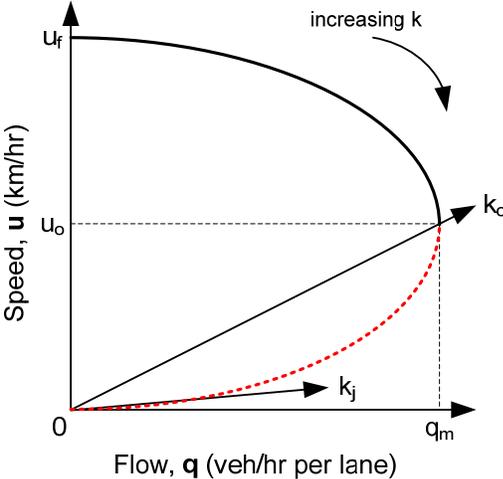
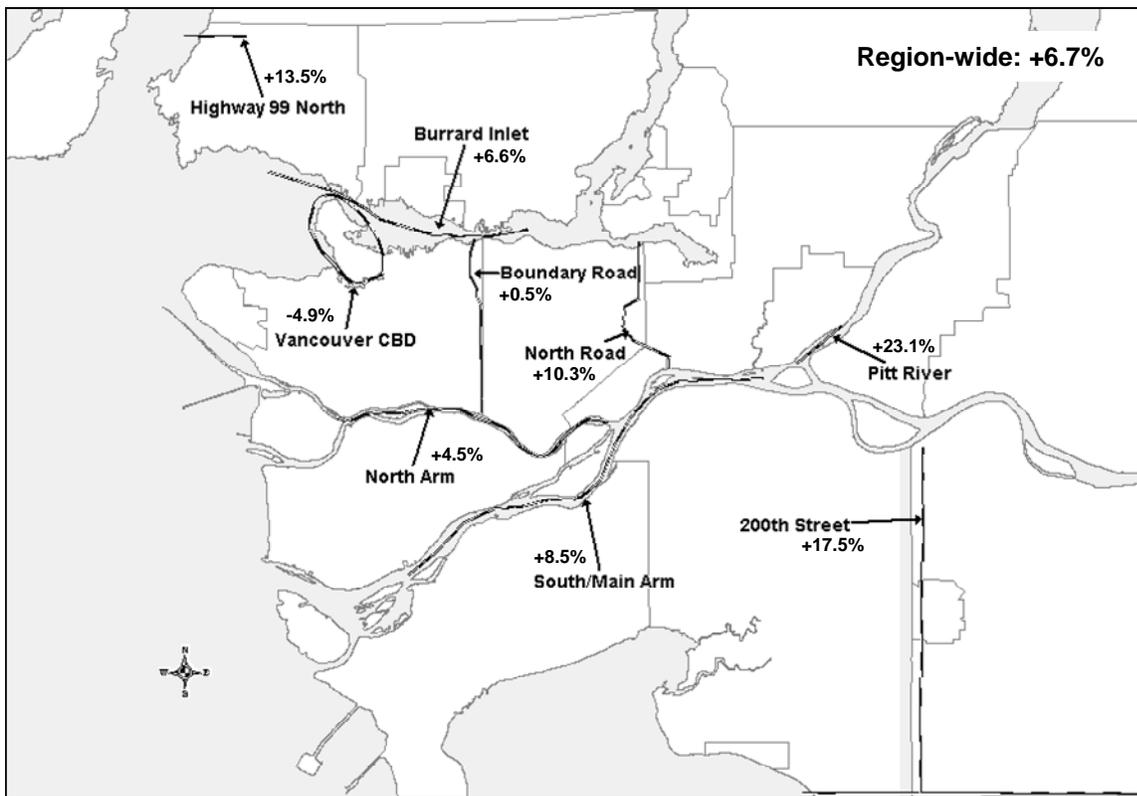


Figure 12: (En13) Location of Select Major Regional Screenlines and Percent Changes Between 1996 and 2004



Adapted from Translink's Summary and Results of the 2004 Greater Vancouver Screenline Survey ([http://www.translink.bc.ca/files/board\\_files/meet\\_agenda\\_min/2006/05\\_24\\_06/4.15report.pdf](http://www.translink.bc.ca/files/board_files/meet_agenda_min/2006/05_24_06/4.15report.pdf)) (accessed April 3, 2009).

Figure 13: (En13) 24-hour change in traffic across the Downtown Peninsula Screenline

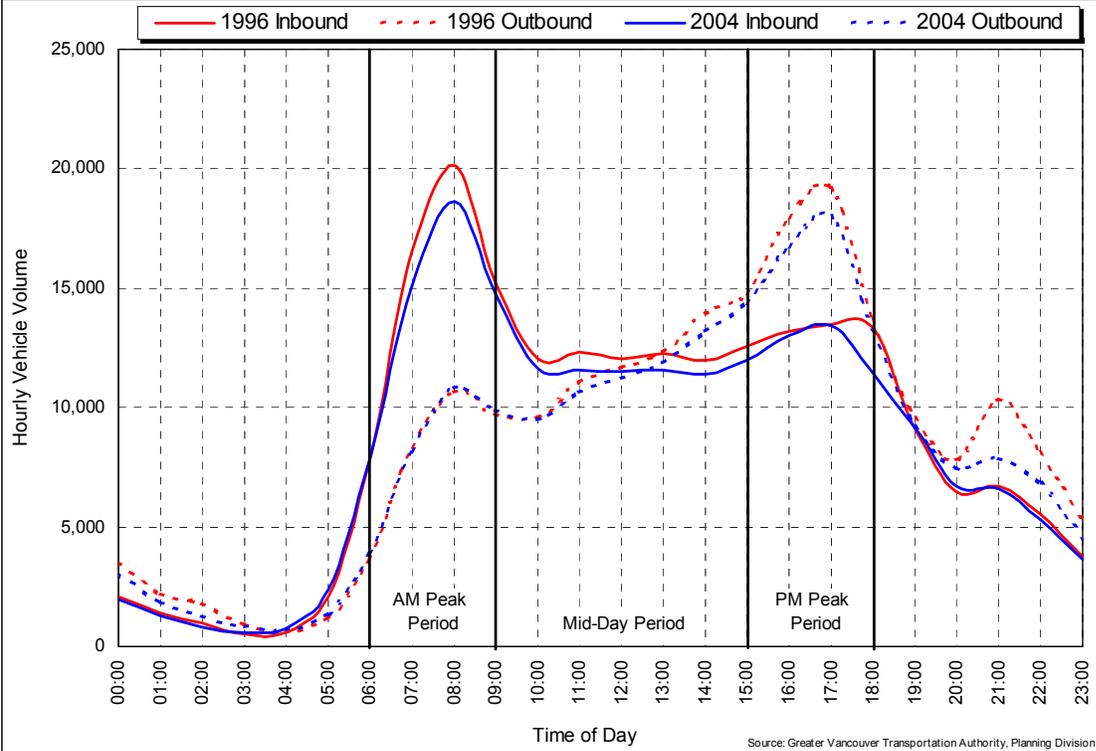


Figure 14: (En4) Greenhouse Gas Emissions, Canada, 2000-2006 (Including Close-up)

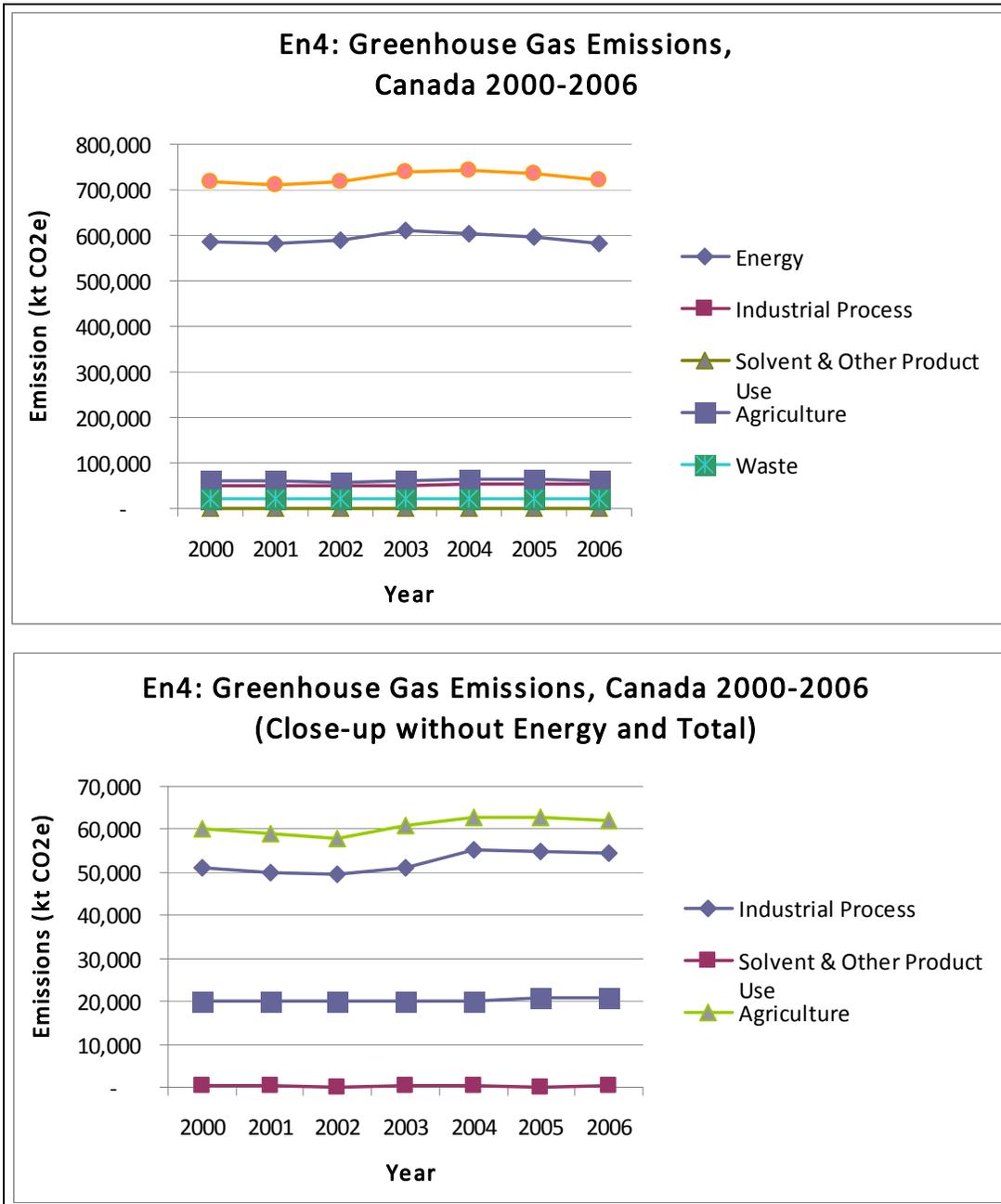


Figure 15: (En4) Greenhouse Gas Emissions, B.C., 2000-2006 (Including Close-up)

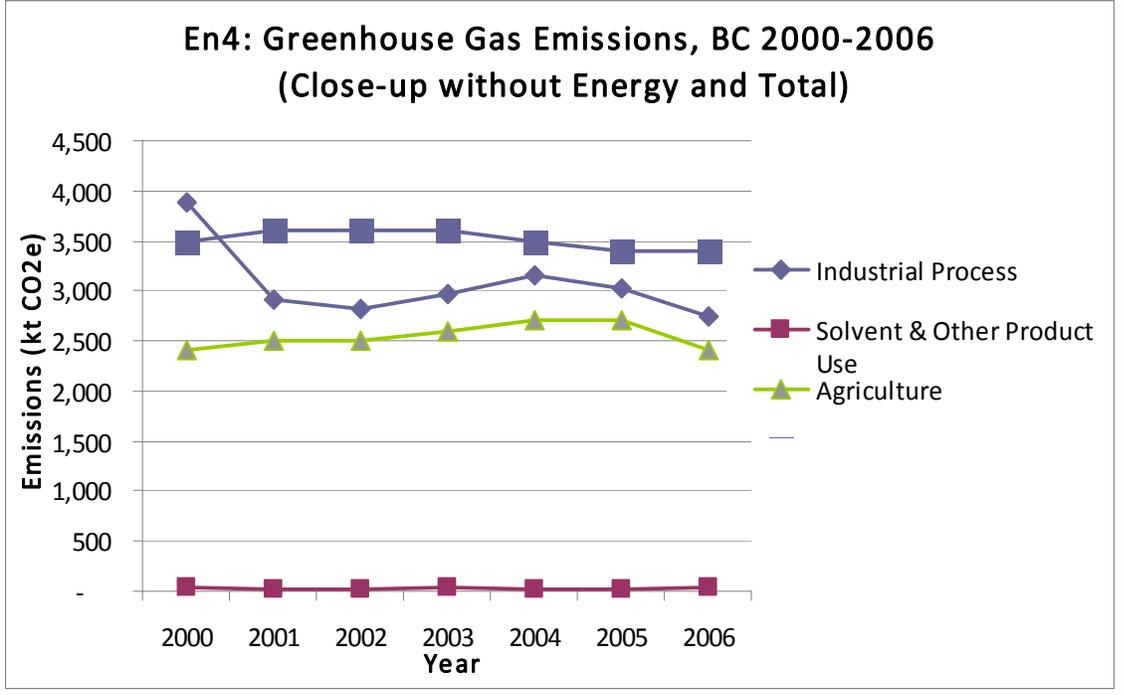
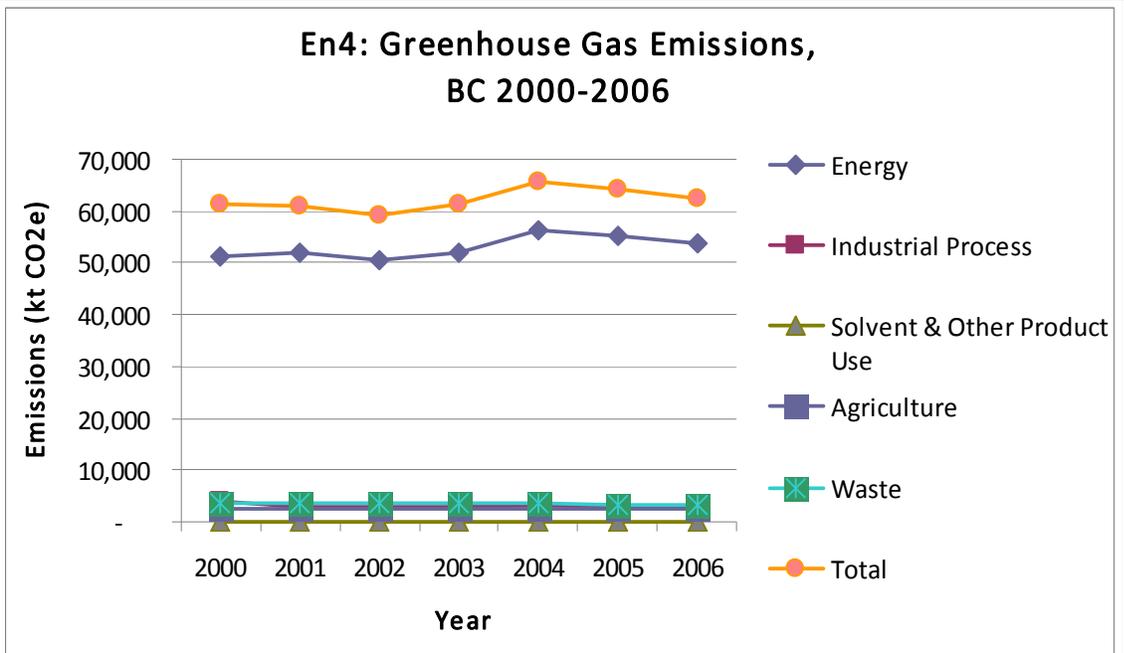


Figure 16: (En5) Air Quality Health Index in 11 B.C. Municipalities, 2000-2007

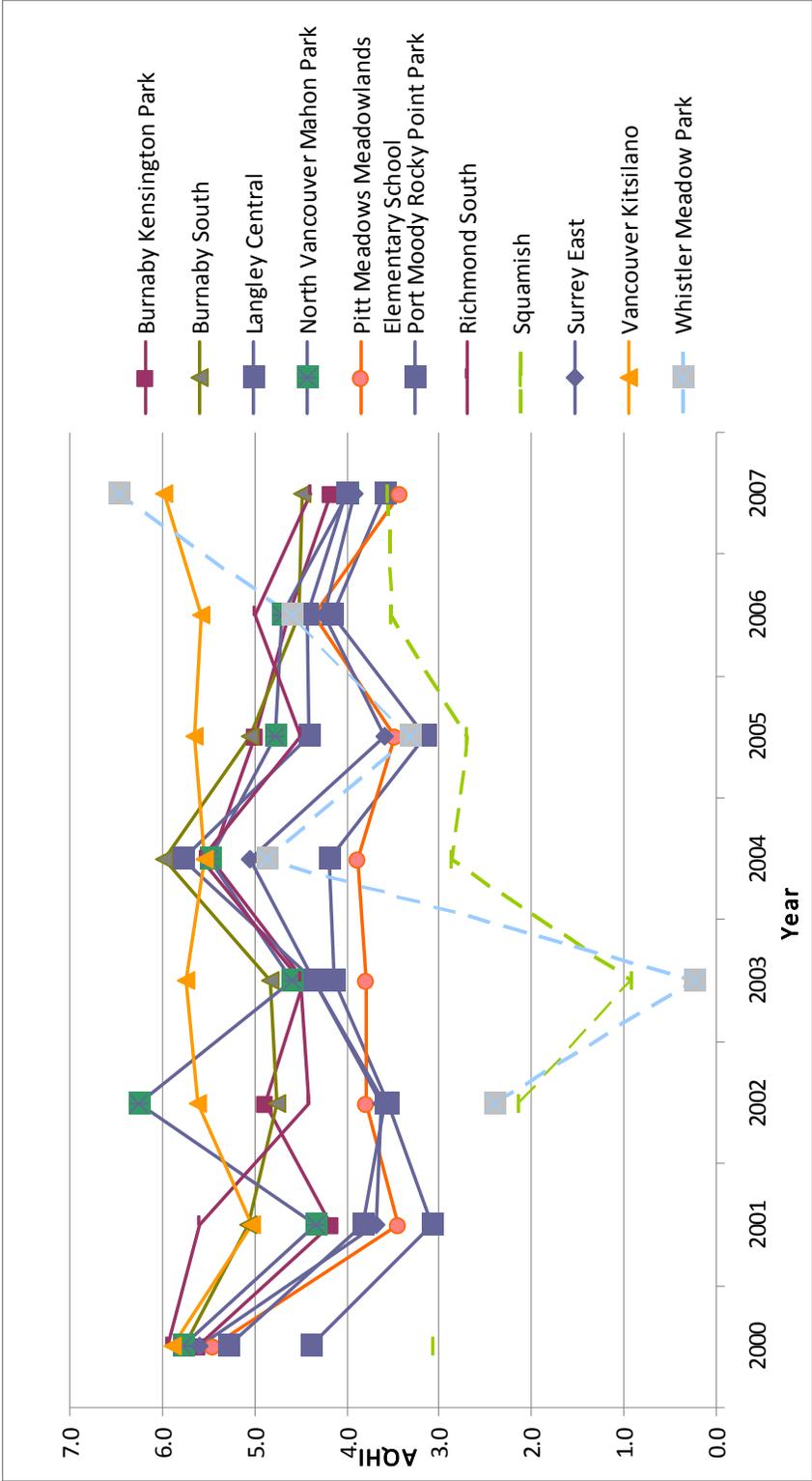


Figure 17: (En2) Metro Vancouver Annual Water Flow (Millions of Litres Per Year)

