



CITY OF VANCOUVER

POLICY REPORT ENVIRONMENT

Date:

March 15, 2005

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Meeting Date: March 29, 2005

TO:

Vancouver City Council

FROM:

City of Vancouver Sustainability Group in partnership with the Cool

Vancouver Task Force

SUBJECT:

Vancouver's Community Climate Change Action Plan

RECOMMENDATION

- THAT Council adopt the Community Climate Change Action Plan (Community A. CCAP) and thank the Cool Vancouver Task Force for their invaluable assistance in its preparation.
- B. THAT Council forward the Plan to the Board of Parks and Recreation, the Police Board, and the Library Board and ask that they endorse the Community CCAP and seek opportunities within their operations and facilities to support the Plan.
- C. THAT Council forward the Plan to the Vancouver School Board, the Greater Vancouver Regional District and its individual member municipalities, TransLink, the Provincial and Federal governments, the Union of British Columbia Municipalities, and the Federation of Canadian Municipalities, as a way of sharing knowledge and to solicit their help in implementation.
- D. THAT Council direct staff to implement the strategies described in the Community CCAP using the resources described and approved in the 2005 Operating Budget (RTS 4810) for that end and detailed in the table in the Budget and Staffing Implications section below.
- E. THAT Council direct staff to implement a community engagement and awareness building program to encourage and support individual citizens and business of all backgrounds to undertake energy conservation behaviours, including:

- i. Building of a shared community vision for action on climate change using a distinctive visual brand, print and web-based outreach materials, special events and programs, interactive displays, and mainstream, community and multi-cultural media campaigns.
- ii. An expansion of the Mayor's Environmental Achievement Awards to recognize members of the community working to address climate change.
- iii. Enabling the action of community leaders and organisations by creating mechanisms to provide resources to these groups. Staff will explore potential mechanisms that balance flexibility, simplicity, and accountability as well as developing criteria for application, evaluation and decision, and report back to Council later in 2005.
- iv. Continuing research of community behaviors, attitudes, motivators and barriers so that the community engagement strategies can adapt over time for maximum effectiveness.
- F. THAT Council direct staff to implement a housing energy efficiency program to enable all residents to improve the energy efficiency and comfort of their homes, including program elements such as:
 - i. Developing and coordinating a marketing approach that integrates existing energy efficiency promotions and incentives of several public organisations, while simultaneously engaging private companies such as contractors, financial institutions and hardware stores to provide complementary promotions and services.
 - ii. Developing a housing energy incentive program, contingent upon securing the required funding from the BC Ministry of Energy and Mines, to accelerate the pace of home energy efficiency improvements. Staff will report back to Council later in 2005 with detailed incentive program recommendations.
 - iii. Exploring opportunities for the appropriate use of building regulations to ensure that homeowners realize improved energy-efficiency over the long term. Staff will work with the Chief Building Official and stakeholders in regard to such City-initiated regulation, and report back in 2006.
- G. THAT Council direct staff to implement the strategies and initial actions for commercial and institutional building energy efficiency, including:
 - i. Consolidating and sharing information on energy efficiency benefits, and promoting best operating practices in order to stimulate greater market utilisation of energy efficiency programs and services.
 - ii. Promoting an environmental performance recognition system for existing buildings among potential building tenants and owners alike. Staff will evaluate existing systems and report back to Council with recommendations on promoting one by spring 2006.

- iii. Researching the potential for additional approaches to commercial building energy efficiency, such as building recommissioning and alternative financing mechanisms.
- H. THAT Council direct staff to implement the strategies and initial actions for community energy systems and sources, to help develop renewable, flexible and cost-effective local energy, thereby helping to provide economic development opportunities and long-term price stability in Vancouver. These activities will include:
 - i. Developing a technical feasibility study, organisational model and business case for a community energy system for the False Creek Sustainability Precinct. Staff will seek external funding partnerships and prepare a Request for Proposals for Council consideration in spring 2005.
- 1. THAT Council direct staff to implement the strategies and initial actions to provide people who live in Vancouver with improved transportation alternatives, and to promote the use of those alternatives, including:
 - i. Emphasizing pedestrian, cycling and transit priority infrastructure improvements, especially regarding the implementation of the Vancouver and Downtown Transportation Plans, when developing proposals for future Capital Plans.
 - ii. Developing a cycling end-of-trip and bike parking facility plan for downtown and other major destinations, including pursuing opportunities for new development to provide funding or in-kind contributions to bike stations. Staff will report back to Council on the adequate provision of publicly accessible facilities in 2006.
 - iii. Implementing a Green Trips to School Program that works with existing school trip programs, provides increased staffing to work with schools, encourages visible Council and School Board support, and partners with health promotion and pedestrian safety programs. Staff will seek external funding sources and delivery mechanisms to support capital improvements on school property, such as bike facilities, in addition to the community leaders funding mechanisms (per Recommendation E.iii above).
 - iv. Developing a comprehensive parking strategy for the city core that uses both on- and off-street parking supply, priority access and pricing to promote transportation alternatives. Staff will report back to Council by fall 2006.
 - v. Council requesting that the Vancouver Police Department work with City staff to enhance pedestrian and cyclist safety through increased enforcement and education measures.
 - vi. Implementing a safe cycling skills course in partnership with TransLink, schools, and community centres.
 - vii. Reviewing and revising Vancouver's Transportation Plan mode share targets to reflect both the successes achieved to date and the

- community greenhouse gas reduction target. Staff to report back with mode share target recommendations by spring 2006.
- viii. Council requesting that by 2006 TransLink and the Greater Vancouver Regional District complete the Regional Parking Strategy, Transportation Demand Management Strategy, and the Regional Tolling Policy outlined in TransLink's 2005-2007 Three Year Plan and 10-Year Outlook.
- ix. Council requesting that City, GVRD, and TransLink staff review GHG emission impacts/reductions in major land-use planning, engineering, and transportation initiatives, including the Vancouver Area Transit Plan.
- J. THAT Council direct staff to implement the strategies and initial actions for vehicle and fuel efficiency to reduce greenhouse gas and other air contaminant emissions associated with the use of personal and commercial vehicles, including:
 - i. Active advocacy by Council and staff, in cooperation with NGO's, the Union of British Columbian Municipalities, the Federation of Canadian Municipalities and other partners for timely and meaningful federal fuel efficiency standards for vehicles, for tax exemptions for employer-funded transit passes, and for tax measures to promote highly efficient vehicles and discourage inefficient ones.
 - ii. Supporting very fuel-efficient vehicles in the Comprehensive Parking Strategy for Transportation Alternatives (as per recommendation I.iv), including recommendations regarding the creation of ultracompact vehicle parking opportunities.
 - iii. Implementing an idle-free awareness campaign and bylaw. Staff will report back with recommendations for an idle-free bylaw and enforcement program once they have secured adequate external funding to complement their City budget for the launch of an awareness campaign.
 - iv. Participating in and supporting regional and national partnerships to promote more efficient vehicles, efficient vehicle operations and renewable fuels. These activities will include initiatives such as the development of a fleet environmental performance standard, a tire inflation awareness campaign, demonstrating and promoting the business case for hybrid taxis, and the Bio-diesel Market Transformation Project.
- K. THAT Council direct staff to develop performance measures for these initiatives, consistent with 'triple bottom line' indicators, and report back to Council annually on implementation progress, and to provide Council with a full evaluation of community-wide greenhouse gas emissions prior to the 2010 Olympics.

CITY MANAGER'S COMMENTS

The City Manager supports Council adoption of Recommendations A through K.

COUNCIL POLICY

On October 16, 1990, Council approved in principle Clouds of Change Recommendation #1 to reduce carbon dioxide emissions by 20% as part of the actions to address global climate change issues, subject to future reports on costs and trade-offs involved in achieving the objectives and targets.

In 1995, Vancouver joined the Federation of Canadian Municipalities' "20% Club", which became the Partners for Climate Protection Program in 1998.

Council has adopted the Vancouver Transportation Plan (1997), Downtown Vancouver Transportation Plan (2002) and Vancouver Transit Strategy (2002), which generally require transit and other non-auto modes to accommodate future increases in travel demand. The City supports maintaining peak road capacity from the region at no more than the present level, with no further significant investment to expand motor vehicle capacity into Vancouver.

On April 23, 2002, Council adopted a Definition and Principles of Sustainability to guide, prioritize, and improve the sustainability of City actions and operations.

On May 2, 2002, Council carried the motion, proposed by the Federation of Canadian Municipalities, to support the Canadian Government's ratification of the Kyoto Protocol.

On March 25, 2003, Council approved an emissions reduction target of 20% from 1990 levels for the corporation of the City of Vancouver, subject to evaluation of the implications of the target to ensure it is realistic. On this same date, Council created the Cool Vancouver Task Force and requested that it report back with a report on the components of a Greenhouse Gas Reduction Action Plan for both the corporation and the community.