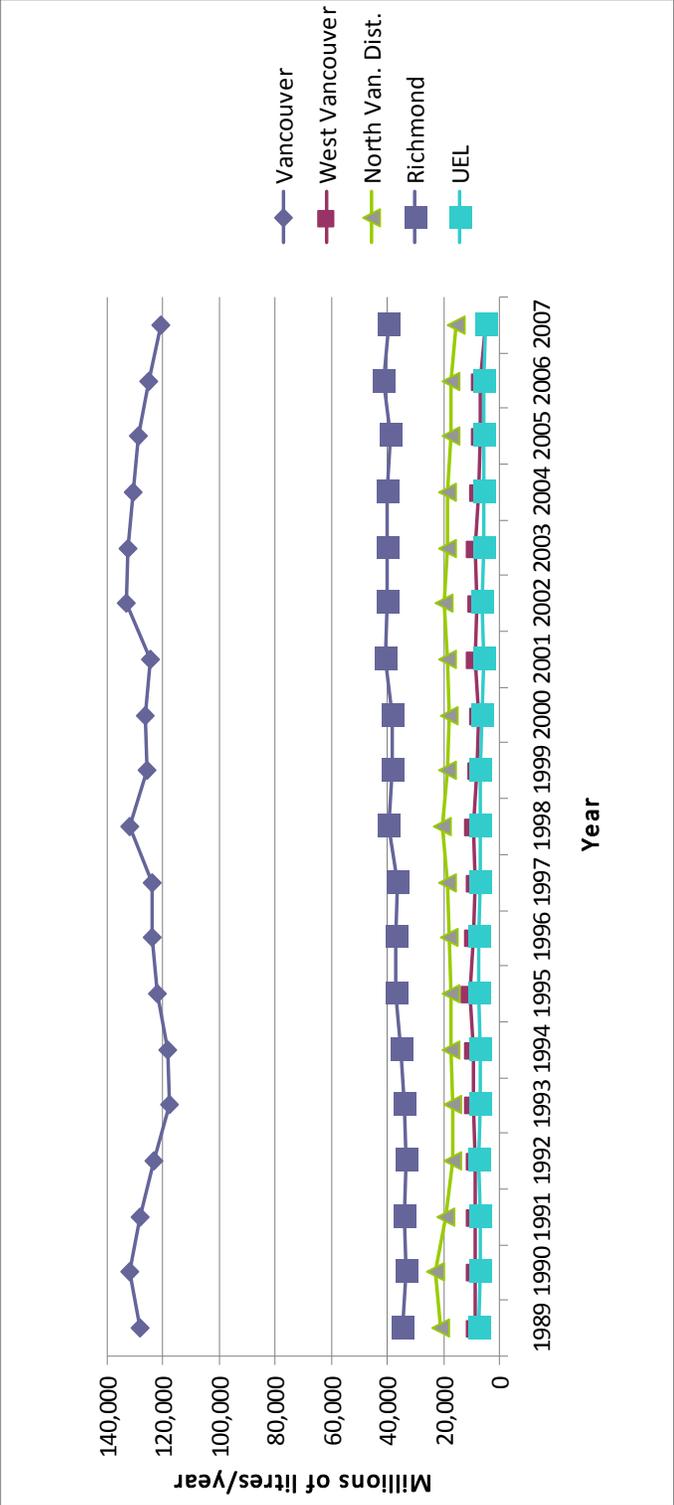


Figure 18: (En2) Metro Vancouver Annual Water Flow per Capita (thousands of litres/year)

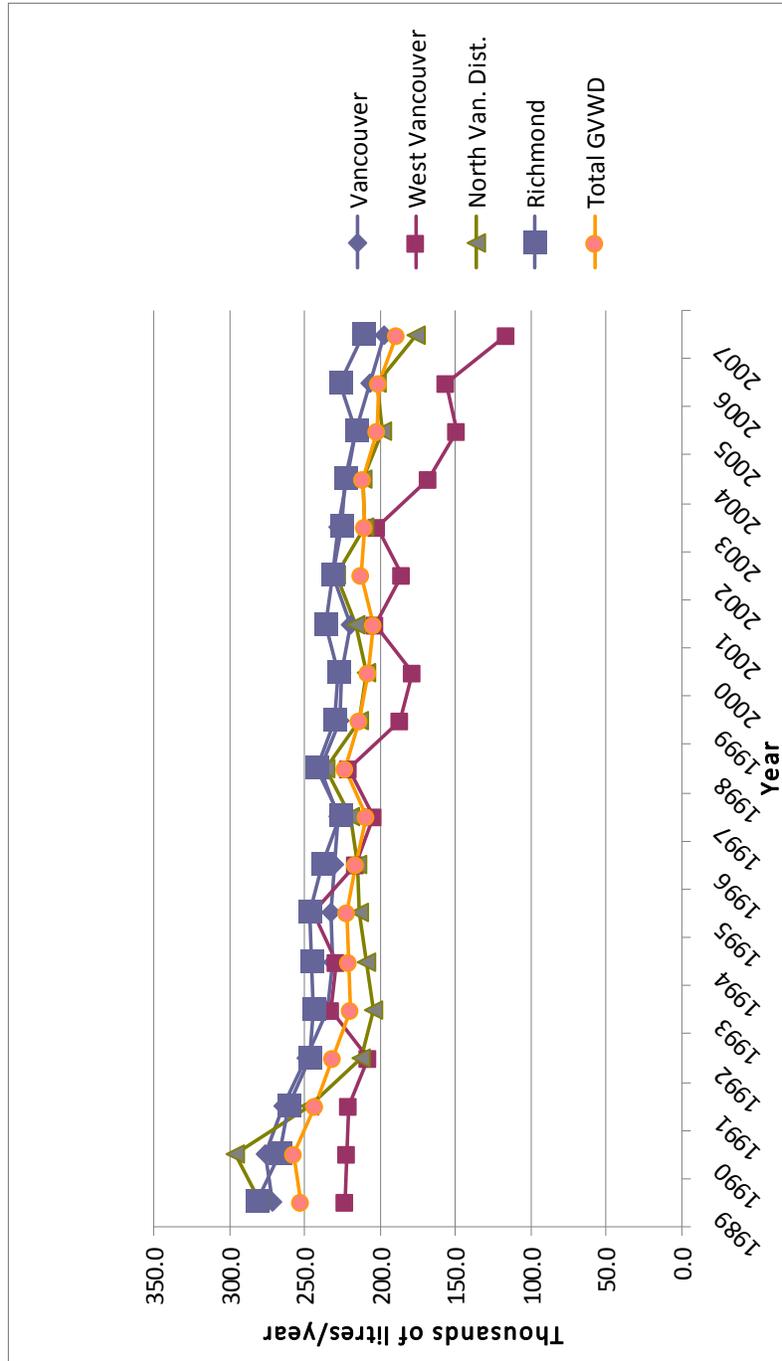


Figure 19: (Ec23) Public Spending and Tax Revenue as a Proportion of GDP in BC, Alberta and Canada, 2001-2007

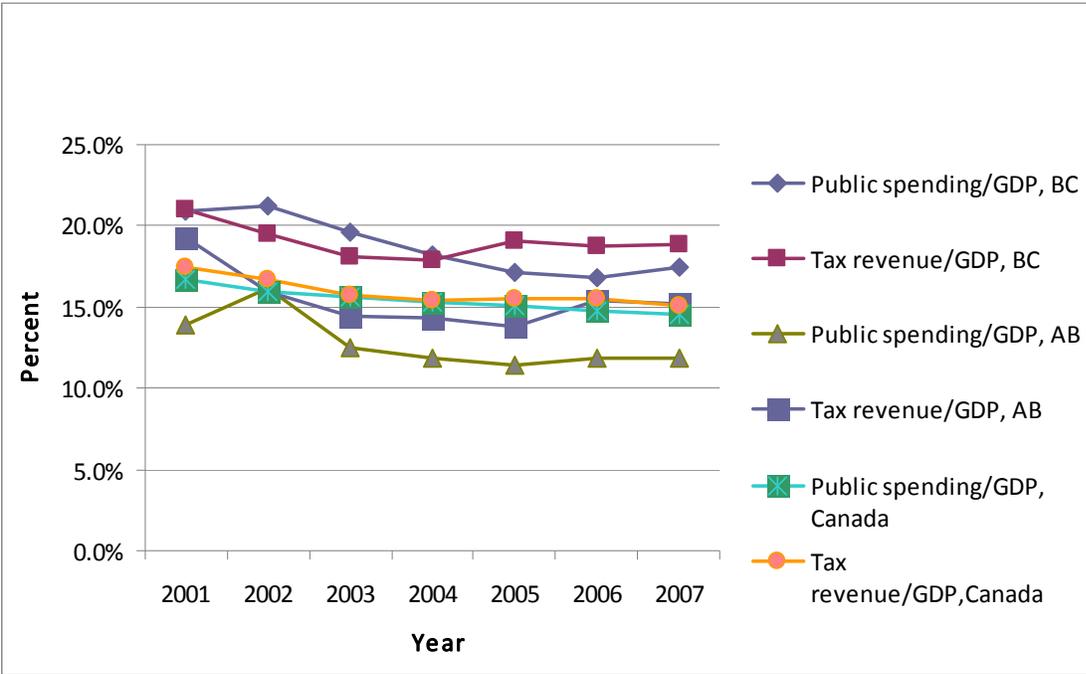


Figure 20: (Ec23) Budget Balance (millions of dollars) of BC, Alberta and Canada, 2001-2007

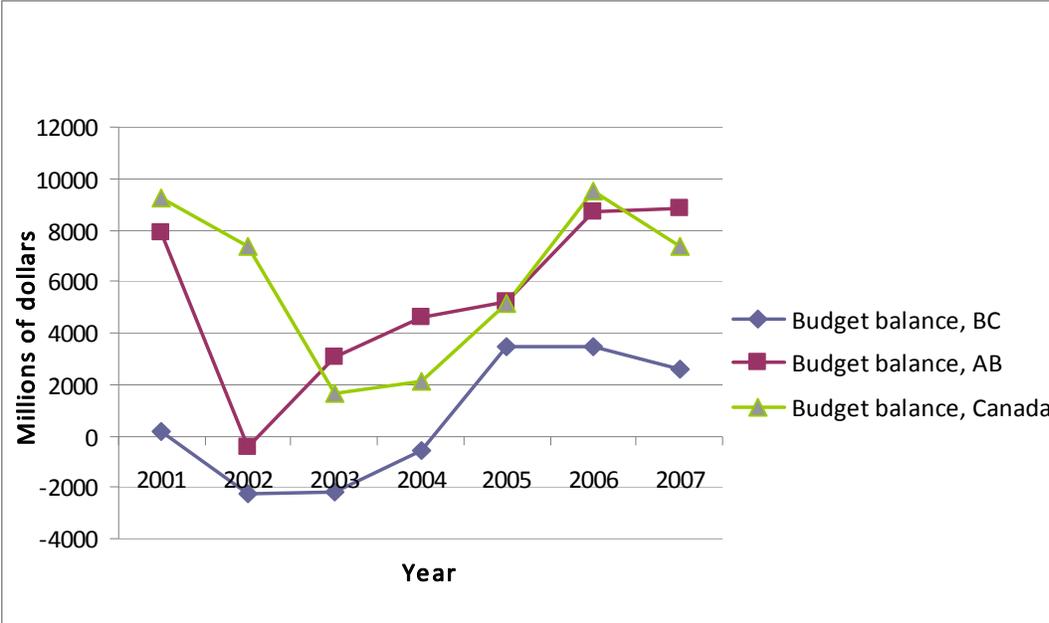


Figure 21: (Ec23) Public Spending and Tax Revenue in Canada, BC and Alberta, 2001-2007 (millions of dollars)

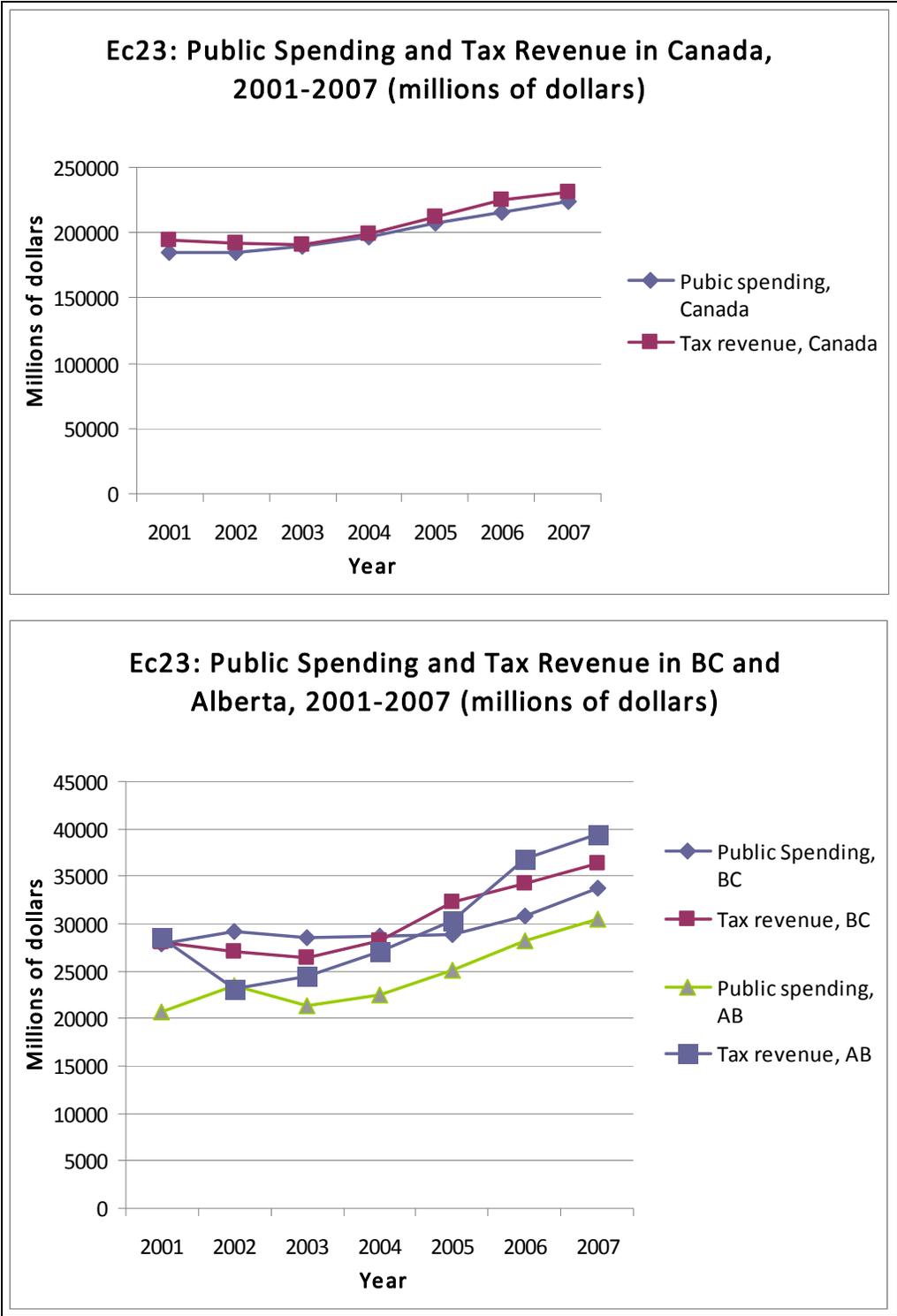
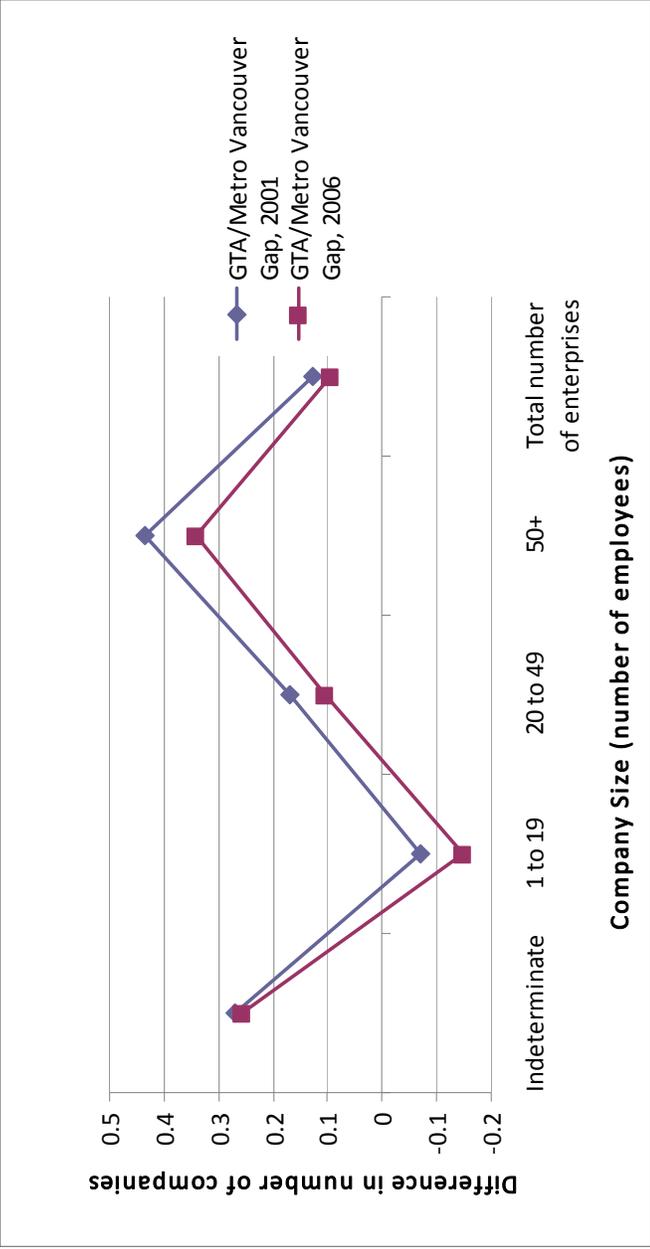


Figure 22: (Ec3) Gap Between GTA and Metro Vancouver's Number of Companies by Size, 2001 and 2006



**One-pager Summary Sheets for Selected Indicators  
(Analysis Possible But Inconclusive at Pre-Games)**

So1	Political Representation											
a) Data Discussion												
<p>The indicator accounts for the political representation at city and provincial level. It also gives insight into the position of women in the political life in the region (data on minority representation are unavailable). Vancouver City Council has both executive and legislative powers. There are no Opposition Party members elected to the Executive Council of the Government of British Columbia. Data provided are for election years.</p>												
b) Data Presentation												
So1 Political Representation, Vancouver (2002-2008) and B.C. (2001-2005)												
Party	<i>Vancouver Legislative Level - Local Elected Officials</i>											
	2002			2005			2008					
	Women	Men	<b>Total</b>	Women	Men	<b>Total</b>	Women	Men	<b>Total</b>			
COPE	2	7	<b>9</b>	0	1	<b>1</b>	1	1	<b>2</b>			
NPA	0	2	<b>2</b>	3	3	<b>6</b>	1	0	<b>1</b>			
VISION	-	-	<b>-</b>	1	3	<b>4</b>	3	5	<b>8</b>			
Totals	2	9	<b>11</b>	4	7	<b>11</b>	5	6	<b>11</b>			
	<i>B.C. Executive Level</i>						<i>B.C. Legislative Level - Provincial Elected Officials</i>					
	2001			2005			2001			2005		
	Women	Men	<b>Total</b>	Women	Men	<b>Total</b>	Women	Men	<b>Total</b>	Women	Men	<b>Total</b>
Governing												
Party - Liberals	5	21	<b>26</b>	5	19	<b>24</b>	18	59	<b>77</b>	10	35	<b>45</b>
Opposition - NDP	-	-	<b>-</b>	-	-	<b>-</b>	2	0	<b>2</b>	7	25	<b>35</b>
Totals	5	21	<b>26</b>	5	19	<b>24</b>	20	59	<b>79</b>	17	60	<b>77</b>
<p>Source: City of Vancouver's Clerk Department (2002, 2005); Elections B.C. (2001); Legislative Assembly of B.C. (2008); Legislative Library of B.C. (2002); City of Vancouver Elections (2008).</p>												
c) Data Analysis												
<p>The Vancouver City Council consists of the Mayor plus ten councillors elected to serve a 3-year term. The majority political representation in the Vancouver City Council shifted from COPE (Coalition of Progressive Electors, left-centre-left) in 2002 to NPA (Non-Partisan Association, centre-right) in 2005, to Vision Vancouver in 2008. Vision Vancouver is a centre-left civic party formed in 2005 by former COPE members who were elected as city councillors in 2002. During this period, the ratio of women to men increased to its current nearly equal (five to six) status.</p> <p>The British Columbia Liberal Party is the current (May 2009) governing party of B.C., and has been in power since 2001. The British Columbia New Democratic Party (NDP) is the Opposition, and was in power from 1991-2001. The NDP has gained new support (and seats) in recent years. It is important to note that as of 2009, the Executive Council of the Government of B.C. consists of the Premier and 21 ministers (<a href="http://www.gov.bc.ca/premier/cabinet_ministers/">http://www.gov.bc.ca/premier/cabinet_ministers/</a>), as two ministries have been consolidated. The Legislative Assembly of B.C. now consists of 85 ridings (seats). The representation of women in the executive and legislative levels of government in B.C. is not as strong as at the city level, with women comprising about a quarter of the Executive Council membership and less than a third of the Legislative Assembly members in 2005. At the time of writing, the Legislative Assembly was dissolved (April 14, 2009), and a provincial general election called for May 12, 2009.</p>												

d) Findings and Recommendations

It is unlikely that the 2010 Winter Games played a role in the NDP's resurgence, or in either the NPA or Vision's rise to power. Because the various parties have been supportive of the 2010 Winter Games, it is unlikely that an incumbent party would lose favour with voters.

So5	Minorities																												
<b>a) Data Discussion</b>																													
<p>The indicator reports the population of visible ethnic minorities (excluding Aboriginal) and Aboriginal minorities in the Vancouver Census Metropolitan Area (CMA). These were the only data dimensions that were suitable for analysis in terms of data availability. Data for other dimensions specified by the Technical Manual were missing, suspect or inconsistent.</p>																													
<b>b) Data Presentation</b>																													
<p><b>So5 Minorities: Population and Percentage of Visible and Aboriginal Minorities, Vancouver Census Metropolitan Area, 2001-2006</b></p>																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 15%;">2001</th> <th style="width: 15%;">2006</th> <th style="width: 10%;">Change</th> </tr> </thead> <tbody> <tr> <td colspan="4"><i>Ethnic minorities</i></td> </tr> <tr> <td>Population of visible minorities</td> <td style="text-align: right;">725,655</td> <td style="text-align: right;">875,300</td> <td style="text-align: right;">20.6%</td> </tr> <tr> <td>Percentage of the general population</td> <td style="text-align: right;">36.9%</td> <td style="text-align: right;">41.7%</td> <td style="text-align: right;">4.8 pts</td> </tr> <tr> <td colspan="4"><i>Aboriginal minorities</i></td> </tr> <tr> <td>Population of Aboriginal identity</td> <td style="text-align: right;">36,860</td> <td style="text-align: right;">40,310</td> <td style="text-align: right;">9.4%</td> </tr> <tr> <td>Percentage of the general population</td> <td style="text-align: right;">1.9%</td> <td style="text-align: right;">1.9%</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>			2001	2006	Change	<i>Ethnic minorities</i>				Population of visible minorities	725,655	875,300	20.6%	Percentage of the general population	36.9%	41.7%	4.8 pts	<i>Aboriginal minorities</i>				Population of Aboriginal identity	36,860	40,310	9.4%	Percentage of the general population	1.9%	1.9%	-
	2001	2006	Change																										
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<p>Source: Statistics Canada (2001, 2006).</p>																													
<b>c) Data Analysis</b>																													
<p>Between 2001 and 2006 in the Vancouver CMA, the number of people from a visible ethnic minority (excluding Aboriginal) increased by 20.6 percent, as did its share of the general population (increased by almost 5 percentage points). During that same period in the Vancouver CMA, the number of Aboriginal people also increased, but at about half the rate (by 9.4 percent) at which the ethnic minority population increased. In 2001, Aboriginal people accounted for nearly 2 percent of the general population; this remained unchanged in 2006.</p>																													
<b>d) Findings and Recommendations</b>																													
<p>No Olympic Games impact is hypothesized. The larger share of visible ethnic minorities than of Aboriginal people in the general population is likely predominantly due to an increase in immigration, which is a long-term trend that is unlikely to be linked to the upcoming 2010 Winter Games.</p>																													

So6	Social Exclusion											
<b>a) Data Discussion</b>												
<p>The indicator combines dimensions that summarize poverty and social exclusion or isolation from income and other opportunities. Data for three dimensions are available: the proportion of low-income population (i.e., below the low-income cut-off line, or LICO (see So31 in the Results Report for more information); the average earnings of the Aboriginal population; and the median income of the Aboriginal population above 15 years of age. Although the indicator dimensions differ considerably from the specifications of the Technical Manual, they do reflect the questions of social exclusion as it is relevant to Canadian society.</p>												
<b>b) Data Presentation</b>												
So6 Social Exclusion												
	Metro Vancouver				B.C.				Canada			
	2001	2005	2005 (=2001)	Change	2001	2005	2005 (=2001)	Change	2001	2005	2005 (=2001)	Change
Percentage of families and individuals with incomes below the LICO	22.5%	16.5%	-	<b>-6.0</b>	19.0%	13.1%	-	<b>-5.9</b>	15.5%	11.4%	-	<b>-4.1</b>
Average earnings for the Aboriginal Population for the Aboriginal Population older than 15 years of age	\$24,749	\$29,354	\$26,813	<b>8.3%</b>	\$21,403	\$24,836	\$22,687	<b>6.0%</b>	\$21,435	\$25,961	\$23,714	<b>10.6%</b>
	\$15,160	\$18,203	\$16,628	<b>9.7%</b>	\$13,242	\$15,836	\$14,465	<b>9.2%</b>	\$13,525	\$16,752	\$15,302	<b>13.1%</b>
Source: Statistics Canada (2001, 2005).												
<p>Note: In the table, the “2005 (=2001)” column accounts for inflation, i.e., transforms 2005-dollars into 2001-dollars to enable comparison over time.</p>												
<b>c) Data Analysis</b>												
<p>Between 2001 and 2005, the percentage of families and individuals with incomes below LICO fell by about 6 percentage points in Metro Vancouver and in B.C., and by about 4 percentage points in Canada. The improved economic conditions were also reflected in the incomes of the Aboriginal population, with the average annual earnings in constant (2001-chained) dollars increasing by 8.3 percent in Metro Vancouver, by 6 percent in B.C., and by more than 10 percent in Canada. The median annual earnings of the Aboriginal population increased by nearly 10 percent in Metro Vancouver, by more than 9 percent in B.C. and by more than 13 percent in Canada. Despite these increases, the earnings of the Aboriginal population remained well below the earnings of the non-Aboriginal population (see Ec13). In 2005, the average annual earnings of the Aboriginal population were more than 87 percent lower in B.C. and more than 84 percent lower in Canada than those of the general population. The median annual earnings of the Aboriginal population were more than 118 percent lower in B.C. and nearly 111 percent lower in Canada than those of the general population.</p>												
<b>d) Findings and Recommendations</b>												
<p>The data show that social exclusion had decreased, specifically a decreasing number of families and individuals below LICO, and increasing average and median earnings of the Aboriginal population. The</p>												

earnings of the Aboriginal population increased at a higher rate, but were still significantly lower, than those of the general population (see Ec13) in Metro Vancouver, B.C. and Canada. Given that the increase in Aboriginal earnings was higher in Canada than for either Metro Vancouver or B.C., the increase was unlikely to have been due to the upcoming 2010 Winter Games (although some effect might be possible).

So8	Crime Rates								
<b>a) Data Discussion</b>									
<p>The indicator reports the number of recorded crimes per year in the province of B.C. (City of Vancouver data were unreliable). Serious or violent crimes against persons are distinguished from crimes against property. Differences between data (specifically number of crimes per 1,000 population) in this report and the baseline report reflect updated population totals.</p>									
<b>b) Data Presentation</b>									
<b>So8 Crime Rates, B.C., 2001 and 2006</b>									
	<u>All recorded crimes</u>			<u>Serious/violent recorded crimes against persons</u>			<u>Recorded crimes against property</u>		
	2001	2006	Change	2001	2006	Change	2001	2006	Change
Total crimes per year	514,358	541,551	5.3%	49,851	52,513	5.3%	264,246	245,063	-7.3%
Crimes per year by 1,000 population	126.2	127.6	1.1%	12.2	12.4	1.6%	64.8	57.7	-11.0%
Source: Statistics Canada (2001, 2006).									
<b>c) Data Analysis</b>									
<p>Between 2001 and 2006, the total number of recorded crimes in B.C. increased by 5.3 percent. Serious or violent crimes against persons increased by the same rate, while crimes against property decreased by 7.3 percent. Taking an increase in population into account, the total number of crimes per 1,000 population increased by 1.1 percent and that of serious and violent crimes against persons per 1,000 population increased by 1.6 percent, while the number of crimes against property per 1,000 population decreased by 11 percent.</p>									
<b>d) Findings and Recommendations</b>									
<p>Between 2001 and 2006, crime rates in B.C. increased. This may be part of a long-term trend. However, without periodic data available to compare crime rates before and after Vancouver was selected as the Host City for the 2010 Winter Games (2003), the detection of any Olympic Games impact is impossible. Although the Olympic Games may hypothetically indirectly affect crime rates, this is very unlikely.</p>									

So17	Professional Leagues	
<b>a) Data Discussion</b>		
<p>The indicator reports the number of sports teams in the city and in the region that participate in professional league championships at the country or international level. Data for B.C. exclude the City of Vancouver.</p>		
<b>b) Data Presentation</b>		
<b>Ec17 Professional Leagues, Vancouver and B.C., 2001 and 2008</b>		
<u>Professional Leagues</u>	<u>Number of teams 2001</u>	<u>Number of teams 2008</u>
	Women Men Total	Women Men Total
Vancouver		
National Hockey League	0 1 1	0 1 1
Canadian Football League	0 1 1	0 1 1
Western Hockey League	0 1 1	0 1 1
Minor League Baseball (Single A Short Season)	0 1 1	0 1 1
United Soccer League - First Division	0 1 1	0 1 1
United Soccer League - Women's League	1 0 1	1 0 1
<i>Total</i>	<i>1 5 6</i>	<i>1 5 6</i>
B.C.		
Western Hockey League	0 5 5	0 5 5
Western Lacrosse Association	0 7 7	0 7 7
<i>Total</i>	<i>0 12 12</i>	<i>0 12 12</i>
<p>Source: Vancouver Canucks (2001, 2008), B.C. Lions (2001, 2008), Vancouver Giants (2001, 2008), Vancouver Canadian Baseball (2001, 2008), United Soccer League (2001, 2008), Westerns Lacrosse Association (2001, 2008), Vancouver Whitecaps - Men and Women (2001, 2008).</p>		
<b>c) Data Analysis</b>		
<p>Between 2001 and 2008, the number of professional sports teams (i.e., those which provide a salary to their athletes) in Vancouver and B.C. remained unchanged. The Vancouver Grizzlies of the National Basketball Association are not included because they were relocated to Memphis in 2001. In March 2009, the Vancouver Whitecaps FC was granted a Major League Soccer expansion franchise set to begin play in 2011.</p>		
<b>d) Findings and Recommendations</b>		
<p>Since the numbers of professional sports teams in Vancouver and in B.C. remained the same between 2001 and 2008, it is obvious that the selection of Vancouver as an Olympic Games Host has had no impact.</p>		

So20	National Anti-Doping Controls
a) Data Discussion	
<p>The indicator reports the number of doping control tests and doping infractions by sport in Canada. Data represents testing within Canada at sports events that were not part of Olympic Games. Data for Modern Pentathlon 2000/2001 and Shooting and Tennis 2007/2008 were unavailable.</p>	
b) Data Presentation	
<p>See attachment.</p>	
c) Data Analysis	
<p>Overall, the total number of doping control tests outside the Olympics increased by 28 tests (1.2 percent) between 2000/2001 and 2007/2008. The total number of doping infractions increased by 9 infractions (or nearly 82 percent). These findings might suggest that either the number of doping incidences is increasing, or that doping rules are getting stricter or both. It may also suggest that testing has become more sophisticated (more athletes are getting caught). Sports that had the largest increase in the number of doping tests during this period were Synchronized Swimming, Skiing and Biathlon. Sports that had the largest decrease in testing were Curling, Figure Skating and Handball. The largest increase in registered infractions was for Football, followed by Boxing and Bobsleigh, while infractions decreased for Basketball, Field Hockey, Taekwondo and Biathlon. For the majority of sports, total infractions remained at zero. A comparison of winter and summer sports showed a larger increase in the total number of doping control tests for summer sports (by 1.9 percent) than for winter sports (by 0.4 percent), and a larger increase in the total number of infractions for summer sports (increase of 8 infractions, or nearly 89 percent) than for winter sports (increase of 1 infraction, or by 50 percent). The summer sport that received the most doping control tests in both years was Athletics. Weightlifting had the most infractions in 2000/2001, while Football had the most infractions in 2007/2008. The winter sport that received the most doping control tests in both years was Speed Skating.</p>	
d) Findings and Recommendations	
<p>It is impossible to ascertain the impact of the upcoming 2010 Winter Games on domestic doping controls in Canada, but it is possible that a more strict application of the Canadian Anti-Doping Program's anti-doping rules and lower tolerance toward doping infractions are related to the Games. Given that most of the infractions were in summer sports, there appears to be a limited increase in doping among winter sport athletes at least at this time. For example, in Bobsleigh, but two more infractions in 2007 than there were in 2001 (3 compared to 1). This increase could possibly be specifically induced by the Games, but it is impossible to know.</p>	

One-pager Summary Sheets for Selected Indicators (Analysis Possible But Inconclusive at Pre-Games)

So20 National Anti-Doping Controls: Doping Control Tests and Infractions, 2000/2001 and 2007/2008

Sport	2000-2001		2007-2008		Change	
	Doping Control Tests	Infractions	Doping Control Tests	Infractions	Doping Control Tests	Infractions
Swimming	150	0	193	0	28.7%	0.0%
Diving	14	0	21	0	50.0%	0.0%
Waterpolo	30	0	50	0	66.7%	0.0%
Synchronized Swimming	4	0	36	0	800.0%	0.0%
Archery	17	0	12	0	-29.4%	0.0%
Athletics	573	2	320	5	-44.2%	150.0%
Badminton	4	0	14	0	250.0%	0.0%
Baseball	28	0	18	0	-35.7%	0.0%
Basketball	111	1	90	0	-18.9%	-100.0%
Boxing	78	0	45	2	-42.3%	200.0%
Canoe/Kayak	64	0	167	0	160.9%	0.0%
Cycling	89	0	153	0	71.9%	0.0%
Equestrian	27	0	13	0	-51.9%	0.0%
Fencing	14	0	13	0	-7.1%	0.0%
Football	197	1	166	9	-15.7%	800.0%
Gymnastics	35	0	55	0	57.1%	0.0%
Handball	18	0	6	0	-66.7%	0.0%
Field Hockey	31	1	57	0	83.9%	-100.0%
Judo	108	0	54	0	-50.0%	0.0%
Modern Pentathlon	-	-	6	0	-	-
Rowing	48	0	101	0	110.4%	0.0%
Sailing	10	0	6	0	-40.0%	0.0%
Shooting	13	0	-	-	-	-
Softball	24	0	26	0	8.3%	0.0%
Table Tennis	10	0	10	0	0.0%	0.0%
Taekwondo	16	1	19	0	18.8%	-100.0%
Tennis	2	0	-	-	-	-
Triathlon	26	0	52	0	100.0%	0.0%
Volleyball	58	0	49	0	-15.5%	0.0%
Weightlifting	45	3	63	1	40.0%	-66.7%
Wrestling	42	0	97	0	131.0%	0.0%
Biathlon	6	1	27	0	350.0%	-100.0%
Bobsleigh	94	1	66	3	-29.8%	200.0%
Curling	29	0	8	0	-72.4%	0.0%
Ice Hockey	73	0	165	0	126.0%	0.0%
Luge	50	0	36	0	-28.0%	0.0%
Figure Skating	42	0	12	0	-71.4%	0.0%
Speed Skating	207	0	124	0	-40.1%	0.0%
Skiing	12	0	77	0	541.7%	0.0%
<i>Total</i>	<i>2399</i>	<i>11</i>	<i>2427</i>	<i>20</i>	<i>1.2%</i>	<i>81.8%</i>

Source: Canadian Centre for Ethics in Sport (2001, 2008).