On June 24, 2003, Council received the Cool Vancouver Task Force's Discussion Paper on Greenhouse Gas Reduction Planning and approved (in principle) a target of 6% below 1990 emissions levels for the city (community) as a whole, subject to evaluation of the implications of the target to ensure it is realistic. Council also approved a process to develop GHG Reduction Plans for both the City (Corporate) and the Community and approved \$30,000 for technical support for the development of these plans.

On December 2, 2003, Council unanimously approved the Corporate Climate Change Action Plan as proposed from the Cool Vancouver Task Force, affirming the target of a 20% reduction from 1990 levels by 2010 of emissions from the City's own operations and facilities.

On April 28, 2004, Council received the draft Community Climate Change Action Plan from the Cool Vancouver Task Force, and directed the Sustainability Group staff to engage in extensive public consultation on the draft, both with stakeholders and the community. On this same date, Council:

 Approved the hiring Karyo Communications for \$150,000 (full amount was contingent upon the City receiving FCM funding for these activities, which it was) to conduct

- stakeholder and public consultations as well as to conduct research into the current behaviours and attitudes of Vancouver's citizens regarding climate change;
- Directed the Chief Building Official report back to Council on the recommended approach to update the Energy Utilization By-law as soon as feasible.
- Instructed the Director of Finance to work with other staff members and report back to Council regarding the feasibility and the implications of establishing an endowment fund similar to the Toronto Atmospheric Fund that would be used to promote energy efficiency and reduced emissions.
- Instructed the Sustainability Group in conjunction with the Director of Finance to develop a financial plan associated with the implementation of the Plan.

On June 8, 2004 Council approved revisions to the Energy Utilisation By-law to improve the energy performance of new, large commercial and residential buildings by approximately 13% by updating references to the 1999 version of ASHRAE90.1.

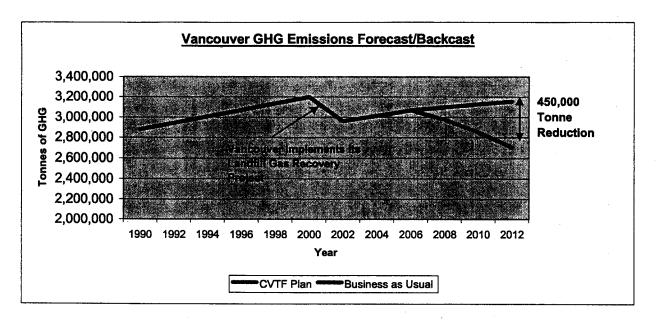
PURPOSE and SUMMARY

This report is submitted to Council to ask for their adoption of Cool Vancouver Task Force's Community Climate Change Action Plan (Appendix A) and to establish a Council directive to begin implementing that plan using the approved City resources.

The Community Climate Change Action Plan establishes a multifaceted program with key strategies and initial implementation actions for how Vancouver as a community can reduce its greenhouse gas (GHG) emissions. It focuses on enabling and motivating individuals, businesses, and institutions to reduce their building and transportation related energy use as these are responsible for over 80% of the greenhouse gas emissions in Vancouver. The Plan is the product of a year and a half of work by the Cool Vancouver Task Force and numerous additional stakeholders, the public, City staff, and technical consultants.

Vancouver's Community Climate Change Action Plan (Community CCAP) presents a comprehensive and systematic approach to the challenge of climate change while simultaneously creating numerous new opportunities for improved air quality, health and fitness, transportation demand management, personal mobility, cost savings, employment, economic development, and community building and empowerment. The Plan articulates numerous activities to improve energy efficiency in residential, commercial and institutional buildings, increase the use of transportation alternatives, and promote shifts toward better vehicle and fuel choices. Many of these activities will be able to utilise an array of programs to help pay for the City's leadership efforts, and thus supplement City resources. The City has received a significant amount of funding already from senior government, and will be working closely with federal, provincial and regional partners to ensure that resources are used wisely and cooperatively to advance climate change program development and implementation.

The emissions reduction target for Vancouver, established in support of Canada's obligations under the Kyoto Protocol of six percent below 1990 levels by 2012 now means a reduction of over a quarter of our projected emissions, or about 450,000 tonnes per year.



It is important to point out that this plan is only the beginning. Experts around the world agree that a 6% reduction in greenhouse gas emissions is only the first step in addressing climate change and much deeper emissions reduction will be required in the coming years.

The recommended initial actions get us moving on the highest priority initiatives that offer the most cost effective and immediate opportunities for emissions reductions based on the magnitude of potential reductions, existing or soon to start partner initiatives, and external funding. Some of the strategies described in the plan require further work with stakeholders and the development of implementation and funding partnerships before concrete programs can be developed.

The main elements of new City activity in the Plan include strategies and initial actions for:

- Community Engagement through public education, the media, special events, and the creation of funding mechanisms for community groups and organisations.
- Housing Energy Efficiency by harmonizing the marketing of funding, programs, and services between institutions and private businesses while utilising regulation when appropriate (mostly for new buildings).
- Commercial and Institutional Building Energy Efficiency through the promotion of an environmental performance recognition system for existing buildings, by facilitating access to existing retrofit resources, and by supporting best operating practices.
- Community Energy Systems and Supply by exploring the technical feasibility and business model for developing a False Creek Sustainability Precinct around proven and viable alternative energy systems, while enabling the easy integration of future clean energy sources, and by exploring opportunities for alternative energy systems in conjunction with ongoing infrastructure and development work city-wide.
- Transportation Alternatives through the increased provision of walking, cycling, and transit infrastructure and service as well as the promotion of these travel modes through school programs, parking strategies, and improved safety measures.
- Vehicle and Fuel Efficiency in partnership with other public and private organisations to advocate for improved national fuel efficiency standards, to support the purchase

of more efficient vehicles, to promote best operating practices, and to support the market development of new vehicle technologies and fuels.

Recognising that the Community CCAP is likely going to be used as a template or learning tool for other municipalities, it also includes brief sections on *Smart Growth*, *Waste Management*, and *Industrial Emissions*. These topics are central to municipal climate change planning but are not discussed in detail as Vancouver is already very successful in these areas (Smart Growth and Waste Management) or, in the case of industry, it is not a major sources of greenhouse gas emissions in our city.

The Community CCAP establishes the multi-sectoral strategies and actions required for Vancouver to realise a 6% reduction in greenhouse gas emissions from 1990 levels by 2012. This Plan builds upon the programs and funding offered by other institutions by connecting Vancouver residents and businesses to the resources available while also initiating innovative and practical new programs. The implementation of this Plan will transform programs and targets to real change, yield numerous health, mobility, and economic co-benefits to the City and its citizens, and will position Vancouver as a leader in sustainability. This will enable Vancouver to leverage its activities with substantial external funding and new partnerships.

BACKGROUND

City Leadership and the Cool Vancouver Task Force

The City of Vancouver has shown significant leadership on the issue of climate change in the past 15 years, both in many City initiatives as well as advocating and organizing at the provincial and federal levels. Vancouver's per capita greenhouse gas emissions are among the lowest in Canada as a result of our success in developing very liveable, higher density, mixed-use communities; the Province's historical abundance of hydro generated electricity (note that new demand is largely being met by fossil fuel fired generation); and our mild climate.

Following Council's support of the Federal Government's ratification of the Kyoto Protocol, the City has moved forward with new plans to directly address the City's GHG emissions through a number of venues, including:

- Working with the Federation of Canadian Municipalities (FCM) through their Partners for Climate Protection (PCP) process, which offers a five step process with support from FCM to develop and implement a GHG reduction plan;
- Establishing the Cool Vancouver Task Force in March 2003, with membership chosen by Council to represent a very wide range of interests and groups to advise staff on the components of a GHG Action Plan and its range of issues and priorities. A complete membership list of the Task Force is included in the Community Climate Change Action Plan.
- Approving a Corporate Climate Change Action Plan on December 3, 2003, which was
 developed by staff and the Task Force for the City's civic buildings, facilities, fleets
 and operations with a target of a 20% reduction in GHG emissions below 1990 levels to
 be achieved by 2010.
- Receiving the Draft Community Climate Change Plan from the Task Force in May 2004 to form the basis for broad public and stakeholder consultations and providing resources for this consultation work (described below).

Public and Stakeholder Consultation

Up until the completion of the first Draft Community Climate Change Plan (May 2004), the Cool Vancouver Task Force was the focus of consultation on this Plan. The Task Force represents several dozen stakeholders and community interests on climate change issues, and the City has had the benefit of their direct guidance and feedback on issues over the entire process to develop both the Corporate and Draft Community Climate Change Action Plans. However, as outlined in the report to Council in May 2004, widespread discussion was needed with other stakeholders and the public in this subsequent phase of the consultation process.