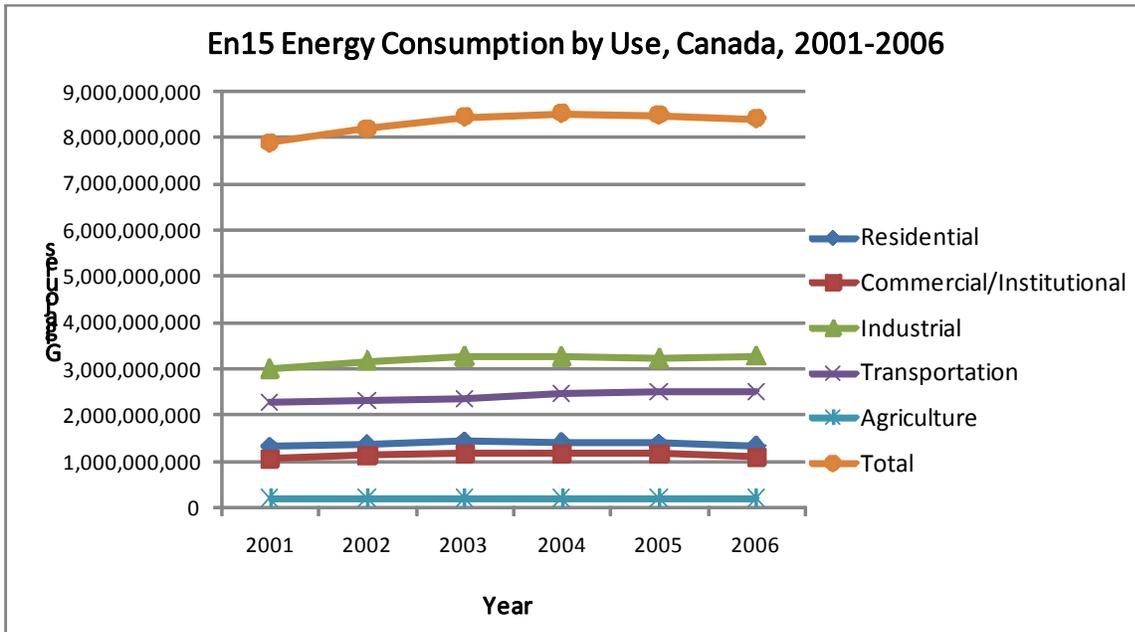
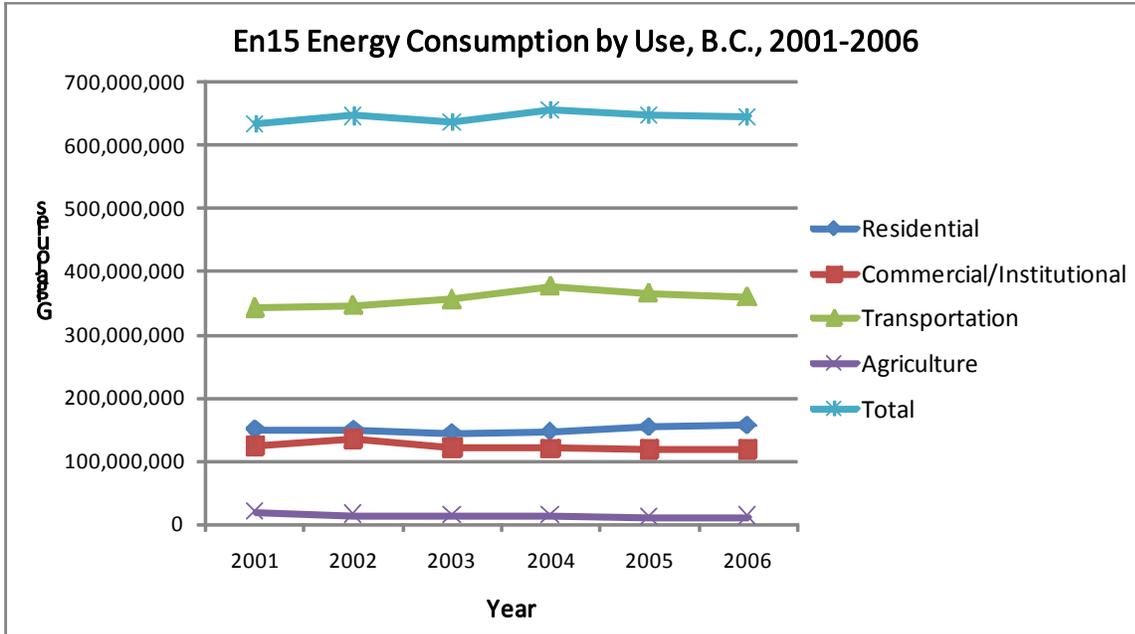
<b>So45</b>	<b>Support Network for Disabled People</b>															
<b>a) Data Discussion</b>																
<p>The indicator reports the percentage of the adult population who have disabilities. Although the Technical Manual also specifies that information on people with disabilities who receive support from the state and by type of disability be reported, only data on the percentage of disabled adults were available.</p>																
<b>b) Data Presentation</b>																
<b>So45 Support Network for Disabled People: Percentage of Adults with Disabilities, B.C. And Canada, 2001 and 2006</b>																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th colspan="2" style="text-align: center;">B.C.</th> <th colspan="2" style="text-align: center;">Canada</th> </tr> <tr> <th></th> <th style="text-align: center;">2001</th> <th style="text-align: center;">2006</th> <th style="text-align: center;">2001</th> <th style="text-align: center;">2006</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Percent of Adults with Disabilities</td> <td style="text-align: center;">9.1%</td> <td style="text-align: center;">18.4%</td> <td style="text-align: center;">9.9%</td> <td style="text-align: center;">16.6%</td> </tr> </tbody> </table>		B.C.		Canada			2001	2006	2001	2006	Percent of Adults with Disabilities	9.1%	18.4%	9.9%	16.6%
	B.C.		Canada													
	2001	2006	2001	2006												
Percent of Adults with Disabilities	9.1%	18.4%	9.9%	16.6%												
<p>Source: Statistics Canada Participation and Activity Limitation Survey (2001, 2006).</p>																
<b>c) Data Analysis</b>																
<p>Between 2001 and 2006 in both B.C. and Canada, the percentage of adults who had some kind of disability increased.</p>																
<b>d) Findings and Recommendations</b>																
<p>Although the percentage of people with disabilities increased considerably in both B.C. and Canada (virtually doubled in B.C.) between 2001 and 2006, a large part of the increase was most likely due to more inclusive diagnosis and more comprehensive recognition of disability (i.e., more inclusive definition of disability) rather than more people becoming disabled. Regardless of the underlying cause, however, we hypothesize no Olympic Games impact for this indicator, unless it could be proven that these new criteria for diagnosis are somehow reflected by more attention, focus and sensitivity to disabilities and the “visibility” of people with disabilities potentially due to the upcoming 2010 Paralympic Games.</p>																

En3	Water Quality			
<b>a) Data Discussion</b>				
<p>The indicator reports water pollution problems. The Technical Manual specifies three main types of water pollution problems: bathing water quality, the eutrophication of lakes/ponds, and the eutrophication of rivers. However, consistent and analyzable data are only available for eutrophication of rivers. Eutrophication is a process whereby excessive plant nutrients are added to a body of water. This is usually caused by the runoff of domestic sewage, animal waste and fertilizers. These nutrients stimulate excessive plant growth. The decomposition of the plants depletes the water's oxygen supply that leads to the death of animal and plant life. In addition to loss of plant and animal species, eutrophication can have a negative impact on water used for human consumption. Data for Vancouver and Metro Vancouver describe eutrophication of Fraser River at different sites.</p>				
<b>b) Data Presentation</b>				
<b>En3 Water Quality: Eutrophication of Fraser River, Ammonia and Nitrite Concentration in mg/L, 2003 and 2006</b>				
Fraser River Sites Monitored	Concentration of Ammonia	Concentration of Nitrite		
	2003	2006	2003	2006
<i>Vancouver</i>				
Near Boundary Rd	0.028 - 0.095	0.010 - 0.049	0.001 - 0.004	<0.001 - 0.002
Near McDonald Slough	0.067 - 0.078	0.037 - 0.076	0.004 - 0.006	<0.005 - <0.020
<i>Metro Vancouver</i>				
MacMillan Island	0.015 - 0.023	0.013 - 0.038	0.001 - 0.004	0.001 - 0.002
Barnston Island	0.018 - 0.026	0.008 - 0.027	0.001 - 0.005	<0.001 - 0.002
Upstream Saperton Bar	0.013 - 0.023	0.008 - 0.025	0.002 - 0.005	<0.001 - 0.002
Source: Ministry of Water, Land and Air Protection Water Quality in B.C. - Objectives Attainment (2003, 2006).				
<b>c) Data Analysis</b>		<p>Between 2003 and 2006, the concentration of ammonia in the Fraser River generally decreased at City of Vancouver monitoring sites. The concentration of ammonia remained mostly unchanged at Metro Vancouver's monitoring sites, although the lower boundaries decreased marginally while the upper boundaries increased marginally (except at MacMillan Island where the upper boundary in 2006 increased by 0.015 mg/L). The concentration of nitrite decreased at all sites, with the exception of one City of Vancouver monitoring site (Near McDonald Slough) where the upper boundary of concentration increased 3.3 times.</p>		
<b>d) Findings and Recommendations</b>		<p>Between 2003 and 2006, there was only a small change in the Fraser River's eutrophication, which was mostly towards decreasing concentrations of ammonia and nitrite. The increase in the nitrite level at McDonald Slough is the exception. It could possibly be explained by the fact that McDonald Slough is located at the southern limits of Metro Vancouver where fertilizer is used on the many farms and agricultural lands. It is unlikely that the upcoming 2010 Winter Games have had an impact on water quality at local monitoring sites.</p>		

En9	Housing Areas																
<b>a) Data Discussion</b>																	
<p>The indicator reports the size of the residential areas in Metro Vancouver along with their population and population density. The Technical Manual specifies distinguishing between formal and informal settlement areas and population, however data on informal settlements and population are largely unavailable. The residential area used is comprised of the areas of the following Metro Vancouver residential land use categories: Commercial/Mixed, High-rise Apartments, Low-rise Apartments, Rural, Single Detached and Duplex, and Townhouses. Since data do not include people living in unauthorized shelter, the occupants per square kilometre of residential area should be considered an approximate but reasonable measure of population density. No conclusions can be drawn regarding the marginality of living conditions of tenants living in unauthorized shelter in Metro Vancouver.</p>																	
<b>b) Data Presentation</b>																	
<p><b>En9 Housing Areas: Residential Area and Number of Occupants, Metro Vancouver, 2001-2006</b></p>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 15%;">2001</th> <th style="width: 15%;">2006</th> <th style="width: 10%;">Change</th> </tr> </thead> <tbody> <tr> <td>Residential Area (km<sup>2</sup>)</td> <td style="text-align: center;">402</td> <td style="text-align: center;">411</td> <td style="text-align: center;">2.2%</td> </tr> <tr> <td>Population</td> <td style="text-align: center;">2,092,902</td> <td style="text-align: center;">2,199,121</td> <td style="text-align: center;">5.1%</td> </tr> <tr> <td>Occupants per km<sup>2</sup></td> <td style="text-align: center;">5,206</td> <td style="text-align: center;">5,352</td> <td style="text-align: center;">2.8%</td> </tr> </tbody> </table>			2001	2006	Change	Residential Area (km <sup>2</sup> )	402	411	2.2%	Population	2,092,902	2,199,121	5.1%	Occupants per km <sup>2</sup>	5,206	5,352	2.8%
	2001	2006	Change														
Residential Area (km <sup>2</sup> )	402	411	2.2%														
Population	2,092,902	2,199,121	5.1%														
Occupants per km <sup>2</sup>	5,206	5,352	2.8%														
<p>Source: Metro Vancouver Generalized Land Use (2001, 2006).</p>																	
<b>c) Data Analysis</b>																	
<p>Between 2001 and 2006, the population of Metro Vancouver increased at a higher rate (5.1 percent increase) than did the available formal residential area (2.2 percent increase). The population density (occupants per square kilometre) also increased.</p>																	
<b>d) Findings and Recommendations</b>																	
<p>Between 2001 and 2006 in Metro Vancouver, any changes in housing areas (size and population density) were unlikely to have been influenced by the upcoming 2010 Winter Games.</p>																	

En15	Energy Consumption by Use					
<b>a) Data Discussion</b>						
<p>The indicator reports the amount of final energy consumed annually in B.C. and Canada in gigajoules, broken down by sector (industrial, transport, residential, commercial/institutional and agricultural). Data on industrial energy consumption in B.C. were not available. The data were provided by Natural Resources Canada.</p>						
<b>b) Data Presentation</b>						
En15 Energy Consumption by Use, B.C. and Canada, 2001-2006 (GJ)						
Sector	2001	2002	2003	2004	2005	2006
<i>B.C.</i>						
Residential	149,125,371	149,817,377	144,090,546	145,533,781	152,897,775	155,849,350
Commercial/Institutional	123,279,025	135,038,191	121,094,399	118,963,159	117,447,645	117,747,032
Transportation	342,560,000	346,307,000	356,031,000	376,883,000	365,769,000	359,340,000
Agriculture	18,110,000	14,462,000	13,715,000	13,421,000	11,239,000	11,461,000
<i>Total</i>	<i>633,074,396</i>	<i>645,624,568</i>	<i>634,930,945</i>	<i>654,800,940</i>	<i>647,353,420</i>	<i>644,397,382</i>
<i>Per Capita</i>	<i>155.3</i>	<i>157.5</i>	<i>154.0</i>	<i>157.6</i>	<i>154.2</i>	<i>151.9</i>
<i>Canada</i>						
Residential	1,335,248,369	1,387,474,972	1,444,250,878	1,420,653,655	1,402,695,176	1,347,262,333
Commercial/Institutional	1,060,930,001	1,131,546,984	1,166,491,014	1,172,749,931	1,158,930,995	1,092,594,990
Industrial	3,006,781,767	3,166,398,237	3,263,326,106	3,258,028,599	3,224,660,430	3,270,629,581
Transportation	2,277,307,989	2,306,162,005	2,361,736,995	2,465,098,001	2,501,295,999	2,492,041,995
Agriculture	218,073,999	206,757,001	211,775,999	208,901,000	208,540,002	210,765,000
<i>Total</i>	<i>7,898,342,125</i>	<i>8,198,339,199</i>	<i>8,447,580,992</i>	<i>8,525,431,186</i>	<i>8,496,122,602</i>	<i>8,413,293,899</i>
<i>Per Capita</i>	<i>254.6</i>	<i>261.3</i>	<i>266.7</i>	<i>266.6</i>	<i>263.3</i>	<i>258.5</i>
Source: Natural Resources Canada (2009).						
See attached figures.						
<b>c) Data Analysis</b>						
<p>Between 2001 and 2006 in both B.C. and Canada, total energy consumption by use remained relatively stable, with a slight increase. More energy was consumed in 2006 than in 2001 in both B.C. (by 1.8 percent) and Canada (by 6.5 percent). During this period in both B.C. and Canada, a “peak” energy consumption was observed in 2004, which slightly decreased afterwards. In most sectors, energy use increased to some extent, except for agriculture (decreased by nearly 37 percent in B.C. and by 3.4 percent in Canada) and the commercial/institutional sector in B.C. (decreased by 4.5 percent). In B.C., the sector in which energy consumption increased the most was transportation (by nearly 5 percent), followed by the residential sector (by 4.5 percent). In Canada, the sector in which energy consumption increased the most was also transportation (by 9.4 percent), followed by the industrial sector (by 8.8 percent). The share of each sector as a proportion of the total remained mostly unchanged (within 1.7 percentage points). Taking population change into account, the total energy consumption per capita in B.C. <i>decreased</i> (by 2.2 percent), while in Canada it increased (by 1.5 percent).</p>						
<b>d) Findings and Recommendations</b>						
<p>The observed changes in total energy consumption between 2001 and 2006 in both B.C. and Canada appear to be a part of a long-term trend. The slight peak in energy consumption in 2004 is consistent with observations made for other indicators about the state of the national economy that year. No Olympic Games impact is hypothesized. It is also unlikely that the decrease in energy consumption <i>per capita</i> in B.C. was due to the Olympic Games; it most likely reflects a gradual shift in preferences, behaviour and</p>						

practices (as a part of a global pro-environmental trend; see En2, En4 and En5).