Since May 2004, the Cool Vancouver Task Force, City staff and Karyo Communications work has been focussed on gaining insight and identifying some of the barriers, challenges and opportunities in implementing emission reduction measures in buildings, transportation and community outreach. Staff and the consultant team worked with a wide range of parties, including:

- Internal staff such as multi-cultural planners and the youth engagement team
- Key stakeholders including utilities, the business community, academic institutions, other levels of government, TransLink, etc.
- o Numerous special interest groups
- o The general public through public events in May, September and November 2004
- o Qualitative focus groups, quantitative telephone surveys, and youth workshops

Additional details about the public and stakeholder consultations can be found in Appendix B of this report.

Ongoing community consultation and engagement will be essential to our success. This engagement will involve ongoing research, meetings with community and stakeholder groups, public education and feedback mechanisms linked to the enabling tools that we develop.

Action by Other Canadian Municipalities

To help Council contextualize the strategies, actions, and resources for implementing the Community CCAP, staff have prepared a *preliminary* overview of the directions other Canadian municipalities are taking to address climate change. Note that direct or quantitative comparisons are difficult because of the varying organisational structures, local context, and scope of activities.

Toronto

- o Does not have a current community climate change plan but have been actively addressing greenhouse gas emissions through air quality initiatives for over a decade.
- City Energy Efficiency Office focuses on residential, commercial, and institutional building efficiency as well as vehicle efficiency initiatives. (8 FTE)
- City endowed the Toronto Atmospheric Fund to enable community leaders and organisations to address energy efficiency and awareness (2 FTE, has provided \$7.9 million of grant money since 1991)
- Clean Air Partnership focuses on outreach and education (8-10 FTE funded by the City, the Toronto Atmospheric Fund, and the federal government)
- Transportation Demand Management and other activities integrated within the City organisation

Edmonton

- o Has a detailed community climate change plan and initiative called CO2RE (Carbon Dioxide Reduction Edmonton)
- o Initiatives largely focused on building home energy efficiency awareness through a widely distributed newsletter and information brochure distributed in partnership with Home Depot (1 FTE, expanding to 2 FTE)

Calgary

- o Community Sustainability Plan to be completed end of 2005
- Emission reductions focused on transit improvements, green energy generation, community energy systems and landfill gas recovery
- o Showcase civic facility energy efficiency to contractors, business owners, etc
- o Transportation initiatives integrated into City departments
- o Office of Climate Change 2 FTE to coordinate City activities

Sudbury

- Becoming a Sustainable Community (2003) and Community Energy Plan target 50% of energy from local green sources
- Community engagement through EarthCare Sudbury Community Partnership of over 100 community organisations

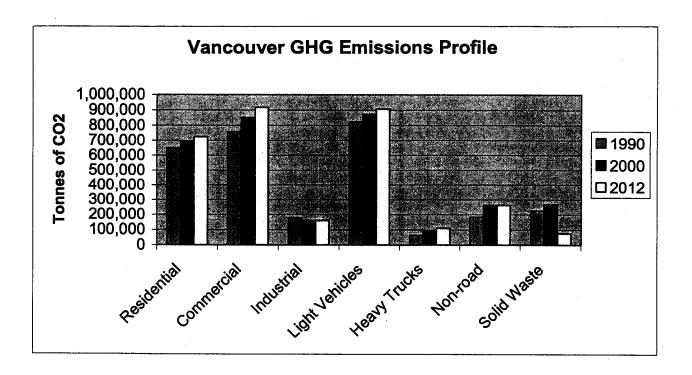
Regina has a community climate change plan and most activities appear to focus on community and stakeholder engagement. Ottawa has a plan completed and awaiting Council approval.

DISCUSSION OF ISSUES

Community Emissions Profile and the Reduction Target

The detailed emissions profile illustrated below helped in identifying and prioritising emission reduction opportunities. According to national and international protocols, municipal greenhouse gas inventories exclude those emissions associated with marine, heavy rail, and air transportation as these are largely outside city control or direct influence.

As evident in this chart, the large majority of emissions come from buildings and cars ("light vehicles" includes automobiles, small trucks, sport utility vehicles, minivans).



In the *Draft* Community Climate Change Action Plan (May, 2004) the Task Force recommended an emissions reduction target of 6% from 1990 levels by 2012 that was adjusted for Vancouver's disproportionately high population growth relative to the national average. The Task Force made this adjustment to establish an ambitious but achievable target without forcing us to carry a disproportionate burden because of our success in attracting new residents relative to the national average.

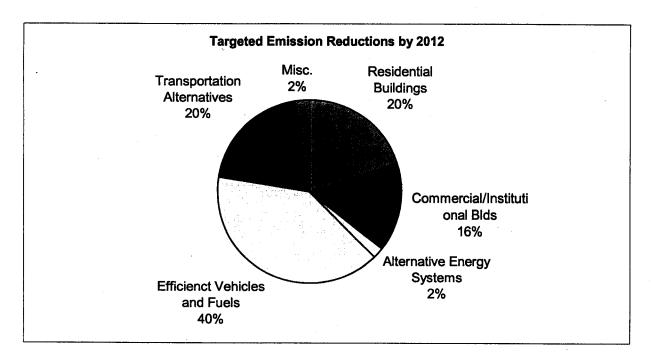
The Task Force is now recommending an absolute 6% greenhouse gas emissions reduction target from 1990 by 2012. Removing the "adjusted for disproportionate growth" qualifier signals a more serious commitment to the challenge and a clearer demonstration of leadership by Vancouver.

In order to quantify the total emission reductions required to meet the 6% reduction target the following annual emissions inventory numbers have been established:

- 1990 GHG emissions for Vancouver = 2.9 million tonnes
- 6% reduction from 1990 baseline = 2.7 million tonnes
- 2012 Business-as-usual forecasted GHG emissions = 3.2 million tonnes

Meeting the 6% emission reduction target means that Vancouver must reduce its forecasted annual GHG emissions by 450,000 tonnes between now and 2012. This is 45,000 tonnes more than the "adjusted for disproportionate growth" target initially recommended in the Draft Plan.

A breakdown of where these emission reductions are targeted to come from is illustrated below:



Note that while Alternative Energy Systems plays a relatively small role in meeting the 2012 target, it is expected the strategies and actions in this part of the Plan will play a rapidly increasing and very significant role beyond 2012.

DISCUSSION of KEY PLAN ELEMENTS

Community Engagement

Engaging the entire community in making different choices and changing their behaviour is essential to meeting the emissions reductions in this plan. Most of the other sections in the Plan describe strategies and actions to make the desired changes easier and attractive. The Community Engagement strategies and actions establish a grassroots approach to creating a shared vision for action and for communicating and connecting individuals to the tools and opportunities for change.

Beyond communications and public education, one of the key approaches to engage the creativity, strengths, and enthusiasm of the community is to develop a mechanism to provide community leaders and organisations with resources to implement their own initiatives that support the strategies in the Community CCAP. Staff will explore efficient, effective, and accountable mechanisms to provide these resources to community leaders and report back to Council. In the interim, they will support the engagement of community organisations through contractual arrangements and will report to Council if individual agreements/initiatives exceed \$30,000.

As part of the development of the Plan, the City engaged the services of Karyo Communications and the Mustel Research Group to undertake qualitative and quantitative research into the motivators, barriers, attitudes and existing behaviours of Vancouverites with respect to climate change. They will use the results of this research in combination with identified City networks of community engagement to provide detailed recommendations on key market segments, effective messaging, and social marketing approaches. This work should be complete by April 2005.

This market research will also help Karyo Communications to develop a new brand for the City's overall sustainability efforts including the Community Climate Change Action Plan. Working together with Corporate Communications, a public launch of the Community Climate Change Action Plan is being planned for later this year, possibly to coincide with Canada's Environment Week, June 5 - June 11. The launch will include a public education component to show people how their individual efforts can help reduce the City's greenhouse gas emissions.

A temporary Community Outreach Coordinator was hired in November 2004 using the funds and as one of the conditions of a \$200,000 grant from Environment Canada to begin promoting desirable climate change behaviours as part of the One Tonne Challenge initiative. The funding is to support these activities until March 31, 2006.

Housing Energy Efficiency

There are numerous existing incentives and services available to homeowners from both public and private organisations. Both the Cool Vancouver Task Force and the provincial Review of Energy Performance Measures for Building in British Columbia have identified the lack of a harmonised marketing and service provision approach as the key barrier to uptake of these existing tools for homeowners.

The BC Ministry of Energy and Mines recently secured over \$11 million dollars under the Federal Opportunities Envelope program to undertake a number of initiatives to reduce the energy use in buildings province wide, many of which are directly complimentary to the strategies and actions in this plan. In their submission, they earmarked \$650,000 to fund incentive programs in Victoria, Vancouver, and one central BC community that are specifically designed to stimulate a harmonised marketing approach. Approximately \$250,000 of this funding awaits a detailed proposal from Vancouver and this will be a high priority in the initial implementation of this Plan.

The substantive initial actions in this plan will predominantly result in energy efficiency improvements in existing detached houses, which are responsible for over 70% of the residential greenhouse gas emissions in Vancouver. Additional stakeholder consultations and research will be required to develop more detailed actions to reduce GHG emissions in the multi-family housing sector, but one prime opportunity is supporting these improvements in conjunction with the substantial "leaky" condo remediation work that remains to be completed.

Commercial and Institutional Energy Efficiency

This section of the plan includes important initial actions in regard to the evaluation of environmental recognition systems for existing commercial buildings, the facilitation of information sharing on energy reducing opportunities, especially amongst institutions, and research into the opportunities associated with building recommissioning. While these initial actions are important, additional programs will be developed in conjunction with the numerous partners involved in the Ministry of Energy of Mines Building Energy Efficiency Market Transformation initiative and emerging new Federal programs.

Community Energy Systems and Supply

Most of this plan focuses on improving the energy efficiency of new and existing buildings and vehicles. While these actions are key to achieving a short term goal such as a 6% reduction by 2012, more significant reductions over the longer term will require a shift away from fossil fuels.

While many research and pilot projects focus on a single leading edge technology, there may be viable opportunities to begin expanding the use of alternatives immediately by looking at complimentary energy use profiles, considering a suite of proven technologies, and designing a community system that allows for incremental growth that can integrate emerging technologies.

The City's explorations of the possibility of creating a greenhouse gas neutral Olympic Village combined with our involvement in the planning of CIRS building, which is intended to be a net energy exporter, lead to serious questions about the immediate opportunities to create an alternative energy system for the False Creek Precinct. Land contained within this envisioned precinct includes SEFC, City Gate, Great Northern Way Campus, Providence Health Care, and Plaza of Nations.

A preliminary feasibility study looking at the economics, technologies, legal issues, and potential business models indicates that this concept warrants further investigation based on:

- a large amount of development on the lands within the next ten years requiring new infrastructure;
- o complementary energy use profiles amongst the anticipated land uses;
- o good opportunity for strong investment returns over the long term; and
- a high level of interest among both existing land owners as well as external funders in the concept

Staff will develop a Request for Proposals for both a preliminary technical design as well as the development of a business model that explores ownership, regulatory, and operational issues. The lessons from this work, while focused on a particular site, would provide us with valuable knowledge to enable us to consider additional opportunities for community energy systems citywide.

Transportation Alternatives

Vancouver's land use patterns, mild climate, and high employment to population ratio make transportation alternatives to the automobile very viable for Vancouver citizens relative to most other North American cities. The City has long pursued the support of these alternatives through a variety of means ranging from rapid transit and the cycling road network to street furniture and traffic calming.

Despite our considerable success in supporting and promoting alternative transportation, numerous promising opportunities for City action remain unexploited. The pursuit of the opportunities identified in the Plan and the active exploration of additional initiatives and funding requires dedicated staff and resources.

Staff involvement in the development of this Plan has already resulted in an opportunity to secure \$4.5MM in federal funding and over \$1.6MM in other external funding in support of \$9.5MM of alternative transportation projects in Vancouver. In addition, numerous powerful

partnership opportunities to work with NGO's, the Province and community groups have likewise emerged.

Vehicle and Fuel Efficiency

While support and promotion of efficient vehicles, best operating practices, and renewable fuels and vehicle technologies on a community-wide basis may appear to be outside the realm of City responsibility, this portion of the plan offers the most cost effective and substantial opportunities to realise greenhouse gas emission reductions leading up to 2012.

- Only limited City staff involvement has already resulted in a number of directly relevant regional initiatives, largely spearheaded by the National Fleet Challenge, through our provision of small amounts of timely seed funding, visible City commitment to the initiative, and a direct link to leveraging of our Corporate Fleet initiatives
- o There are a number of significant and cost effective opportunities for greenhouse gas reductions through federal regulation, in particular in regard to federal fuel efficiency standards and tax incentives/disincentives. The City can play an influential role in advocating for these changes.
- Municipal governments are the most effective level of government for the local delivery and uptake of tools and programs.

FINANCIAL IMPLICATIONS

Funding and Direct Partner Initiatives

The table below illustrates the considerable external resources already secured or sought as part of the City's involvement and commitment to developing the Community Climate Change Action Plan.

Status	Program ~	Agency	External Funding	Purpose	Timeframe
Approved and Completed	Sustainable Enterprise Fund	GVRD	\$25,000	Support Plan development	2003/2004
Approved and Completed	Green Municipal Enabling Fund	FCM	\$100,000	Support plan development and community consultation process	2004
Approved and Completed	·	Vancity	\$20,000	Partner in social marketing research	Dec. 2004
Secured	Community One Tonne Challenge (OTC)	Env. Canada	\$200,000	Social marketing of climate change behaviours	Nov. 2004 - Mar. 2006
Secured	Sustainable Enterprise Fund	GVRD	\$8,000	Pilot expansion of car-sharing	2004/2005
Partner program	Community One Tonne Challenge	Fraser Basin Council	\$60,000	Multi-cultural media support of Vancouver and Richmond OTC	Jan. 2005 - Mar. 2006
Partner program	Bio-diesel market transformation	Ntl Fleet Challenge (numerous funders)	\$230,000	Bio-diesel demonstration and market transformation	April 2005 -
Partner program requiring matching funds	One Tonne Challenge	BEST	\$47,500	High school trip reduction program	April 2005 - June 2006
Earmarked - awaiting detailed proposal	Building Energy Efficiency Market Transformation	BC Ministry of Energy and Mines	+/- \$250,000	Incentives for residential building retrofits	Apr. 2005 - Mar. 2007
Proposal in development	Climate Impacts and Adaptations	C-Cairn	\$96,000	Research/Planning for climate change impacts	Sep. 2005 - Sep. 2007
Proposed	Opportunities Envelope	NRCan	\$4.5MM	Transportation alternatives programs and infrastructure	May 2005 - Mar 2007
Proposed		NRCan	\$150,000	Idle free awareness campaign	Apr. 2005 - Mar 2006
Proposed	Sustainable Enterprise Fund	GVRD	\$50,000	Support for Car-free day and the development of an environmental rating system for fleets	2005/2006

The recent Federal budget allocation of \$5 billion dollars over 5 years to address climate change, the underlying sustainability principles inherent in the New Deal for Cities, and preliminary conversations with numerous public and private funders all suggest that this Plan and the associated City resource commitments will provide the City with the leverage to secure substantial external resources for implementation activities. Not only will these activities help us reach our greenhouse gas reduction target but they will help to maximise the associated economic, employment, health and safety, and traffic congestion reducing benefits. Future resources secured will be used for scope expansion and/or City resource offsets.

2005 Budget Implications and Allocations

On February 3, 2005, Council considered a report from the Sustainability Group that identified annual funding for the CCAP of \$2.08 million. This proposed budget was developed on the assumption that \$5.0 million of Federal Opportunities Envelope funding to support of a number of the transportation alternative initiatives (capital and operating costs) would be available to enhance the proposed City funding of \$960,000. While we were not successful in securing funding in the first round of proposals (likely due to the fact that the BC Ministry of Energy and Mines secured nearly 50% of the first round funding made available nationwide) we have been strongly encouraged to re-submit our proposal for round two.

As a result of this delay in securing senior government funding, priorities in the plan have been shifted and some projects deferred to later years. In addition, the staffing resources required to implement this plan have increased by one position. However, the overall impact to the 2005 operating budget remains at \$960,000.

BUDGET IMPACTS OF THE COMMUNITY PLAN FOR ACTION ON CLIMATE CHANGE

	EXTERMAL PLEE	500	2006 BUDGET IMPACTS		2067	2007 BUDGET MPACTS	3			ET IMPACTS EXTENSAL FUNDING	MT NE ACT	MOTES	ACTIVITY CATEGORY STAFF
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Personnel Implications

As noted in the above table on budget implications, implementing the Community CCAP requires the creation of six new permanent full-time positions, two of which will be focused on transportation demand management, one of which will be focused on community engagement, and the responsibilities covered by the remaining three positions will include project management and new opportunity development, building energy efficiency, alternative energy systems, and vehicle/fuel efficiency. The one temporary full-time position created to support the development of this plan will conclude in mid-April.

Long Term Resourcing Approaches

When receiving the Draft Community Climate Change Action Plan in May 2004 Council asked Finance to report back on the feasibility and implications of establishing an endowment fund similar to the Toronto Atmospheric Fund to be used to support energy efficiency and greenhouse gas emission reductions.