En17	Raw Material Consumption							
<b>a) Data Discussion</b>								
<p>The indicator reports the consumption of raw materials in terms of annual inputs and outputs by industry and commodity, S-level aggregation, according to the North American Industry Classification System (NAICS), and in millions of dollars, as reported by Statistics Canada National Economic Accounts. Data on input and output volume, as well as on some specific categories of raw materials, as specified by the Technical Manual, are not available. The inputs consist of natural resources extraction and the import of raw materials. The outputs consist of wastes, emissions and exports.</p>								
<b>b) Data Presentation</b>								
<b>En17 Raw Materials Consumption, B.C. And Canada, 2001 and 2004 (\$ millions)</b>								
	2001		2004		2004 (=2001)		Change	
	Outputs	Inputs	Outputs	Inputs	Outputs	Inputs	Outputs	Inputs
<i>Canada</i>								
Forestry products	10,734	10,092	12,536	11,617	11,716	10,857	9.1%	7.6%
Lumber and wood products	32,397	15,860	38,727	19,749	36,192	18,456	11.7%	16.4%
Metal Ores and Concentrates	10,310	8,442	13,921	11,036	13,010	10,314	26.2%	22.2%
Primary Metal Products	36,121	32,629	44,387	39,840	41,482	37,233	14.8%	14.1%
Non-metallic minerals and mineral products	15,260	14,853	18,191	16,785	17,000	15,686	11.4%	5.6%
<i>B.C.</i>								
Forestry Products	4,972	4,430	5,518	5,053	5,157	4,722	3.7%	6.6%
Lumber and wood products	10,936	3,299	12,796	3,480	11,959	3,252	9.4%	-1.4%
Metal ores and concentrates	1,063	340	1,678	542	1,568	507	47.5%	49.2%
Primary metal products	1,659	1,712	1,888	2,098	1,764	1,961	6.3%	14.5%
Non-metallic minerals and mineral products	1,407	1,610	1,670	1,891	1,561	1,767	10.9%	9.8%
Source: Statistics Canada National Economic Accounts (2008).								
Note: In the table, the “2004 (=2001)” columns account for inflation, i.e., transform 2004-dollars into 2001-dollars to make comparison over time possible.								
<b>c) Data Analysis</b>								
<p>For both Canada and B.C. in 2001 and in 2004, outputs were larger than inputs for all categories of raw materials, except for primary metal products and non-metallic minerals and mineral products in B.C. Essentially, this means that Canada and B.C. export more raw materials than they use as inputs (both from natural extraction and imports), with the exception of the noted categories in B.C. The largest differences between output and input are in categories like lumber and wood products in Canada and in B.C., and metal ores and concentrates in B.C. These are industries/products for which Canada and B.C. have long had traditional comparative advantages. Between 2001 and 2004, the dollar values (adjusted for inflation) of both outputs and inputs increased for all categories in both Canada and B.C., with the exception of the input of lumber and wood products in B.C., which marginally decreased. In Canada, the outputs increased more than the inputs for all categories, except for lumber and wood products (where outputs increased by 11.7 percent while inputs increased by 16.4 percent). In B.C. for most categories, inputs increased more than outputs, specifically for forestry products (6.6 percent versus 3.7 percent), metal ores and concentrates (49.2 percent versus 47.5 percent) and primary metal products (14.5 percent versus 6.3 percent). This indicates an increase in the use of these raw materials in construction.</p>								

d) Findings and Recommendations

Assuming that higher dollar-values reflect (at least in part) larger volumes of raw materials, and not only global price changes, it is still difficult to isolate an Olympic Games impact based on two data points. However, the data suggest that in B.C. certain categories of raw materials were used more in 2004 than in 2001 (as reflected by the larger increase in inputs than in outputs). This increase may be related to an increase in construction, which in turn may be related to preparations for the upcoming 2010 Winter Games.

<b>En33</b>	<b>New Waste and Wastewater Treatment Facilities</b>		
<b>a) Data Discussion</b>			
<p>The indicator reports a list of all new waste and wastewater treatment facilities and final disposal facilities that were built before 2001 (two years prior to 2003, when Vancouver was selected as the Host City for the 2010 Winter Games). The same list is used in this report as was used in the baseline report because no new facilities had been built since the baseline report.</p>			
<b>b) Data Presentation</b>			
<b>En33 New Waste and Wastewater Treatment Facilities</b>			
	Vancouver		Metro Vancouver
Name of the facility	Vancouver Landfill	Vancouver Landfill	Iona Sewage Treatment
Localization of the project	Landfill gas and flare system upgrade	Leachate collection and containment system upgrade	Enhanced primary treatment assessment upgrade
New project or already planned project	Approved in 1999	Approved in 2001	2001
Direct relation to Olympic activities or context activities	No	No	No
Type of treatment	Solid Waste	Wastewater	Wastewater
Start of construction	2000	2001	-
End of construction	2001	2002	2001
Opening	2001	2002	2001
Average yearly treatment capacity (billion litres)	-	-	200
Total investment (dollars)	5,400,000	1,355,000	300,000
<small>Source: City of Vancouver Annual Report , Solid Waste Division (2002); Metro Vancouver Recycling and Waste &amp; Sewerage Divisions.</small>			
<b>c) Data Analysis</b>			
<p>During the past 10 years, three waste and wastewater treatment facilities were built – two in the City of Vancouver and one in the Metro Vancouver area. No new facilities have been built since the baseline report (or even since 2002).</p>			
<b>d) Findings and Recommendations</b>			
<p>Given that all three listed facilities were built before Vancouver was selected as the Host City in 2003, no new facilities were specifically built for the upcoming 2010 Winter Games. Therefore, no Olympic Games impact is hypothesized.</p>			

Ec1	Employment by Economic Activity
a) Data Discussion	
<p>The Employment by Economic Activity indicator measures the number of people employed in each economic sector, reflecting the structure of the economy. The Technical Manual prescribes the unit of measurement to be FTEs (Full-Time Equivalents). However, FTE data were not available, and therefore the number of persons employed was used instead. In addition, the sector classification is to follow ISIC (International Standard Industrial Classification). Statistics Canada and its Labour Force Survey report data in accordance to NASIC (North American Standard Industry Classification); therefore, NASIC was used. An attempt was made to match the categories of ISIC and NASIC in both the baseline and this report (pre-Games). The prescribed ISIC (version 3.1) categories are as follows: A) Agriculture, Hunting and Forestry; B) Fishing; C) Mining and Quarrying; D) Manufacturing; E) Electricity, Gas and Water Supply; F) Construction; G) Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household goods; H) Hotels and Restaurants; I) Transport, Storage and Communications; J) Financial Intermediation; K) Real Estate, Renting and Business Activities; L) Public Administration and Defense, Compulsory Social Security; M) Education; N) Health and Social Work; O) Other Community, Social and Personal Service Activities; P) Activities of Private Households as Employers and Undifferentiated Production Activities of Private Households; and Q) Extraterritorial Organisations and Bodies. The attached table matches these seventeen ISIC categories with the sixteen NASIC categories. ISIC categories <i>B</i> and <i>C</i> were combined to match the NASIC category, <i>Forestry, Fishing, Mining, Oil and Gas</i>.</p>	
b) Data Presentation	
See attached table.	
c) Data Analysis	
<p>Given that the population increased over time, it is not surprising that the number of individuals employed also increased between 2001 and 2006. This increase in employment was observed in almost all the economic sectors, with the exception of <i>Other Services</i> in B.C. (which fell by 7,500 people) and <i>Manufacturing</i> in Canada (which fell by 111,300 people). The size of the sectors remained relatively unchanged (within one percentage point of their size in 2001), with the exception of <i>Construction</i> (which rose by 2.4 percentage points in B.C.) and <i>Manufacturing</i> (which fell by 1.1 percentage points in B.C. and by 2.1 percentage points in Canada).</p> <p>In both B.C. and Canada, the three largest employment sectors remained unchanged over time. In B.C., the largest sector was <i>Trade</i> (16 percent of the employed population), followed by <i>Health Care and Social Assistance</i> (10.4 percent) and <i>Manufacturing</i> (9.5 percent). In Canada, the second and third places are reversed, with <i>Manufacturing</i> occupying second place (13.5 percent) followed by <i>Health Care and Social Assistance</i> (10.5 percent). For these three sectors, the percentage of the employed population is comparatively similar between B.C. and Canada, with the exception of <i>Manufacturing</i> (this sector is roughly 3-4 percent larger in Canada than it is in B.C.).</p>	
d) Findings and Recommendations	
<p>The observed changes over time are relatively small. Therefore, it is unlikely that the 2010 Winter Games had much impact during this time period (2001-2006). A possible exception is the increase in employment in <i>Construction</i> in B.C., which might be linked to the upcoming Games. However, employment in <i>Construction</i> also increased in Canada (although less than it did in B.C.). Therefore, the impact of the Games on employment (in construction) must remain hypothetical.</p>	

Ec1: Employment by Economic Activity, B.C. And Canada,  
 2001 and 2006 (persons, thousands)

ISIC <sup>1</sup>	NASIC <sup>2</sup>	British Columbia				Canada			
		2001		2006		2001		2006	
		Persons	Percent	Persons	Percent	Persons	Percent	Persons	Percent
A	Agriculture	25.5	1.3%	34.7	1.6%	323.3	2.2%	346.4	2.1%
B	Forestry, fishing,								
C	mining, oil and gas	40.7	2.1%	43.8	2.0%	278.9	1.9%	330.1	2.0%
D	Manufacturing	194.9	10.1%	197.5	9.0%	2,229.0	14.9%	2117.7	12.8%
E	Utilities	10.5	0.5%	8.6	0.4%	124.4	0.8%	122	0.7%
F	Construction	110.7	5.8%	179.3	8.2%	824.3	5.5%	1069.7	6.5%
G	Trade	303.3	15.8%	353.7	16.1%	2,363.3	15.8%	2633.5	16.0%
H	Accommodation and food services	163.7	8.5%	170.5	7.8%	943.2	6.3%	1015	6.2%
I	Transportation and warehousing	112.4	5.8%	119.5	5.4%	775.8	5.2%	802.2	4.9%
J	Finance, insurance, real estate and leasing	120.9	6.3%	138	6.3%	876.7	5.9%	1040.5	6.3%
K	Business, building and other support services	71.2	3.7%	98.8	4.5%	537.2	3.6%	690	4.2%
L	Public administration	89.5	4.7%	91.3	4.2%	785.4	5.3%	837.4	5.1%
M	Educational services	138.3	7.2%	156	7.1%	981.6	6.6%	1158.4	7.0%
N	Health care and social assistance	196.8	10.2%	232.2	10.6%	1,540.4	10.3%	1785.5	10.8%
O	Other services	98.3	5.1%	90.8	4.1%	666.8	4.5%	701	4.3%
P	Professional, scientific and technical services	139.2	7.2%	167.6	7.6%	986.5	6.6%	1089.9	6.6%
Q	Information, culture and recreation	105.6	5.5%	113.2	5.2%	709.4	4.7%	745	4.5%
	<i>Total</i>	<i>1,921.6</i>	<i>100.0%</i>	<i>2195.5</i>	<i>100.0%</i>	<i>14,946.2</i>	<i>100.0%</i>	<i>16,484</i>	<i>100.0%</i>

<sup>1</sup> International Standard Industrial Classification of All Economic Activities.

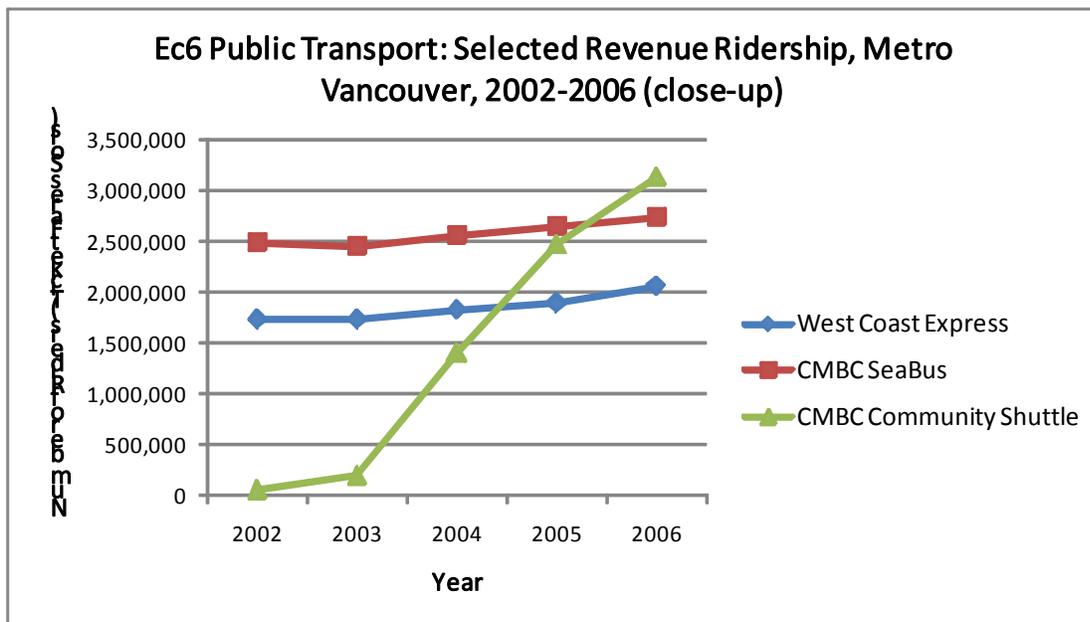
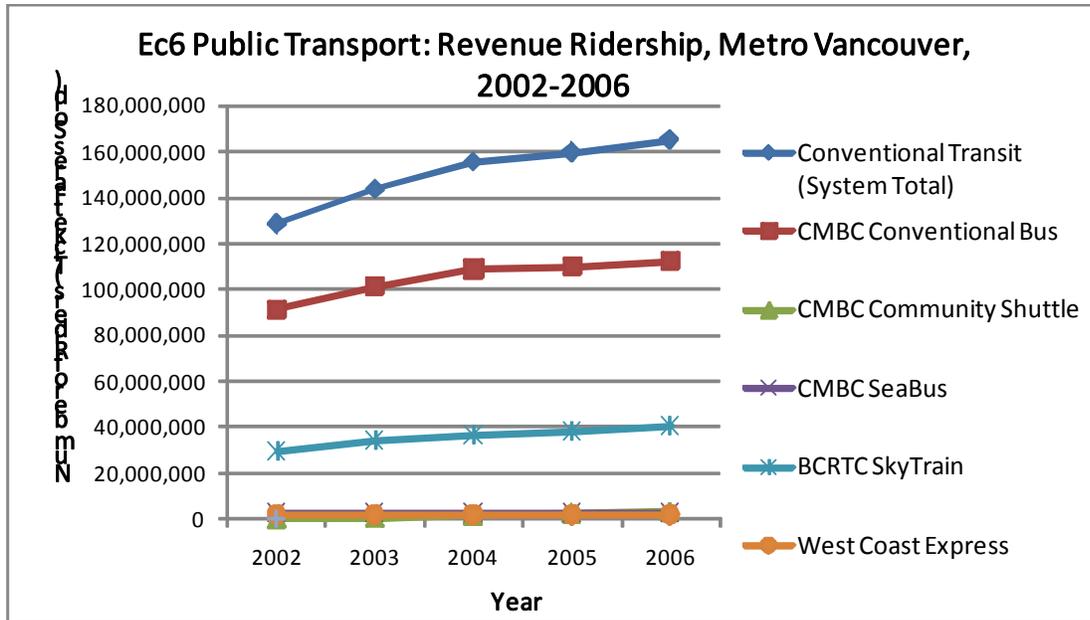
<sup>2</sup> North American Standard Industry Classification.

Source: Statistics Canada's Labour Force Survey.