This work, as well as other innovative financing approaches for supporting the implementation of this Plan, is currently underway. It is anticipated that preliminary findings will be reported in the spring of 2005.

CONCLUSION

The Cool Vancouver Task Force's Community Climate Change Action Plan is a strong plan with a diversity of approaches to address GHG reductions throughout the city. The range of proposed emissions reduction measures in this plan are as far reaching as the sources of emissions in the city. They include the involvement of a significant scope of stakeholders.

The development of this Action Plan is an important initiative for Vancouver, as it increases environmental quality and economic efficiencies within the city, positions the city as a responsible leader in the World with regard to the Kyoto Protocol and climate change, and creates significant partnership opportunities for both funding and implementation.

The Cool Vancouver Task Force's

Community Climate Change Action Plan:

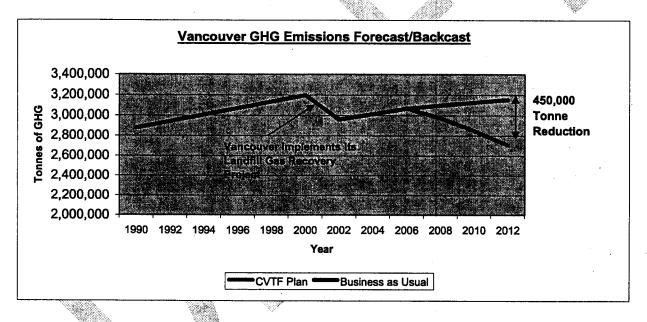
Creating Opportunities



EXECUTIVE SUMMARY

Vancouver's Community Climate Change Action Plan (Community CCAP) presents a comprehensive and systematic approach to the challenge of climate change while simultaneously creating numerous new opportunities for improved air quality, health and fitness, transportation demand management, personal mobility, cost savings, employment, economic development, and community building and empowerment. It focuses on enabling and motivating individuals, businesses, and institutions to reduce their building and transportation related energy use as this is responsible for over 80% of the greenhouse gas emissions in Vancouver. This Plan is the product of a year and a half of work by the Cool Vancouver Task Force (a complete list of member organisations is available in Appendix A1) and numerous additional stakeholders, the public, City staff, and technical consultants.

The Community CCAP establishes an emissions reduction target for Vancouver of six percent below 1990 levels by 2012 to reflect Canada's commitments under the Kyoto Protocol. Achieving this target will require us to reduce our greenhouse gas emissions by roughly 450,000 tonnes per year from projected 2012 levels.



It is important to point out that this plan is only the beginning. Experts around the world agree that a 6% reduction in greenhouse gas emissions is only the first step in addressing climate change and much deeper emissions reduction will be required in the coming years.

The recommended initial actions get us moving on the highest priority initiatives that offer the most cost effective and immediate opportunities for emissions reductions based on the magnitude of potential reductions, existing or soon to start partner initiatives, and external funding. Some of the strategies described in the plan require further work with stakeholders and the development of implementation and funding partnerships before concrete programs can be developed.

The main elements of new City activity in the Plan include strategies and initial actions for:

APPENDIX A: Vancouver's Community Climate Change Action Plan

- Community Engagement through the media, special events, and the creation of funding mechanisms for community leaders.
- Housing Energy Efficiency by harmonizing the marketing of funding, programs, and services between institutions and private businesses while utilising regulation when appropriate (mostly for new buildings).
- Commercial and Institutional Building Energy Efficiency through the promotion of an environmental performance recognition system for existing buildings, by facilitating access to existing retrofit resources, and by supporting best operating practices.
- Community Energy Systems and Supply by exploring the technical feasibility and business
 model for developing a False Creek Sustainability Precinct around proven and viable
 community energy systems, while enabling the easy integration of future clean energy
 sources, and by exploring opportunities for alternative energy systems in conjunction with
 ongoing infrastructure and development work city-wide.
- Transportation Alternatives through the increased provision of walking, cycling, and transit infrastructure and service as well as the promotion of these travel modes through school programs, parking strategies, and improved safety measures.
- Vehicle and Fuel Efficiency in partnership with other public and private organisations to advocate for improved national fuel efficiency standards, to support the purchase of more efficient vehicles, to promote best operating practices, and to support the market development of new vehicle technologies and fuels.

Recognising that the Community CCAP is likely going to be used as a template or learning tool for other municipalities, it also includes brief sections on *Smart Growth*, *Waste Management*, and *Industrial Emissions*. These topics are central to municipal climate change planning but are not discussed in detail as Vancouver is already very successful in these areas (Smart Growth and Waste Management) or, in the case of industry, it is not a major sources of greenhouse gas emissions in our city.

The Community CCAP establishes the multi-sectoral strategies and actions required for Vancouver to realise a 6% reduction in greenhouse gas emissions from 1990 levels by 2012. This Plan builds upon the programs and funding offered by other institutions by connecting Vancouver residents and businesses to available resources while also initiating innovative and practical new programs. The implementation of this Plan will transform programs and targets into real change, yield numerous health, mobility, and economic co-benefits to the City and its citizens, and will position Vancouver as a leader in effective action enabling us to leverage our activities with substantial external funding and new partnerships.

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1.0 Introduction

Changes in the earth's climate, largely resulting from the greenhouse gasses that are emitted when fossil fuels are burned to produce electricity, heat our homes, and power our vehicles, are viewed by many experts as the most significant environmental challenge facing the planet today. On February 16th, 2005 the Kyoto Protocol went into effect, obligating Canada to meet its greenhouse gas reduction commitments. This plan identifies key strategies and initial actions to be taken to address this challenge in Vancouver.

While this plan focuses primarily on the first step of how we can reduce Vancouver's greenhouse gas emissions by 6% from 1990 levels by 2012, it also describes:

- o actions that should be taken now to enable further reductions beyond 2012; and
- recognizes that the climate has already begun to change and recommends steps to help us anticipate and prepare for those changes.

A 6% reduction in greenhouse gas emissions is not sufficient to prevent climate change and there are clear indications much more significant reductions will be required if we hope to avoid earth changing consequences. While this plan represents only the first step, it is not an insignificant one. When you take into account population growth, an absolute reduction of 6% below 1990 levels would require a reduction of over 25% on a per person basis. This first step represents a very important change in direction for Vancouver and the nation as a whole regarding our use of fossil fuels. To build off of this new direction, the City will work to establish a new, longer range emissions reduction target prior to 2012.

As this plan illustrates, this important first step is ambitious but entirely achievable if the community, both residents and businesses alike, embrace the challenge. This is Vancouver's plan; it was developed jointly by the Cool Vancouver Task Force (with representatives ranging from non-government organizations to the Board of Trade) and the City. It has incorporated the input of all major stakeholders as well as the public at large. Most of the changes required are outside the City's ability to regulate or control - if the plan is to be successful, the entire community must get engaged.

This plan:

- provides some contextual information on climate change, Vancouver's emissions, and the reduction target;
- o describes the strategy for wide-spread community engagement that will be essential for success;
- provides specific context, strategies, and recommended initial actions for emission reductions in residential and commercial buildings, through energy systems, by reducing automobile usage, and by making vehicles and their fuels more efficient
- concludes with implementation considerations including organisational structure and resourcing, measurements, etc.

1.1 Climate Change

Climate change refers collectively to changes in climates around the world resulting from increased accumulations of "greenhouse gasses" in the atmosphere, the most prevalent of which is carbon dioxide (CO2). These greenhouse gasses trap the sun's rays causing the planet to warm – an effect similar to a greenhouse. While the global average temperature change is slight, this warming results in significant regionally specific changes in the climate.

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While natural processes, such as the decomposition of trees, emit large amounts greenhouse gasses, the total amount of these gases in the atmosphere has historically been kept in balance by other natural processes, such as the growth of new trees (a process referred to as sequestration). The rapid increase in the use of fossil fuels for transportation, heat, and power is releasing large amounts of carbon into the atmosphere that has been trapped in the earths crust for thousands of years and is upsetting the natural balance. In Vancouver, addressing climate change by reducing greenhouse gas emissions is synonymous with reducing the direct or indirect use of fossil fuels including those used to move vehicles, heat our buildings and water, and generate electricity¹. This climate change plan is also Vancouver's community energy plan and improved energy and fuel efficiency is used synonymously with greenhouse gas emission reductions.

At a national or global scale, increased carbon sequestration through means such as reforestation may play a role in addressing climate change. At the urban scale, while planting trees has many positive social and environmental benefits, the amount of carbon sequestered is not sufficient to play a meaningful role in a climate change plan.

The impacts of climate change are regionally specific but for Vancouver they are likely to include:

- o summer droughts
- winter flooding
- o increased frequency of extreme weather events
- fluctuations in energy and water supplies
- o species extinction mainly resulting from habitat changes
- o **new diseases**

While these local impacts are of considerable concern, the impacts of climate change in the developing countries are expected to be much more significant and could result in major social upheavals and population displacements. With large populations living close to coasts, rising sea levels and increasingly frequent and intense tropical storms could be devastating. In addition, most developing countries do not have the financial resources or infrastructure in place to deal with these events or disruptions of food supply, new diseases, landslides, etc.

1.2 Vancouver Context

Vancouver is a city of nearly 600,000 citizens at the heart of a metropolitan region of nearly 2.1 million people. Located on Canada's south-western Pacific coast, Vancouver enjoys a relatively moderate climate. Partially because of its climate and attractive location, it is an appealing destination for both immigration and national migration; Vancouver is expecting that its population will increase nearly 30% from 1990 levels by 2012.

A combination of factors, including natural limitations on horizontal growth and a transportation planning approach that limits the priority placed on automobiles, has resulted in densification and the development of walkable, mixed-use communities. As a result of this "smart growth", our per capita greenhouse gas emissions are less than half of those for most other Canadian municipalities. Compact communities close to employment nodes have resulted in overall decreases in automobile travel by residents and the average residential energy intensity is decreasing as growth is accommodated in more efficient, higher density building forms.

¹ While much of British Columbia's power is produced from hydro-electricity, our hydro-electricity capacity peaked in 1995; since that time all new demand has effectively been met with natural gas or coal generated electricity production.

APPENDIX A: Community Climate Change Action Plan

In addition to Vancouver's planning approach and development trend, the City is very committed to addressing climate change. The City of Vancouver was one of the original signatories to the national Partners for Climate Protection initiative and in December, 2003 the City approved a Corporate Climate Change Action Plan outlining the steps and committing the resources to realize a 20% reduction in greenhouse gas emissions below 1990 levels by 2010 from its own operations. This included energy use in its own civic facilities, buildings, and fleets. The Corporate Plan was developed to be useful as a model for community change:

- the actions required to make these significant reductions are largely expected to pay for themselves; and
- o many of the initiatives have been designed so as to be replicable by individuals and corporate citizens alike.

Some of the challenges that Vancouver faces in reaching its greenhouse gas reduction target include:

- o increasing carbon intensity of electricity as our power increasingly comes from fossil fuel powered generation;
- the combination of energy prices that are amongst the lowest in North America with low usage due to our mild climate makes the economics of energy conservation less attractive than in many other jurisdictions
- o a regional approach to transit planning and our compact development pattern has the demand for transit surpassing supply capacity.

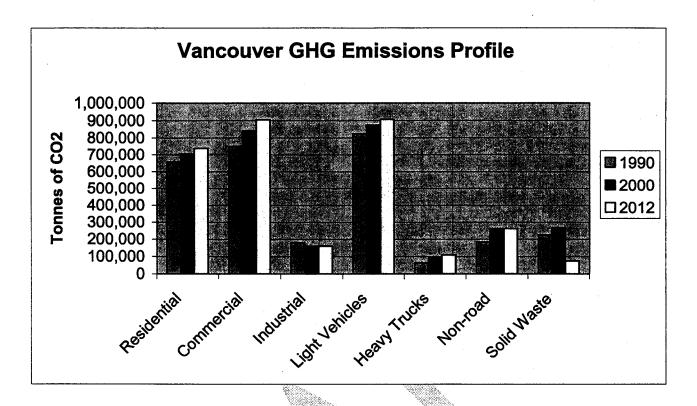
1.3 Greenhouse Gas Emissions Profiles and the Reduction Target

The greenhouse gas emissions profile for Vancouver (below) illustrates the relative contributions of buildings, vehicles, industry and other sources. The 2012 projection is based on "business as usual" as suggested by historical trends. It is immediately evident that the three largest greenhouse gas emission sources in Vancouver are residential buildings, commercial buildings, and light vehicles such as cars, small trucks and mini-vans.² A detailed discussion of the methodology, data sources, and assumptions inherent in this backcast and forecast is presented in *Appendix A2: Vancouver Community Greenhouse Gas Emissions Profile Methodology*.

The scale of emissions from existing sources far exceeds those associated with growth projected between now and 2012. As a result, meeting a 2012 reduction target cannot be based solely on improving the energy performance of new buildings and vehicles, but must have a central focus on reducing energy use and associated emissions from existing sources through building energy retrofits, fuel switching and operational improvements.

Other important implications of the emissions profile (both what is included as well as what is excluded) are discussed below.

² It is important that the reader does not confuse greenhouse gas emissions with "common air contaminant" emissions. In this report, unless specified otherwise, emissions refer to greenhouse gas emissions.



Solid Waste and Landfill Gas Recovery

The solid waste greenhouse gas emissions in Vancouver's greenhouse gas emission profile are largely caused by the decomposition of organic materials, such as food scraps, yard waste and paper, at landfills. Vancouver and the Greater Vancouver Regional District have been very successful in limiting these emissions through programs such as recycling and the landfill paper ban. Even more significantly, between 2000 and 2003 Vancouver implemented a large scale landfill gas recovery and cogeneration project that reduced solid waste related greenhouse gas emissions by 75% (a reduction of 200,000 tonnes per year) while simultaneously generating enough electricity to power 11,000 homes and to heat a nearby greenhouse.

Without the landfill gas recovery and cogeneration project, a 6% reduction target would not have been a realistic goal for Vancouver to pursue.

Notable Omissions from the Profile

Greenhouse gas emissions that are significant at the regional and national scale but are not included in Vancouver's emissions profile include those from air travel and transportation, heavy rail goods movement, and marine transportation. The City's ability to impact or even influence these emissions is very limited, and would require significant program attention from a provincial or national level.

In addition, while there is considerable energy "embodied" in the production of food, materials, and consumer goods, it is nearly impossible to measure the associated greenhouse gas emissions unless this production occurs within the City – the emissions associated with production of goods are attributed to the specific location where the production occurred. This plan does not outline a strategy to reduce these impacts, but citizens should be aware that consumption of food, materials, and consumer goods contribute to global greenhouse gas emissions. In general, the greater the distance

APPENDIX A: Community Climate Change Action Plan

from production to consumption points, the larger the emissions that could be attributed to a particular product.

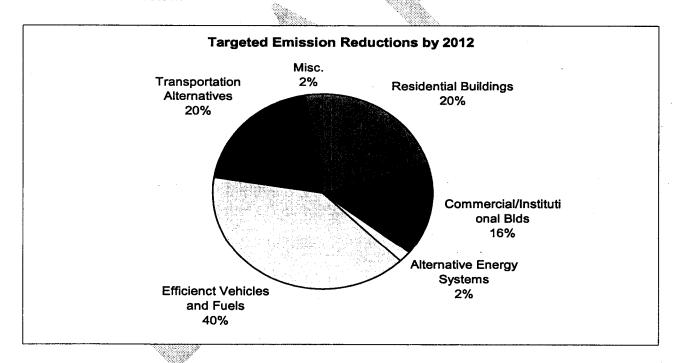
Greenhouse Gas Emissions Reduction Target

The Cool Vancouver Task Force recognized the importance of setting a target that would challenge the entire community to make real emissions reductions. At the same time, the target had to be one that could be achieved through concerted and coordinated efforts. The Cool Vancouver Task Force has recommended Vancouver adopt a 6% reduction target in greenhouse gas emissions from 1990 by 2012.

In order to quantify the total emission reductions required to meet the 6% reduction target the following annual emissions inventory numbers have been established:

- 1990 GHG emissions for Vancouver = 2.9 million tonnes (6.0 tonnes/person)
- 6% reduction from 1990 baseline = 2.7 million tonnes
- 2012 Business-as-usual forecasted GHG emissions = 3.2 million tonnes

Meeting the 6% emission reduction target means that Vancouver must reduce its forecasted annual GHG emissions by 450,000 tonnes between now and 2012 - this would translate into per capita emissions of 4.3 tonnes. A breakdown of where these emission reductions are targeted to come from is illustrated below:



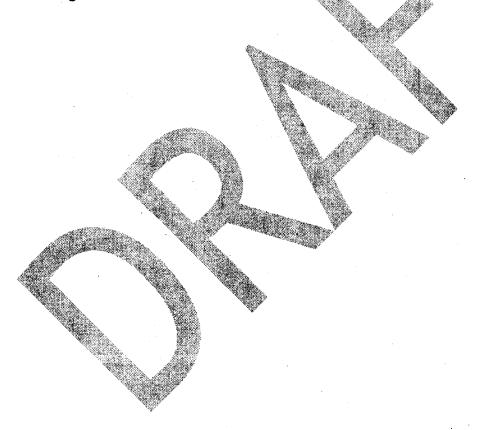
Note that while Alternative Energy Systems plays a relatively small role in meeting the 2012 target, it is expected the strategies and actions in this part of the Plan will play a rapidly increasing and very significant role beyond 2012.