Ec5	Motor Vehicle Population				
<b>a) Data Discussion</b>					
<p>The indicator describes the number and type of motor vehicles at a regional level (Metro Vancouver). This is the only data dimension used in this pre-Games report, as other data such as vehicle age and type of energy used were not available. The data come from ICBC (the Insurance Corporation of B.C.) and were provided by Translink. Because baseline data represented a larger geographic area than for this pre-Games report, they were not considered for comparison in this report.</p>					
<b>b) Data Presentation</b>					
<b>Ec5: Motor Vehicle Population, Metro Vancouver,            2003 and 2008 (number of vehicles)</b>					
		<u>2003<sup>1</sup></u>		<u>2008<sup>1</sup></u>	
Type of vehicle	Vehicles	Percent	Vehicles	Percent	
Class 1 (Passenger)	985,700	77.2%	1,095,696	76.1%	
Class 2 (Commercial)	188,864	14.8%	215,558	15.0%	
Class 3 (Motorcycle)	11,830	0.9%	17,753	1.2%	
Class 4 (Trailer)	54,376	4.3%	64,910	4.5%	
Class 5 (Motorhome)	10,917	0.9%	9,342	0.6%	
Class 6 (Commercial Trailer)	25,702	2.0%	36,716	2.5%	
<i>Total</i>	<i>1,277,389</i>	<i>100.0%</i>	<i>1,439,975</i>	<i>100.0%</i>	
<p><sup>1</sup> End of March totals.            Source: ICBC (provided by Translink).</p>					
<b>c) Data Analysis</b>					
<p>Between 2003 and 2008, the total number of vehicles in Metro Vancouver increased by 12.7 percent. When broken down by type of vehicle, an increase was observed for five of the six types of vehicles, and a decrease in one type of vehicle (motor homes). The largest absolute increase was observed for motorcycles (by 50 percent), followed by commercial trailers (by 43 percent). The remaining classes changed by less than 20 percent. Taking Metro Vancouver's population increase into account during that period, the number of vehicles per capita rose from 0.60 to 0.63 vehicles per person, an increase of 5.8 percent.</p> <p>The distribution of motor vehicles in Metro Vancouver by type of vehicle remained almost unchanged (numbers in 2008 were within 1.1 percentage points of numbers in 2003). The two largest changes were observed for passenger vehicles (which decreased their share by 1.1 percentage points) and commercial trailers (which increased their share by 0.5 percentage points).</p>					
<b>d) Findings and Recommendations</b>					
<p>While the absolute number of vehicles by type of vehicle changed between 2003 and 2008, their proportions remained essentially the same. While it is possible that the 2010 Winter Games may have affected the number of vehicles, the lack of comparable pre-2003 data precludes us from evaluating trends in the number of vehicles. Specifically, we cannot establish whether the increase in vehicles is part of a "normal" (Games-less) trend or a recent (post-2003, Games) development.</p>					

Ec6	Public Transport				
<b>a) Data Discussion</b>					
<p>The indicator reports on public transit use as measured by the number of tickets sold in Metro Vancouver 2002-2006. Although the Technical Manual specifies different dimensions for this indicator, this is the only data this are consistently available for analyzing public transit use. The Transit System includes the Coast Mountain Bus Company (conventional busses, community shuttles and SeaBus), the West Coast Express and the BC Rapid Transit Company (SkyTrain).</p>					
<b>b) Data Presentation</b>					
<b>Ec6 Public Transport: Revenue Ridership, Metro Vancouver, 2002-2006</b>					
	2002	2003	2004	2005	2006
CMBC Conventional Bus	91,361,404	101,192,123	108,852,583	110,007,162	112,139,244
CMBC Community Shuttle	49,844	189,404	1,395,732	2,458,264	3,124,945
CMBC SeaBus	2,488,443	2,450,166	2,549,668	2,650,060	2,731,712
BCRTC SkyTrain	29,448,780	33,897,782	36,602,020	38,145,071	40,345,947
West Coast Express	1,736,137	1,736,627	1,830,592	1,893,933	2,057,502
<i>Conventional Transit (System Total)</i>	<i>128,580,064</i>	<i>143,627,321</i>	<i>155,594,015</i>	<i>159,713,782</i>	<i>165,109,068</i>
<i>Per Capita</i>	<i>60.9</i>	<i>67.4</i>	<i>72.5</i>	<i>73.5</i>	<i>75.1</i>
Source: TransLink (2007).					
See attached figures.					
<b>c) Data Analysis</b>					
<p>In Metro Vancouver, public transit ridership increased steadily between 2002-2006 or by 28.4 percent in total. All types of public transportation increased their ridership. In 2006, the conventional bus ridership was nearly 23 percent higher than its 2002 number; SeaBus ridership was up by almost 10 percent, SkyTrain by 37 percent, and West Coast Express by almost 19 percent. The largest increase in ridership however was experienced by the community bus shuttles – in 2007, its ridership was more than sixty times higher than its 2002 number. The community bus mode’s popularity could be linked to its smaller size (cheaper to operate), flexible service (goes into suburbs) and attractiveness for seniors (less walking). Taking into consideration population change, the per capita ridership of public transit rose by 23.3 percent: conventional bus ridership by 17.9 percent, SeaBus by 5.5 percent, SkyTrain by almost 32 percent, and West Coast Express by nearly 14 percent. As a proportion of the total, conventional busses account for the largest share of ridership (about 70 percent), followed by SkyTrain (about 24 percent) and 2% for each of the other 3 categories of transport. Between 2002 and 2006, the conventional bus ridership share diminished by 3.1 percentage points, while community bus shuttle’s share and SkyTrain’s shares augmented by 1.9 and 1.5 percentage points, respectively. The SeaBus and the West Coast Express ridership shares remained more or less unchanged.</p>					
<b>d) Findings and Recommendations</b>					
The observed changes appear to be a part of a long-term trend of increasing public transit ridership. The					

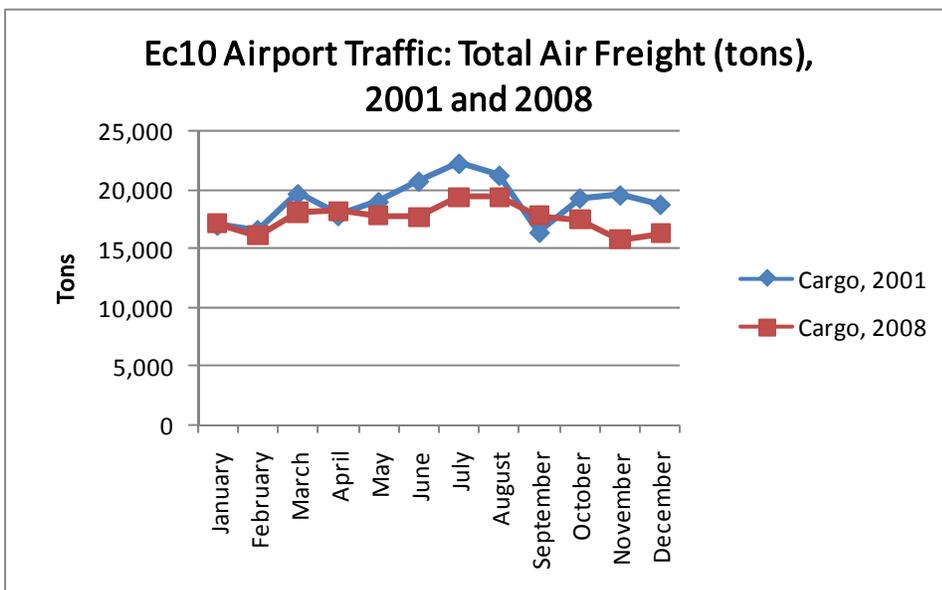
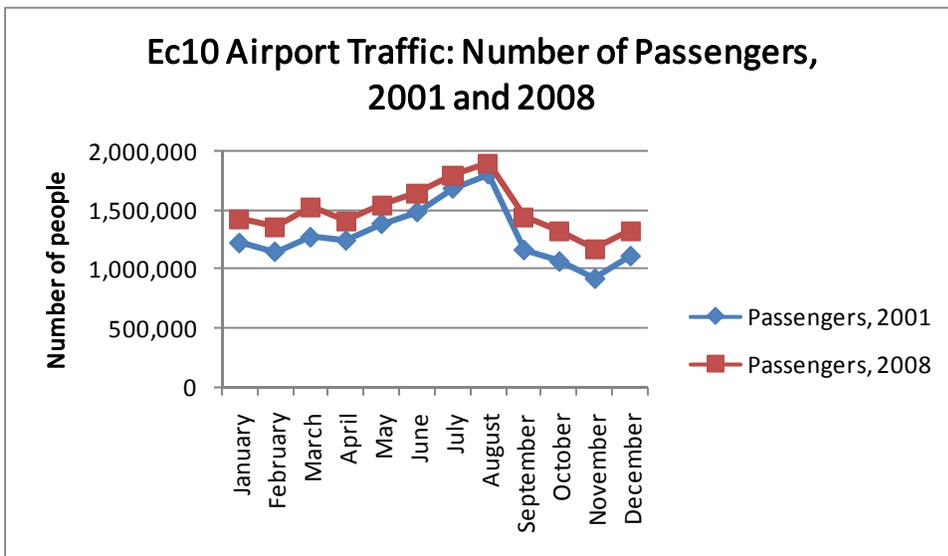
largest year-to-year increase came in 2003-2004, predominantly due to the skyrocketing community shuttle ridership. Overall, the increase in public transit ridership seems to reflect a pro-environmental (government) efforts as well as change in preferences, values and behaviour of the population. While the Olympic Games could have had some impact on these, it is impossible to isolate it and determine whether these changes would not have happened without the upcoming Games. Most likely there is no Olympic Games impact, but it's possible that some exists to a certain (small) extent.



Ec10	Airport Traffic			
a) Data Discussion				
<p>The indicator reports the number of passengers and the tons of air cargo freight transported through Vancouver International Airport (YVR). The number of passengers and tons of cargo by month constitute the only dimension available for this indicator. The data provided did not allow for the break down of passengers and freight into arrivals and departures, nor was it possible to isolate transferring passengers, those who were simply passing through Vancouver (estimated at about 30 percent by YVR).</p>				
b) Data Presentation				
<b>Ec10 Airport Traffic, 2001 and 2008</b>				
Month	<u>Number of passengers arriving and departing</u>		<u>Total air freight (tons)</u>	
	2001	2008	2001	2008
January	1,220,568	1,420,775	17,019	17,113
February	1,146,890	1,361,183	16,625	16,104
March	1,269,070	1,527,585	19,695	18,131
April	1,241,644	1,401,731	17,840	18,237
May	1,381,675	1,544,030	19,015	17,806
June	1,480,690	1,641,891	20,781	17,686
July	1,679,267	1,798,422	22,302	19,337
August	1,799,740	1,892,901	21,274	19,379
September	1,161,925	1,440,717	16,401	17,840
October	1,064,991	1,327,442	19,338	17,506
November	920,210	1,173,363	19,594	15,818
December	1,110,092	1,322,419	18,790	16,356
<i>Total</i>	<i>15,476,762</i>	<i>17,852,459</i>	<i>228,674</i>	<i>211,313</i>
<p>Source: Vancouver International Airport Facts (1992-2009);          YVR Cargo Volume (Tonnes) (1992-2009)</p>				
Please also see attached figures.				
c) Data Analysis				
<p>In 2008, YVR's total annual passenger traffic was higher by 15.4 percent than it was in 2001, while the annual freight traffic fell by 7.6 percent. The overall passenger traffic trend remained the same: rising January through August, peaking in August, and falling until November, then rising a bit in December. The cargo traffic trend smoothed out in 2008, settling on more constant, but lower monthly levels (see attachment). It should be noted that population increase cannot fully account for the passenger traffic increase. In 2008, the ratio of passengers to number of Metro Vancouver residents was about 6 percent higher than it was in 2001.</p>				

**d) Findings and Recommendations**

Assuming that the proportion of transferring passengers has remained unchanged between 2001 and 2008, it is plausible that Vancouver has become a more popular travel destination. However, it is impossible to definitively conclude that Vancouver has become a more population travel “destination” because how much of the airport traffic is arrivals vs. departures is not known. One could equally conclude that Vancouver has become less popular (more departures than arrivals). At the same time, less goods and cargo were being transported through YVR in 2008 than in 2001. In summary, it is possible that the increase in passenger traffic may be due partly to a greater “visibility” of Vancouver as a future Olympic Host. It may be useful to compare airport passenger traffic with other tourist travel data to see if there is a similar trend.



Ec13	WAGES								
a) Data Discussion									
<p>The indicator reports the mean and median wage by gender along with the gender disparity ratio at the city, provincial and country level. The median wage identifies the midpoint of the wage distribution (half of the wage-earners are paid less, and half are paid more than the median wage). The mean wage is the average wage; an easily calculable and understandable measure. Since a small number of very high wages could skew the mean wage (wages appear higher than they really are), the median wage is considered a more representative estimation of a typical wage. Thus the median wage is usually lower than the mean wage. The gender disparity ratio compares the median annual wage of females to males. A ratio of one means that females and males earn equal pay (a ratio of less than one means that females earn less than males). Data are provided by Statistics Canada as mean and median annual earnings. Mean weekly wages are calculated by dividing the mean annual earnings by 52 (weeks); hourly wages are calculated by dividing mean weekly wages by 37.5 (hours per week). Data come from the 2001 and 2006 censuses and report wages for 2000 and 2005, respectively. Any differences between the data used in this analysis and the baseline report are due to updates to the data by Statistics Canada. All wages/earnings are in constant (2005-chained dollars), as supplied by Statistics Canada.</p>									
b) Data Presentation									
<b>Ec13 Wages by Gender, Vancouver, B.C. And Canada, 2000 and 2005</b>									
Earnings/Wage	2000 (=2005)			2005			Change		
	Women	Men	Gender Disparity Ratio	Women	Men	Gender Disparity Ratio	Women	Men	Gender Disparity Ratio
<b>Vancouver</b>									
Median Annual	\$21,393	\$32,315	0.66	\$20,754	\$30,652	0.68	-3.0%	-5.1%	0.02
Mean Annual	\$27,955	\$42,790	0.65	\$28,427	\$44,246	0.64	1.7%	3.4%	-0.01
Mean Weekly	\$538	\$822.88	0.65	\$547	\$851	0.64	1.7%	3.4%	-0.01
Mean Hourly	\$14	\$22	0.65	\$15	\$23	0.64	1.7%	3.4%	-0.01
<b>B.C.</b>									
Median Annual	\$19,679	\$32,535	0.60	\$19,997	\$31,598	0.63	1.6%	-2.9%	0.03
Mean Annual	\$25,969	\$40,665	0.64	\$26,905	\$42,469	0.63	3.6%	4.4%	-0.01
Mean Weekly	\$499	\$782	0.64	\$517	\$817	0.63	3.6%	4.4%	-0.01
Mean Hourly	\$13	\$21	0.64	\$14	\$22	0.63	3.6%	4.4%	-0.01
<b>Canada</b>									
Median Annual	\$19,206	\$32,823	0.59	\$20,460	\$32,224	0.63	6.5%	-1.8%	0.05
Mean Annual	\$25,668	\$41,347	0.62	\$27,653	\$43,684	0.63	7.7%	5.7%	0.01
Mean Weekly	\$494	\$795	0.62	\$532	\$840	0.63	7.7%	5.7%	0.01
Mean Hourly	\$13	\$21	0.62	\$14	\$22	0.63	7.7%	5.7%	0.01
Source: Statistics Canada (2006).									

### c) Data Analysis

Between 2000 and 2005, mean wages increased for both genders across all levels. In Canada, mean wages increased by 7.7 percent for women and 5.7 percent for men. In Vancouver, mean wages increased by 1.7 percent for women and 3.4 percent for men. Unlike the rest of Canada, the increase was greater for men than it was for women in Vancouver and B.C. The median wage increased for all women in Canada, indicating an increasing income disparity between a few high-wage earners and bottom-half earners. This finding is also reflected in the fact that the gender disparity in Canada has decreased (i.e., women's wages in Canada rose by more than men's wages did). This decreased gender disparity did not affect the average woman in B.C. and Vancouver (i.e., the average male wage increased by more than the average female wage did). The median wage gender disparity ratio improved at all levels. Ostensibly, the nominal wage for women did not improve by much in Vancouver in that period. In 2000, women in Vancouver already earned about 10 percent more than women in B.C. and in Canada, and continued to do so in 2005. However, men in Vancouver earned on average less than men in B.C. and Canada for that period. Still, as the average male wage in Vancouver and B.C. was growing more than the average female wage, the mean wage gender disparity ratio decreased.

### d) Findings and Recommendations

The observed changes in wage gender disparity indicate that, on average, the situation has improved for women in Canada as a whole. On the other hand, it also suggests that there was greater income inequality in Canada – a decrease in *median* wage suggested lower wages overall, while a corresponding increase in *mean* wage suggested that top earners were earning even more. This was especially for men in Vancouver, B.C., and Canada. The situation in Vancouver, and to some extent in B.C., is somewhat different in terms of gender disparity but it is unlikely that the difference is due to the upcoming Olympic Games.

Ec14	Gini income distribution index						
<b>a) Data Discussion</b>							
<p>The Gini <i>coefficient</i> measures the inequality of income or wealth in a country. The Gini coefficient's values range between 0 and 1. A low Gini coefficient indicates more equal income or wealth distribution, while a high Gini coefficient indicates more unequal distribution. A value of 0 corresponds to perfect equality (income/wealth is equally distributed among all persons/households) and a value of 1 corresponds to perfect inequality (a single person holds all the income/wealth). The Gini <i>index</i> is the Gini coefficient expressed as percentage.</p> <p>The United Nations Development Programme (UNDP) publishes annual Human Development Reports that include the Gini index by country. Our data come from the Human Development Report 2000 and the Human Development Report 2007/2008.</p>							
<b>b) Data Presentation</b>							
<p style="text-align: center;"><b>Ec14 Gini Income Distribution Index, Canada, 2000 and 2007/2008</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;">2000</th> <th style="text-align: center;">2007/2008</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Gini index</td> <td style="text-align: center;">32.6%</td> <td style="text-align: center;">32.6%</td> </tr> </tbody> </table> <p>Source: UNDP Human Development Report, 2000 and 2007/2008.</p>			2000	2007/2008	Gini index	32.6%	32.6%
	2000	2007/2008					
Gini index	32.6%	32.6%					
<b>c) Data Analysis</b>							
<p>There was no change in the Canadian Gini income distribution index for the period 2000-2007/2008. Although the data are not strictly comparable across countries (due to the fact that the underlying household surveys differ in method and in the type of data collected), Canada's Gini index of 32.6 percent can be put into perspective by comparing it with other countries. The lowest Gini index reported by UNDP (2007/2008) is that of Denmark at 24.7 percent. The highest Gini index is that of Namibia at 74.3 percent. Other countries that had Gini indices close to Canada's were South Korea (31.6 percent), Tajikistan (32.6 percent), France (32.7 percent), Mongolia (32.8 percent), and Belgium (33 percent). There was more income/wealth inequality in the U.S. (Gini index of 40.8 percent) than in Canada.</p>							
<b>d) Findings and Recommendations</b>							
<p>For Canada, there were no changes in the Gini index (32.6%) between 2000 and 2007/2008; therefore, the impact of the 2010 Winter Games on this indicator is unlikely. While the indicator may be useful as a description of the Games context at a country level, it does not reflect any changes at a local level (Host City or regional level). The Gini index could be a useful indicator at the city/regional level if data were available to calculate the index at these levels.</p>							