1.4 Understanding This Plan

Based on Vancouver's greenhouse gas emissions forecast and the opportunities for reducing those emissions, we have organized this plan into the following seven categories:

- o Community Engagement (essential for reductions in all categories)
- o Residential Buildings (existing and new)
- o Commercial Buildings (including institutional facilities)
- Energy Systems (alternative sources of energy such as ground source heat, cogeneration, etc.)
- o Transportation Alternatives (walking, cycling, transit)
- Vehicle and Fuel Efficiency
- o Implementation Considerations (organizational structure, measurement, reporting)

Each of the following sections describes the goal or targeted emission reductions from the strategies in that section, provides some important contextual information, describes the general strategies to meeting the 2012 target, and provides specific recommended actions to initiate implementation of those strategies.



2.0 Community Engagement

OBJECTIVE

Change individual and corporate behaviours with regard to transportation choices, vehicle operations, and energy efficiency.

2.1 Context

Greenhouse gas emissions relating to individual choices in residential energy use and personal mobility account for over half of all emissions in Vancouver. If we are to achieve our greenhouse gas emission reduction target, Vancouver residents must come to embrace a number of changes in their personal choices. As such, engaging the entire community through outreach efforts by the City, other organizational partners and community leaders is the first and single most important element of this plan. The remaining sections of the plan describe ways in which these other players can make individual changes easier and more attractive.

The key strategies for Vancouver's community outreach are to:

- o create a shared community vision;
- o connect individuals to the resources required to facilitate the desired behaviour changes;
- engage partners with a wide diversity of interests; and
- o to empower community champions to lead the way.

There are numerous small and large ways in which an individual can reduce their energy usage and therefore their greenhouse gas emissions. These methods range from using compact fluorescent lights in high use areas to buying an energy efficient furnace. The federal government, through Environment Canada, has developed one program to help individuals learn about and make changes. The One Tonne Challenge is a national program to encourage Canadians to reduce their greenhouse gas emissions. The One Tonne Challenge is being promoted widely through several information channels, which is helping to raise awareness and enable action by individuals. Visit http://www.climatechange.gc.ca/ for a comprehensive listing of the ways in which you can help to meet the greenhouse gas reduction target, improve our air quality, save money, and get healthier all at the same time.

The table below identifies the top ten behaviours that will provide the greatest impact for the cost and effort required. The list starts and ends with two opportunities that arise infrequently, but would have large and lasting impacts. The changes identified below are appropriate for homeowners and renters alike. Even if a landlord is unwilling to help pay for the up-front costs, many of these steps pay for themselves so quickly that a renter could realise the financial benefits directly.

			The state of the s
Other Benefits	Access to federal grants and low rate financing. Typical grants in BC are \$1,500 Increased resale value of home Increased health and comfort of home	Increased comfort through reduced drafts and street noise	Increased safety from combustion spillage Improved indoor air quality
Estimated Cost	\$75 - \$150 for evaluation Incremental costs of energy efficient retrofits varies	\$500 - \$800	\$6003
Savings over 5 yrs	\$1,250	\$500	\$1,250
Typical Annual Savings	\$250	\$100	\$250
Opportunity	Purchase an EnerGuide Evaluation prior to home renovations - an EnerGuide evaluation provides accurate information on energy savings opportunities for your home.	Draft Proof (caulking and weather stripping) home	Install a high efficiency furnace upon replacement

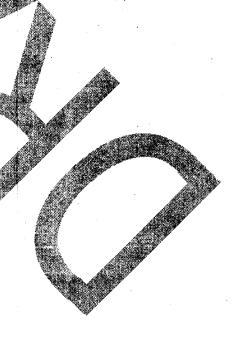
³ Based on the cost to upgrade from a mid efficient furnace

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Never run out of hot water	A cooler room facilitates sound sleep Vegetables left out less likely to spoil	Reduced air pollution Increased reliability Increased durability	Reduced air pollution	Increased safety	Increased tire life
\$10 -\$50	Free!	Varies but should be part of regular maintenance		Free!	
\$125	\$500	\$1000		\$1000	
\$25	\$100	\$200		\$200	
install a low-flow showerhead	Turn your thermostat down at night or when on holiday	Keep your vehicle well maintained		Measure your vehicle's tire pressure once a month and reduce vehicle	Turing by 5 illillintes/ day

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Different vehicles in the same class range in fuel economy with no incremental capital cost.	Improved health and fitness Reduced air pollution Sense of community
%	
\$1,500	
\$300	Variable
Buy the most fuel- efficient vehicle that meets your everyday needs	Leave your car at home for your work commute one day per week



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In addition to the measures listed above, there are significant opportunities to reduce greenhouse gas emissions by eating more locally produced fruits and vegetables, as these require less energy and resources to produce and transport. This plan does not highlight several opportunities to reduce greenhouse gas emissions through our general purchasing habits, as these emissions are very difficult to measure and are unlikely to contribute toward our emissions reduction target.

If this plan is to succeed, Vancouver citizens must make those changes (small or large) that work for them and celebrate their contribution to being part of the climate change solution. In this way, neighbours and friends help each other play their role in a positive manner.

Barriers

Despite all of the benefits to individuals and society in making these behavioural changes, there are a number of barriers to community-wide changes in behaviours and attitudes.

- Awareness: Generally low level of awareness by the general public about the connection between energy consumption by individuals in their homes and vehicles, and the resulting impacts on the environment.
- Cost and Convenience: Encouraging changes in people's behaviour in relation to energy consumption and fuel usage faces the real and perceived barriers of cost and convenience (both at home and in their transportation choices).
- **Delayed Gratification**: While these behaviour changes offer many benefits to the individual, as well as society in general, these benefits are often not immediate.
- Responsibility: Even when the benefits and ability to change rest directly with the individual, there is often a perception that "someone else" should be responsible for making the change happen.
- Societal Norms: Societal norms and practices are still structured in such a manner that some forms of sustainable energy consumption are viewed by mainstream society as marginal or fringe behaviour.
- Long-term Commitment: The success or failure of a community outreach program cannot be
 measured in fiscal years or electoral terms; Vancouver must be prepared to engage in these
 changes for a minimum of 7 years and a sustainable shift may take a generation or more.

The remainder of the Community Outreach section of this plan describes these behaviour changes, and describes the strategy and priority actions that the City can pursue to begin the subtle but fundamental shift in how people use energy in Vancouver.

2.2 Strategies and Initial Actions

As described earlier, most of Vancouver's greenhouse gas emissions are directly related to individual choices and decisions; if our ambitious community greenhouse reduction target is to be achieved there needs to be widespread sense of both individual responsibility as well as power for making the required incremental changes in our lives. Vancouver's strategy to foster this environment is to create a shared community vision based on common values, to connect individuals to the resources to make changes easy, to engage partners with a wide diversity of interests, and to empower community champions to lead the way.

As a first step, the City is currently engaged in extensive community research process, combining qualitative research (focus groups), quantitative research (telephone surveys), and participatory

APPENDIX A: Community Climate Change Action Plan

community research through Open Space Technology sessions. The research program has been designed to identify key market segments, barriers to beneficial behavioural changes within those market segments, and potential motivators and triggers for change. Results of this research will be used to inform a comprehensive and detailed community engagement plan for climate change. This strategy will include specific initiatives that offer the greatest promise to act as catalysts for widespread behavioural change.

With the help of federal funding under the One Tonne Challenge program, the City has a full-time Community Outreach Coordinator tasked with the responsibility of coordinating the development and implementation of the Community Outreach strategy.

S2 Engagement Strategy

A Create a Shared Vision

In order to make the required fundamental shift in how Vancouver uses energy, it will be essential to create a shared sense of purpose and accomplishment among individuals, non-profit organizations, neighbourhoods, communities and businesses with the aim of galvanizing the community in pursuit of a common goal and vision. It is easy to say but a considerable challenge to do. Recognizing that all of these steps will take time, some of the factors to address include:

- Long-term commitment
- Create a unifying message and "umbrella" brand for greenhouse gas reduction initiatives in Vancouver and make them visible throughout the community over time
- Position the Community Climate Change Action Plan and the overall "umbrella" brand in a wider context than environmental benefits, tailoring messages to connect with personal motivators and triggers within different segments of the Vancouver population. Focus must be to encourage small first steps as a means of generating momentum and a sense of shared success.
- Establish a Community Leadership Council that brings together leaders from the City, business, the non-profit sector, and the community to provide the direction, support and commitment of their organizations.