Ec15	Consumer Price Index																																													
<b>a) Data Discussion</b>																																														
<p>The Consumer Price Index (CPI) is a measure of the average price of consumer goods and services purchased by households. It is a price index determined by measuring the price of a standard group of goods meant to represent the typical market basket of a typical urban consumer. Statistics Canada measures CPI consisting of prices of food; shelter; household operations, furnishing and equipment; clothing and footwear; transportation; health and personal care; recreation, education and reading; and alcoholic beverages and tobacco products. The CPI is calculated monthly, and then averaged annually.</p> <p>A year is chosen as a basis of comparison and the CPI that year is called the base index (set equal to 100). Then, the CPI for every following year is calculated in terms of change to the base index, and the change reflects the percentage price increase of the goods and services measured (i.e., the inflation). The Technical Manual specifies that for OGI, year 2001 should serve as base; since Statistics Canada currently reports CPIs based on 2002, however, in our analysis the index for 2002 is the base, set at 100. Since the rate of change itself carries the important information, the selection of specific year does not affect the analysis in any significant way.</p>																																														
<b>b) Data Presentation</b>																																														
<b>Ec15 Consumer Price Index, B.C. and Canada, 2001-2008<sup>1</sup> (2002=100)</b>																																														
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<p><sup>1</sup> Annual average indexes are obtained by averaging the indexes for the 12 months of the calendar year.          Source: Statistics Canada (2009).</p>																																														
<b>c) Data Analysis</b>																																														
<p>The CPIs for both B.C. and Canada exhibit a relatively stable, rising trend, increasing by an average of 2 percent per year, for the 2001-2008 period. I.e., the prices of consumer goods and services have seen a moderate rise which is normal and nothing out of the ordinary. For comparison purposes, the average rate of change for the U.S.A. was 2.8 percent per year in that period. All in all, consumer prices were higher in 2006 than they were in 2002, by 8.1 percent in B.C. and by 9.1 percent in Canada. In 2008, the prices were 12.3 percent and 14.1 percent higher than in 2002, respectively.</p>																																														
<b>d) Findings and Recommendations</b>																																														
<p>There is no marked difference in the rate of change pre-2003 and post-2003 (the year Vancouver was selected as a host city). No Games effect can be detected (although some impact for B.C. is not completely unlikely) but it is possible that B.C. monthly CPIs during and immediately prior to the Games may be affected.</p>																																														

Ec16	Price Indexes																																																																							
<b>a) Data Discussion</b>																																																																								
<p>The indicator reports indexes of prices of water, electricity and housing. Any change in these indexes relative to a base-index year reflects the percentage increase in the price in question. Statistics Canada, which compiled the source data, does not differentiate between water and electricity; thus, only one index is given for both. The Technical Manual advises that the base-index year should be two years prior to the awarding of Games (2001). We've used 2002 as the base-index year.</p>																																																																								
<b>b) Data Presentation</b>																																																																								
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<p>The prices of water/electricity in both B.C. and Canada increased steadily between 2003 and 2008. In B.C., the water/electricity price index increased by 3.4 percent per year on average, while the housing price index increased by 2.3 percent per year on average. In Canada, the water/electricity price index increased by 5.2 percent per year, while the housing price index increased by 3.4 percent per year. Overall, prices increased more in Canada than they did in B.C. Between 2003 and 2008, the price of water/electricity in Canada increased by 24.4 percent, while in B.C. it increased by 17.5 percent. The price of housing in Canada increased by 18.2 percent, while in B.C. it increased by 12.3 percent. It is interesting to note that one of the lowest levels of price increases (in 2007) was followed by the largest jump in prices in 2008. Finally in both B.C. and Canada, water/electricity prices increased at a higher rate than housing prices.</p>																																																																								
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<p>Between 2003 and 2008, the annual inflation trend for prices of water/electricity and housing in B.C. were comparable to trends in Canada. However, B.C. generally had less inflation than Canada. The available data do not allow for comparison of inflation before vs. after Vancouver was selected as a Host City (2003), but the observed trends do not seem out of the ordinary, especially considering the overall similarity in trends between B.C. and Canada. It is possible that the inflation rate in B.C. may increase in the lead up to the 2010 Winter Games. In addition, future analysis must take into consideration the potential effect of the current economic crisis (2008-2009).</p>																																																																								

Ec17	Hotel Price Index												
a) Data Discussion													
<p>This indicator shows the evolution of the price of visitor accommodation. The available data come from Tourism B.C. Year in Review for 2001 and 2006 years in the form of average monthly price for all hotel classes and room sizes in Canadian dollars.</p>													
b) Data Presentation													
Ec17 Hotel Price Index, Metro Vancouver and B.C., 2001 and 2006, by month (in CAD)													
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
2001 Metro Van.	98.88	100.75	105.91	103.88	124.87	141.11	147.04	143.75	130.43	109.07	99.07	94.23	120.57
2006 Metro Van.	106.4	106.91	109.72	110.88	138.69	150.78	152.34	151.29	143.45	121.65	110.38	104.97	128.24
Change	7.6%	6.1%	3.6%	6.7%	11.1%	6.9%	3.6%	5.2%	10.0%	11.5%	11.4%	11.4%	6.4%
2001 BC	114.7	117.83	117.45	104.88	113.99	127.75	136.62	135.94	119.6	100.31	93.25	111.13	118.22
2006 BC	111.9	112.61	111.3	108.72	127.64	138.27	145.86	146.56	133.67	113.46	105.33	119.16	124.73
Change	-2.5%	-4.4%	-5.2%	3.7%	12.0%	8.2%	6.8%	7.8%	11.8%	13.1%	13.0%	7.2%	5.5%
Source: Tourism Vancouver Data in Review (2001, 2006).													
c) Data Analysis													
<p>Overall, the monthly hotel prices for both B.C. and Metro Vancouver follow the same annual pattern: relatively low prices in the winter and early spring (January to April), followed by steep rise in the late spring and to late summer (May-September) peaking in July and August, and a gradual decline in the final months of the year (October to December). It is interesting to note that hotel prices in B.C. tend to hike up in December compared to other winter-early spring months, unlike in Metro Vancouver where December marks the cheapest hotel prices of the year.</p> <p>This pattern is almost exactly replicated in 2001 and 2006, the only difference being the January-April hotel prices in B.C., which were lower in 2006 than they were in 2001.</p> <p>The average annual price increase between 2001 and 2006 was 6.4 percent in Metro Vancouver and 5.5 percent in B.C. Adjusting for inflation, however, it appears that hotel accommodation has in reality become cheaper. Since \$128.24 in 2006 (the average hotel price in Metro Vancouver for the year) cost only \$114.94 in 2001-dollars (inflation calculator provided by Bank of Canada), the annual average hotel prices in the Region have actually decreased by 4.6 percent once inflation is taken into account. By analogy, the average hotel price in B.C. has actually fallen by 5.4 percent in 2006.</p>													
d) Findings and Recommendations													
<p>Nominal hotel prices have increased in both B.C. and Metro Vancouver for the five-year period between 2001 and 2006. The real (adjusted for inflation) prices, however, have fallen. The monthly trend in hotel pricing appears seasonal and thus unaffected by the Olympic Games yet. The <i>de facto</i> lower hotel prices could be brought about by numerous reasons, including increased availability of hotel accommodation (as reported for Ec8), or a desire of metro Vancouver and the province to attract more tourist. Both reasons can be potentially linked to the Olympic Games, though it is possible that the change has nothing to do with OGI. If annual data for all the years between 2001 and 2006 are obtained and examined, better</p>													

assessment of any potential OGI is feasible.

Ec18	Real Estate Market																																																																																																	
<b>a) Data Discussion</b>																																																																																																		
<p>The indicator reports on the <i>average</i> prices of real estate for sale and for rent. The Technical Manual specifies <i>median</i> price as the recommended dimension, but this data was not available. It was also not possible to disaggregate median price by new and old real estate, by square meter, or by residential neighbourhoods. Thus, the data presented in the analysis are <i>averages</i> for Metro Vancouver and B.C. Note that baseline data for prices in USD were discarded due to incorrect calculations in the baseline report; prices reported here were recalculated to correct that. The numbers presented here correct for that mistake.</p>																																																																																																		
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Average Rental Price																																																																																																		
Bachelor	\$621	\$415	\$701	\$606	\$573	\$383	\$650	\$562																																																																																										
One-Bedroom	\$726	\$485	\$816	\$705	\$665	\$444	\$754	\$652																																																																																										
Two-Bedroom	\$919	\$614	\$1,045	\$903	\$772	\$516	\$882	\$762																																																																																										
Three-Bedroom	\$1,060	\$708	\$1,220	\$1,054	\$874	\$584	\$1,001	\$865																																																																																										
<p><sup>1</sup> Exchange rates used are from Jan. 2, 2001 and Jan. 3, 2006.          Source: BC Statistics (2001, 2007), Canada Mortgage and Housing Corporation (2001, 2006).</p>																																																																																																		
<b>c) Data Analysis</b>																																																																																																		
<p>Between 2001 and 2006, the average residential unit price in <i>nominal Canadian dollars</i> increased by 79 percent in Metro Vancouver and by 77 percent in B.C. The average owner's major payments increased by 17 percent in both Metro Vancouver and B.C., while the average rental unit prices for all unit types increased by between 12 percent and 15 percent in both Metro Vancouver and B.C.</p> <p>When these prices are converted into <i>U.S. dollars (USD)</i>, the rates at which prices increased were even higher. Prices were converted using exchange rates for each respective year. In 2001, the Canadian dollar was much weaker (1CAD=0.668USD) than it was in 2006 (1CAD=0.864USD). Taking these exchange rates into account, calculations showed that in both Metro Vancouver and B.C., the average residential unit price increased by about 130 percent, the average owner's major payments (i.e., mortgage payments) increased by about 50 percent, and average rental unit prices increased by between 46 percent and 49 percent.</p> <p>However, taking inflation into account (2.3 percent average annual rate of inflation for the period; not shown in table) suggests that in 2001-chained Canadian dollars the rates at which prices increased were relatively negligible, with the exception of average residential unit price. The average residential unit price was 36 percent higher in 2006 than it was in 2001 in Metro Vancouver, and 58 percent higher in B.C. The average owner's major payments were only 5 percent higher in both Metro Vancouver and B.C., and the average rental unit prices for all unit types were less than 3 percent higher in both Metro Vancouver and B.C. Finally, despite higher average residential unit prices in 2006, nearly 30 percent more properties were sold in Metro Vancouver, and more than 40 percent more properties were sold in B.C. than were sold in 2001.</p>																																																																																																		

#### d) Findings and Recommendations

Between 2001 and 2006, the average rental price and owner's major payments did not increase by much in *real dollars*. More residential properties were sold in 2006, and at a higher average price, than were sold in 2001. One possible explanation is that demand for property had increased (e.g., due to rising population, changing preferences, speculation, etc.). Another possible explanation is that there were a greater proportion of more expensive units sold in 2006 than in 2001 (i.e., greater number of luxurious properties were being sold in 2006). Since there can be many reasons for the observed price increases, it is difficult to isolate any specific impacts related to the Games. At best, it is reasonable to hypothesize that speculative property buying was/is on the rise the closer we get to the Games.

Ec19	Economic Balance (Import / Export)																										
<b>a) Data Discussion</b>																											
<p>The indicator reflects the relative importance of import-export activities in the total economy of the host country. Any change can be interpreted as either intensification or reduction in trade with other countries.</p>																											
<b>b) Data Presentation</b>																											
<p><b>Ec19: Economic Balance          Import-Export, 2001-2007</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2" style="text-align: center;">Percentage of GDP (nominal)</th> </tr> <tr> <th style="text-align: center;">Imports</th> <th style="text-align: center;">Exports</th> </tr> </thead> <tbody> <tr> <td>2001</td> <td style="text-align: center;">31.6%</td> <td style="text-align: center;">38.0%</td> </tr> <tr> <td>2002</td> <td style="text-align: center;">30.9%</td> <td style="text-align: center;">35.9%</td> </tr> <tr> <td>2003</td> <td style="text-align: center;">28.2%</td> <td style="text-align: center;">32.8%</td> </tr> <tr> <td>2004</td> <td style="text-align: center;">28.1%</td> <td style="text-align: center;">33.2%</td> </tr> <tr> <td>2005</td> <td style="text-align: center;">28.3%</td> <td style="text-align: center;">32.8%</td> </tr> <tr> <td>2006</td> <td style="text-align: center;">27.9%</td> <td style="text-align: center;">31.3%</td> </tr> <tr> <td>2007</td> <td style="text-align: center;">27.0%</td> <td style="text-align: center;">30.2%</td> </tr> </tbody> </table> <p>Source: Statistics Canada (2008).</p>			Percentage of GDP (nominal)		Imports	Exports	2001	31.6%	38.0%	2002	30.9%	35.9%	2003	28.2%	32.8%	2004	28.1%	33.2%	2005	28.3%	32.8%	2006	27.9%	31.3%	2007	27.0%	30.2%
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<b>c) Data Analysis</b>																											
<p>Between 2001 and 2007 both imports and exports, as a proportion of the gross domestic product (GDP), decreased almost steadily, with the exception of the 2003-2005 period when the proportions of both remained more or less the same. Compared to 2001, the proportions in 2007 were less for both imports (by 4.6 percentage points) and exports (by 7.9 percentage points). In 2001, the difference between the proportions of imports and exports was 6.4 points, while in 2007 this difference was smaller at 3.1 points. This further suggests that Canadian exports had shrunk more than imports had.</p>																											
<b>d) Findings and Recommendations</b>																											
<p>Between 2001 and 2007, a trend of decreased “openness” of the Canadian economy to foreign trade was observed (i.e., decreases in both imports and exports as a proportion of the GDP over time). However, it is unlikely that this trend can be substantially linked to the upcoming 2010 Winter Games. Rather, the state of the national and the global economies as a whole is a more likely driving force behind the observed changes.</p>																											

Ec21	Investment Risks																
<b>a) Data Discussion</b>																	
<p>The indicator provides risk assessment for international investors investing in Canada. Ratings used are: the composite International Country Risk Guide (ICRG), a general index ranging from 0 to 100 based on 22 risk components; Moody's sovereign long-term debt rating (foreign currency), with ratings varying from Aaa to C, indicating a country's debt security; and Standard &amp; Poor's sovereign long-term debt rating (foreign currency), varying from AAA to CC, indicating a country's ability to repay its debts. The Euromoney country credit-worthiness rating data is available through a subscription fee of \$595 USD. This was not deemed to be an appropriate use of limited resources; however, a subscription may be appropriate for future OGI reports when data could be acquired for the full period of the OGI study.</p>																	
<b>b) Data Presentation</b>																	
<b>Ec21 Investment Risks, Various Ratings 2001-2008</b>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 35%;">Political Risk Services (ICRG)</th> <th style="width: 15%;">Moody's</th> <th style="width: 40%;">Standard &amp; Poor's</th> </tr> </thead> <tbody> <tr> <td>2001</td> <td style="text-align: center;">84.5</td> <td style="text-align: center;">Aa1</td> <td style="text-align: center;">AA+</td> </tr> <tr> <td>2007</td> <td style="text-align: center;">85.5</td> <td style="text-align: center;">-</td> <td style="text-align: center;">AAA/Stable/A-1+</td> </tr> <tr> <td>2008</td> <td style="text-align: center;">-</td> <td style="text-align: center;">Aaa</td> <td style="text-align: center;">AAA/Stable/A-1+</td> </tr> </tbody> </table>			Political Risk Services (ICRG)	Moody's	Standard & Poor's	2001	84.5	Aa1	AA+	2007	85.5	-	AAA/Stable/A-1+	2008	-	Aaa	AAA/Stable/A-1+
	Political Risk Services (ICRG)	Moody's	Standard & Poor's														
2001	84.5	Aa1	AA+														
2007	85.5	-	AAA/Stable/A-1+														
2008	-	Aaa	AAA/Stable/A-1+														
<b>c) Data Analysis</b>																	
<p>The ICRG composite rating on the political, economic and financial risks to international business and financial institutions rose by 1 point between 2001 and 2007, from 84.5 to 85.5. Countries with a rating above 80 points are considered very low-risk.</p> <p>The Moody's rating on the country's debt security was upgraded from Aa1 in 2001 to Aaa in 2008. According to Moody's rating definitions obligations rated Aa are judged to be of high quality and are subject to very low credit risk, but "their susceptibility to long-term risks appears somewhat greater;" while obligations rated Aaa are judged to be of the highest quality, with the "smallest degree of risk."</p> <p>The Standard &amp; Poor's rating of Canada's ability to pay its debts was upgraded from AA+ in 2001 to AAA in 2008. AAA is the highest rating indicating that the borrower is reliable and stable (usually governments, as in this case), while AA+ indicates a quality borrower with slightly higher risk than AAA. (The Standard &amp; Poor's short-term rating is also given in the table, where A-1+ indicates a borrower with a strong capacity to repay its debt.)</p>																	
<b>d) Findings and Recommendations</b>																	
<p>Canada has been, and still is, estimated to be a very low-risk country for foreign capital investment. Although all of the reported ratings were upgraded between 2001 and 2008, this change was highly unlikely to have been influenced by the upcoming 2010 Winter Games.</p>																	

Ec22	Foreign Direct Investment					
a) Data Discussion						
<p>Foreign direct investment (FDI) is a measure of foreign ownership of productive assets, such as factories, mines and land. It monitors foreign assets in the domestic economy and thus serves to measure the economic attractiveness of a country.</p> <p>Data in the analysis were provided by Statistics Canada. Differences in data in this pre-Games report and the baseline report are due to updates and recalculations by Statistics Canada; our practice is to use the most up-to-date data available.</p>						
b) Data Presentation						
<b>Ec22 Foreign Direct Investment,          Canada 2001-2007 (mlns of dollars)</b>						
	CAD	USD <sup>1</sup>	Change from prev. year (%)	Change USD 2001 from prev. year (%)		
<b>2001</b>	\$340,429	\$227,514	-	\$227,514	-	
<b>2002</b>	\$356,819	\$223,305	-1.8%	\$219,829	-3.4%	
<b>2003</b>	\$373,685	\$237,306	6.3%	\$228,407	3.9%	
<b>2004</b>	\$379,450	\$294,147	24.0%	\$275,773	20.7%	
<b>2005</b>	\$395,238	\$328,380	11.6%	\$297,778	8.0%	
<b>2006</b>	\$437,801	\$378,361	15.2%	\$332,380	11.6%	
<b>2007</b>	\$500,851	\$428,114	13.1%	\$365,671	10.0%	
<p><sup>1</sup> Rates in US dollars calculated based on exchange rates calculated on January 2 of the listed year.          Source: Statistics Canada 2008.</p>						
c) Data Analysis						
<p>Between 2001 and 2007, FDI in Canada increased steadily; this is part of a long-term trend over the past 20 years (Statistics Canada, 2007). The only drop in the FDI was in 2002 that was due to the relative value of the Canadian and U.S. dollars. In 2004 the FDI picked up and then increased at more moderate rates in the following years. The same trend is observed even when inflation is taken into account (see the recalculation in 2001-chained dollars in the table). Overall in 2007, FDI in Canada was 88 percent higher than it was in 2001 in nominal USD (or about 60 percent higher in 2001-chained USD).</p>						
d) Findings and Recommendations						
<p>Between 2001 and 2007, FDI in Canada increased steadily, and the largest increase was in 2004 (a year after Vancouver was selected as the Host City for the 2010 Winter Games). However, given the scale of measurement (country level), the increase in 2004 was most likely coincidental with Vancouver becoming the 2010 Host City. FDI data at a regional level may be more susceptible to impacts from the upcoming 2010 Winter Games.</p>						

Ec24	Structure of Public Spending
a) Data Discussion	
<p>The indicator presents a breakdown of public spending by activity fields. In the data presented, the classification of fields by activity are those used by Statistics Canada are relatively close. According to the classifications specified in the Technical Manual, the following are excluded from the totals for public spending. Data for B.C. exclude Debt Charges and Other Expenditures. Data for Canada exclude Foreign Affairs and International Assistance, and Debt Charges and Other Expenditures. Any differences between data for the year 2001 reported in the baseline report and in this report are due to updates to the data since then. Any differences between the B.C. totals for this indicator and the totals in this report for the indicator Ec23 (Public Spending and Tax Revenue as a Proportion of GDP) are due to the excluded categories for this indicator (Ec24), the use of constant dollars for Ec23, and updated data. Any differences with the Canadian totals for this indicator (Ec24) and the indicator Ec23 are also due to these three reasons, as well as the presentation of Canadian spending as consolidated data (federal, provincial, territorial, etc. combined) for this indicator (Ec24). Both nominal and real (2001-chained) dollar values are presented; only real dollars are used in the analysis.</p>	
b) Data Presentation	
See attachment.	
c) Data Analysis	
<p>Between 2001 and 2006, public spending increased at all levels – city, regional and country. In Vancouver, all categories of public spending experienced a rise, the largest being in Engineering, followed by Recreation and Parks. Overall, public spending in Vancouver increased by nearly 30 percent. As a proportion of the total, the categories remained more or less the same, with Engineering increasing its share the most, by 4.5 percentage points. The largest category as a proportion of the total spending for both years was Police Protection.</p> <p>Between 2001 and 2006, public spending in B.C. increased by 7.2 percent. The category in which the largest increase was observed was General Purpose Transfers to Other Government Subsectors, followed by Research Establishments and General Government Services. Unlike Vancouver, public spending in B.C. decreased for some categories. The largest decrease was for Labour, Employment and Immigration, followed by Protection of Persons and Property. The proportion of each category (compared to the total) remained mostly unchanged; the largest change occurred in Social Services, which decreased its share by 2.3 percentage points. The two largest categories in B.C. in terms of public spending in 2001 and in 2006 were Health and Education, whose combined share was over 50 percent.</p> <p>Between 2001 and 2006, public spending in Canada increased by more than 15 percent. The largest increase was in Health and Environment, followed by Transportation and Communication. The only category in which spending decreased was Labour, Employment and Immigration. As a proportion of the total, almost all categories in 2006 remained within 0.3 percentage points compared to their proportions in 2001, except for Social Services (which decreased its share by 2.2 percentage points) and Health (which increased its share by 1.8 percentage points).</p>	

#### d) Findings and Recommendations

Most of the observed changes, especially at the regional and country levels, seem unrelated to the upcoming 2010 Winter Games. At the city level however, the increase in public spending may have possibly been driven in part by Games preparations, especially given the increases in Engineering, Recreation and Parks, Solid Waste and Community and Cultural Services.

Ec24 Structure of Public Spending, Vancouver, B.C. and Canada, 2001 and 2006 (\$ millions)

	Vancouver					
	2001	Proportion	2006	Proportion	2006 (=2001)	Change
General government	94.36	12.7%	115.90	10.9%	103.63	9.8%
Police protection	135.10	18.2%	179.57	16.9%	160.55	18.8%
Fire protection	71.77	9.7%	81.37	7.7%	72.75	1.4%
Planning and development	54.96	7.4%	64.12	6.0%	57.33	4.3%
Engineering	86.30	11.6%	171.15	16.1%	153.03	77.3%
Water utility	59.48	8.0%	69.83	6.6%	62.44	5.0%
Solid waste	29.77	4.0%	45.32	4.3%	40.52	36.1%
Sewer utility	61.85	8.3%	80.03	7.5%	71.56	15.7%
Community and cultural services	61.88	8.3%	92.97	8.8%	83.13	34.3%
Recreation and parks	86.57	11.7%	160.26	15.1%	143.29	65.5%
<i>Total</i>	<i>742.06</i>	<i>100.0%</i>	<i>1,060.52</i>	<i>100.0%</i>	<i>948.23</i>	<i>27.8%</i>

	BC					
	2001	Proportion	2006	Proportion	2006 (=2001)	Change
General government services	312	1.2%	753	2.3%	673	115.7%
Protection of persons and property	1,225	4.5%	1,126	3.5%	1,007	-17.8%
Education	7,071	26.2%	8,925	27.6%	7,980	12.9%
Recreation and culture	301	1.1%	426	1.3%	381	26.6%
Health	9,806	36.4%	11,888	36.8%	10,629	8.4%
Social services	4,972	18.5%	5,223	16.2%	4,670	-6.1%
Transportation and communication	1,289	4.8%	1,755	5.4%	1,569	21.7%
Environment	144	0.5%	247	0.8%	221	53.5%
Labour, employment and immigration	68	0.3%	55	0.2%	49	-27.9%
General purpose transfers to other government subsectors	26	0.1%	145	0.4%	130	400.0%
Housing	140	0.5%	167	0.5%	149	6.4%
Regional planning and development	83	0.3%	81	0.3%	72	-13.3%
Research establishments	13	0.0%	50	0.2%	45	246.2%
Resource conservation and industrial development	1,497	5.6%	1,462	4.5%	1,307	-12.7%
<i>Total</i>	<i>26,947</i>	<i>100.0%</i>	<i>32,303</i>	<i>100.0%</i>	<i>28,882</i>	<i>7.2%</i>

	Canada					
	2001	Proportion	2006	Proportion	2006 (=2001)	Change
General government services	15,968	4.5%	19,796	4.3%	17,700	10.8%
Protection of persons and property	32,978	9.2%	43,534	9.5%	38,924	18.0%
Education	63,522	17.8%	82,685	18.0%	73,929	16.4%
Recreation and culture	10,871	3.0%	14,207	3.1%	12,703	16.9%
Health	70,465	19.8%	99,126	21.6%	88,629	25.8%
Social services	110,145	30.9%	131,543	28.7%	117,613	6.8%
Transportation and communication	17,979	5.0%	24,723	5.4%	22,105	22.9%
Environment	9,222	2.6%	12,935	2.8%	11,565	25.4%
Labour, employment and immigration	2,882	0.8%	2,480	0.5%	2,217	-23.1%
General purpose transfers to other government subsectors	0	0.0%	0	0.0%	0	0.0%
Housing	3,723	1.0%	4,244	0.9%	3,795	1.9%
Regional planning and development	1,847	0.5%	2,217	0.5%	1,982	7.3%
Research establishments	1,419	0.4%	1,859	0.4%	1,662	17.1%
Resource conservation and industrial development	15,713	4.4%	19,754	4.3%	17,662	12.4%
<i>Total</i>	<i>356,734</i>	<i>100.0%</i>	<i>459,103</i>	<i>100.0%</i>	<i>410,486</i>	<i>15.1%</i>

Source: Statistics Canada (2008), City of Vancouver Annual Financial Report (2001, 2006).

Ec25	Structure of Fiscal Revenue
a) Data Discussion	
<p>The indicator reports on the structure of fiscal revenue broken down into three categories: direct taxation, indirect taxation, and other revenue. Tax data in Canada, however, are not classified into "direct" and "indirect" forms of taxation. As income tax and consumption tax are the most common forms of direct and indirect taxation (respectively), these represent the best available alternative source of data. Any differences between data reported in this report and data presented in the baseline report are due to data that have been updated since the baseline report. Any differences between B.C. data for this indicator (Ec25) reported here and the indicator Ec23 (Public Spending and Tax Revenue as a Proportion of GDP) are due to the use of constant dollars for Ec23 and updated data. Any differences between Canadian data for this indicator (Ec25) and the indicator Ec23 are due to the same two reasons, as well as the use of consolidated data (federal, provincial, territorial, etc. combined) for fiscal revenue for Ec25.</p> <p>Both nominal and real (2001-chained) dollar values are presented; only real dollars are used in the analysis.</p>	
b) Data Presentation	
See attachment.	
c) Data Analysis	
<p>Between 2001 and 2006, fiscal revenues (in real, 2001-chained dollars) increased for the City of Vancouver (by 20.7 percent), B.C. (by 13.5 percent), and Canada (by 6.3 percent). The specific changes to the various types of revenue are presented in the attached table.</p> <p>Overall, the structure of the fiscal revenues for the City of Vancouver and Canada did not change much during that period. In Vancouver's revenue sheet, all but two categories changed in proportion to the total by less than one percentage point. The two categories that exhibited the largest changes were Property Tax, Solid Waste, Sewer and Other (its share decreased by 4.8 percentage points) and Other Fees (its share increased by 6.2 percentage points). In Canada's fiscal revenue sheet, virtually all categories' shares of the total remained within 0.6 percentage points of their 2001 state.</p> <p>The structure of the fiscal revenue of B.C. changed the most of the three levels of government: the proportion of income taxes in B.C. fell by nearly 4 percentage points, investment income's share fell by 5.3 percentage points, general purpose transfers from other government subsectors' share was reduced by 4 percentage points, while the shares of specific purpose transfers from other government subsectors' share rose by 8.4 percentage points.</p>	
d) Findings and Recommendations	
<p>While the structure of the fiscal revenues of the City of Vancouver and Canada remained mostly unchanged between 2001 and 2006, the structure of B.C.'s revenue changed. Given the definitions of the categories in the revenue sheet, it is difficult to speculate on any potential link between these changes and the upcoming 2010 Winter Games. For example, it is possible that the specific purpose transfers from other government subsectors may be related to the Games; however, the available data precludes a definite conclusion.</p>	

One-pager Summary Sheets for Selected Indicators (Analysis Possible But Inconclusive at Pre-Games)

Ec25 Structure of Fiscal Revenue, Vancouver, B.C. and Canada, 2001 and 2006 (\$ millions)

		<b>Vancouver</b>					
		2001	Proportion	2006	Proportion	2006 (=2001)	Change
Direct taxation	Property tax, solid waste, sewer and other	\$413.61	52.4%	\$507.51	47.6%	\$453.77	9.7%
	Water fees	\$56.49	7.2%	\$68.86	6.5%	\$61.57	9.0%
Indirect taxation	Solid waste fees	\$31.77	4.0%	\$42.79	4.0%	\$38.26	20.4%
	Sewer fees	\$28.83	3.7%	\$33.19	3.1%	\$29.67	2.9%
	Other fees	\$182.94	23.2%	\$313.23	29.4%	\$280.06	53.1%
Other revenue	Revenue sharing, grants and contributions	\$11.38	1.4%	\$18.59	1.7%	\$16.62	46.0%
	Investment income	\$22.93	2.9%	\$30.08	2.8%	\$26.89	17.3%
	Rental and lease income	\$38.50	4.9%	\$43.02	4.0%	\$38.46	-0.1%
	Sale of property	\$2.82	0.4%	\$8.06	0.8%	\$7.20	155.0%
<b>Total</b>		<b>\$789.26</b>	<b>100%</b>	<b>\$1,065.31</b>	<b>100%</b>	<b>\$952.50</b>	<b>20.7%</b>
		<b>BC</b>					
		2001	Proportion	2006	Proportion	2006 (=2001)	Change
Direct taxation	Income Taxes	\$7,369	24.4%	\$7,841	20.4%	\$7,011	-4.9%
Indirect taxation	Consumption Taxes	\$6,322	20.9%	\$8,127	21.2%	\$7,266	14.9%
	Property and related taxes	\$2,161	7.2%	\$2,708	7.1%	\$2,421	12.0%
	Other taxes	\$591	2.0%	\$802	2.1%	\$717	21.3%
	Health and drug insurance premiums	\$895	3.0%	\$1,461	3.8%	\$1,306	45.9%
	Contributions to social security plans	\$866	2.9%	\$1,271	3.3%	\$1,136	31.2%
Other revenue	Sales of goods and services	\$2,357	7.8%	\$3,446	9.0%	\$3,081	30.7%
	Investment income	\$6,075	20.1%	\$5,662	14.8%	\$5,062	-16.7%
	Other revenue from own sources	\$271	0.9%	\$1,140	3.0%	\$1,019	276.0%
	General purpose transfers from other government subsectors	\$2,632	8.7%	\$1,804	4.7%	\$1,613	-38.7%
Specific purpose transfers from other government subsectors		\$677	2.2%	\$4,082	10.6%	\$3,650	439.1%
<b>Total</b>		<b>\$30,216</b>	<b>100%</b>	<b>\$38,344</b>	<b>100%</b>	<b>\$34,284</b>	<b>13.5%</b>
		<b>Canada</b>					
		2001	Proportion	\$2,006	Proportion	2006 (=2001)	Change
Direct taxation	Income Taxes	\$191,144	42.8%	\$225,218	42.4%	\$201,369	5.3%
Indirect taxation	Consumption Taxes	\$87,870	19.7%	\$107,844	20.3%	\$96,424	9.7%
	Property and related taxes	\$41,063	9.2%	\$49,404	9.3%	\$44,172	7.6%
	Other taxes	\$15,157	3.4%	\$18,885	3.6%	\$16,885	11.4%
	Health and drug insurance premiums	\$2,178	0.5%	\$3,258	0.6%	\$2,913	33.7%
	Contributions to social security plans	\$30,087	6.7%	\$32,368	6.1%	\$28,940	-3.8%
Other revenue	Sales of goods and services	\$34,689	7.8%	\$42,869	8.1%	\$38,329	10.5%
	Investment income	\$37,749	8.4%	\$45,341	8.5%	\$40,540	7.4%
	Other revenue from own sources	\$7,020	1.6%	\$5,950	1.1%	\$5,320	-24.2%
	<b>Total</b>	<b>\$446,957</b>	<b>100%</b>	<b>\$531,137</b>	<b>100%</b>	<b>\$474,893</b>	<b>6.3%</b>

Source: City of Vancouver Annual Financial Report (2001, 2006); Statistics Canada (2007).

Ec26	Public Debt																																							
<b>a) Data Discussion</b>																																								
<p>The indicator reports the debt of the federal (Canadian) and provincial (B.C.) governments per capita and as a proportion of the GDP. Although the Technical Manual specifies that the gross debt should be reported, Statistics Canada data were only available for net debt (defined as the excess of liabilities over financial assets). Thus, net debt was used in the analysis. Any differences between the data in this report and the data in the baseline report are due to incorrect ratios being presented in the baseline report (specifically, the net public debt per capita as a proportion of the GDP).</p>																																								
<b>b) Data Presentation</b>																																								
<b>Ec26 Public Debt: Government Net Financial Debt, B.C. and Canada, 2001 and 2006</b>																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="3">Net Financial Debt (\$ millions)</th> <th colspan="3">Net Financial Debt per capita (\$)</th> <th colspan="3">Net Financial Debt Percentage of GDP</th> </tr> <tr> <th>2001</th> <th>2006</th> <th>Change</th> <th>2001</th> <th>2006</th> <th>Change</th> <th>2001</th> <th>2006</th> <th>Change</th> </tr> </thead> <tbody> <tr> <td>B.C. - Provincial Government</td> <td>15,448</td> <td>16,221</td> <td>5.0%</td> <td>3,790</td> <td>3,770</td> <td>-0.5%</td> <td>11.6%</td> <td>9.9%</td> <td>-1.6</td> </tr> <tr> <td>Canada - Federal Government</td> <td>545,300</td> <td>514,099</td> <td>-5.7%</td> <td>17,640</td> <td>15,798</td> <td>-10.4%</td> <td>49.8%</td> <td>36.8%</td> <td>-13.0</td> </tr> </tbody> </table>			Net Financial Debt (\$ millions)			Net Financial Debt per capita (\$)			Net Financial Debt Percentage of GDP			2001	2006	Change	2001	2006	Change	2001	2006	Change	B.C. - Provincial Government	15,448	16,221	5.0%	3,790	3,770	-0.5%	11.6%	9.9%	-1.6	Canada - Federal Government	545,300	514,099	-5.7%	17,640	15,798	-10.4%	49.8%	36.8%	-13.0
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<p>The net financial debt of the federal government has decreased continuously since 1997, as a total amount per capita, and as a proportion of the GDP. Between 2001 and 2006, the net financial debt of the federal government decreased by 5.7 percent. The net financial debt per capita in Canada decreased by more than 10 percent, and the net financial debt as a proportion of the GDP decreased by 13 percentage points from nearly 50 percent in 2001 to 36.8 percent in 2006 (in 2007, the financial debt as a proportion of the GDP fell even further to the lowest since 1984 (Statistics Canada, 2008)). During this period, the net financial debt of the B.C. provincial government increased by 5 percent; however, the net financial debt per capita decreased marginally by a half percent. The provincial debt as a proportion of the GDP decreased by 1.6 percentage points.</p> <p>Overall, the data show that public debt per capita decreased over time, and more so in Canada than in B.C. In addition, the decrease in debt as a proportion of the GDP (at least up until 2006) suggests that the economies of both B.C. and Canada were better able to support public debt during this period.</p>																																								
<b>d) Findings and Recommendations</b>																																								
<p>The upcoming 2010 Winter Games do not appear to have overburdened the governments of B.C. and Canada, at least in terms of public debt. It could be speculated that public debt (both per capita and as a proportion of the GDP) could have decreased even more than they did, especially in B.C., had Vancouver not been selected as the 2010 Host City. However, we have no means to test this speculation. Nevertheless, the decrease in public debt (both per capita and as a proportion of the GDP) of the B.C. and Canadian governments suggests that the governments were able to meet the expenses associated with the Games (at least up until 2006).</p>																																								