Initial Actions

- A2.i Secure a long-term resource commitment from Council to ensure greenhouse gas reduction initiatives in the community remain a priority until at least 2010.
- A2.ii Develop a name, visual identity, brand and slogan for the Community CCAP that will be applied to all communications and marketing materials. The brand must be bold, memorable and compelling.
- A2.iii Conduct launch advertising to position the umbrella brand and raise awareness of Vancouver's commitment to reaching Kyoto targets and reducing greenhouse gas emissions.
- A2.iv Conduct a coordinated, proactive media relations campaign with mainstream, community and multicultural media to build awareness for the Community CCAP and to highlight successes and action in the community.
- A2.v Identify existing and develop new annual public and community events that will generate community and media interest in Vancouver's Community CCAP initiatives.

S2 Engagement Strategy

B Develop Diverse Partnerships

The ways in which individuals will identify with the "shared vision" and their motivations for changing their own behaviour are likely to vary greatly. By coordinating our efforts with a wide diversity of partners and by supporting their programs where appropriate, we can make the shared vision personally relevant to the greatest number of people and enhance each of the separate initiatives. These partners will include existing organizations and programs that are currently promoting at least one of the same behaviours described in this Plan. Program partners will include environmental protection, energy conservation, outdoor recreation, social responsibility, air quality, health and fitness, safety, personal savings and others.

INITIAL ACTIONS

- A2.vi Identify existing programs in the community focused on health, safety and the environment (i.e., *Way to Go*, Action Schools, Vancouver School Board's Cool Schools initiatives, BOMA's "Go Green" Program), and find ways to support and extend the reach and impact of these programs with additional resources and tools.
- A2.vii Coordinate with corporate leaders and business associations to establish support for and participation in Climate Change Action Plan initiatives.

S2 Engagement Strategy

C Empower Community Champions

A shared vision that is meaningful to the entire community requires more than just a unifying "brand" and message; it must be relevant to individual interests and values. The best way to connect such a wide diversity of people and their interests to a common goal is to work with people that they trust and who understand them, such as teachers, involved neighbours, religious leaders, or the head of a local community group. In order to encourage these community champions to engage their friends and neighbours, the City and its other partners must develop tools that are useful to these champions and make resources available to them. By placing these resources into the hands of community champions, we can unleash their creativity and commitment.

Two significant groups that will receive particular focus in this outreach effort are multi-cultural communities and youth. Over half of Vancouver's population has a first language other than English and, in order to realize widespread shifts in the entire community's behaviours with regard to energy, it will be critical to work with the unique strengths of the multi-cultural communities and communicate with these citizens in an effective way.

Similarly, youth offer two unique opportunities. First they can act as powerful influencers in family decisions and behaviours. In addition, facilitating their role in broader community action not only taps into their energy and creativity, but it also prepares the future leaders of tomorrow.

INITIAL ACTIONS

A2.viii

Identify, map, engage, and support existing community organizations, school programs, and networks as a means of encouraging change and identifying useful tools that could be provided to assist them. These groups include, but

will not be limited to, youth and environmental organizations, multicultural communities, churches, community and neighbourhoods associations.

A2.ix Develop and fund a community grant program that provides resources to capable community champions and non-governmental organizations that have a well conceived plan or initiative to reduce greenhouse gas emissions consistent with this Community Climate Change Action Plan

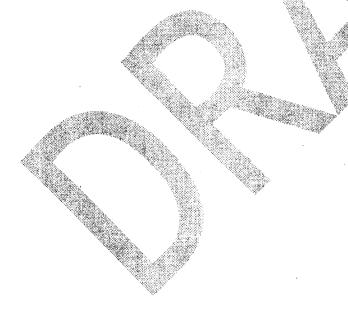
S2 Engagement Strategy

D Connect Individuals to Tools

While a common vision and empowered community champions can create strong motivators for change, if there are significant barriers to actually making this change, such as cost or convenience, the likelihood of a change decreases. The majority of this Community Climate Change Action Plan describes ways in which organisations such as the City, TransLink, the federal government and others can make the desired behaviour changes as easy and attractive as possible through information, incentives, programs or other means.

INITIAL ACTIONS

- A2.x Launch a central Web portal that provides residents with relevant information to their situation that will become the "go-to" place for information, tools, resources and support for community actions to reduce greenhouse gas emissions.
- A2.xi Ensure that the communications of all City initiated and/or funded programs include links to relevant tools.



3.0 Smart Growth

The most important long-range strategy for managing housing and transportation related green house gas emissions in an urban context is land use planning for higher density, mixed use, walkable communities – frequently referred to as smart growth. Vancouver's history of smart growth development⁴, along with our relatively mild climate, are the key reasons that greenhouse gas emissions on a per capita basis are about ½ to 1/5 what they are in other Canadian cities. Not only is this a fundamental approach to limiting and even reducing greenhouse gas emission in the long term, land-use planning is largely within the control of local governments enabling them to take meaningful, independent action. It is important to note though, that land-use change is relatively slow and therefore, other than development already under way (e.g. South East False Creek, Fraser Lands, C-2 housing above shops, and Knight & Kingsway Neighbourhood Centre) cannot be central in meeting a short-term reduction goal like 6% by 2012.

The reason smart growth development is key to limiting and reducing greenhouse gas emissions is that it reduces dependence on the automobile while simultaneously supporting the development of a more energy efficient built form. Higher density development that incorporates a mix of uses such as housing, employment, retail, and recreation in relatively close proximities make it easier to walk or cycle for a more of our daily trips. At the same time, higher densities also make transit increasingly cost effective and enable better service. As a result of building housing close to jobs in Vancouver and maintaining sites for services close to the core, emissions from cars and light trucks increased less than 6% from 1990 to 2000 despite a population increase of 18% and a shift towards less fuel efficient vehicles. AirCare and ICBC data indicates that while the total number of Vancouver insured vehicles increased over this period, the distance traveled per vehicle and the total distance traveled by all vehicles actually decreased. This finding is consistent with the results of TransLink's 1999 Trip Diary Study that indicated that automobile trips originating in Vancouver decreased slightly, in terms of both mode share and the total number of trips.

In addition to reducing the reliance on automobiles for personal mobility, higher density development frequently includes a greater amount of attached housing. Townhouses, apartments and condominiums are often smaller than single family, detached homes and require less energy to heat. Exterior walls and windows along with roofs are where a home losses most of its heat. When homes share one or more walls and/or are stacked one atop another, there is less heat loss area for each individual home.

Initial Actions

A3.i Continue supporting the principles of smart growth when considering major transportation and land use decisions. Increasing density around rapid transit stations and ensuring that Vancouver's growth includes new employment opportunities are particularly important.

⁴ Some of Vancouver's notable smart growth approaches since the early 80's include the successful mixing of housing, retail, and office space downtown; the mixed-use residential/commercial development along transit lines throughout the city; encouragement of job and housing intensification at transit stations; allowing secondary suites throughout the single family neighbourhoods; and planning for neighbourhood centres combining ground-oriented moderate density housing, retail and services in single family neighbourhoods.

4.0 RESIDENTIAL BUILDINGS

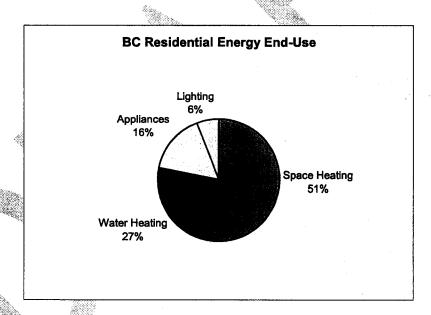
Goal

Reduce annual greenhouse gas emissions resulting from energy use in residential buildings by 12% (or 90,000 tonnes) by 2012

- 25% of detached housing improve energy efficiency by 30% through retrofits (38,000t)
- 35% of all housing improve energy efficiency by 15% through appliance replacements and doit-yourself improvements (38,000t)
- Retrofit non-market housing to improve energy performance by 15% (9,000t)
- 25% improvement in efficiency for new construction compared to 2000 by 2012 (5,000t)

4.1 Context

Residential energy use in Vancouver accounted for just over one fifth of all of Vancouver's Greenhouse Gas emissions in 2000. Over three quarters of energy use in the home is for space and water heating. Improving the efficiency of heating appliances such as furnaces and hot water tanks, reducing residential heat loss with improved insulation, windows and draft-proofing, and reducing the amount of hot water used are key in achieving significant greenhouse gas emission reductions in the residential sector.



Existing detached/semi-detached housing are responsible for the majority of the residential greenhouse gas emissions and have greatest opportunities for voluntary retrofits (resulting from high percentage of owner occupation and focus of existing incentives). These form the first priority for residential action in this plan.

 The EnerGuide for Existing Housing (EGH) program provides homeowners with an unbiased rating of their home's energy performance and customized information on how energy is used in their home. This enables them to evaluate and prioritize home energy improvement opportunities.

- Home owners that undertake retrofits and measurably improve their EnerGuide for Houses rating receive federal grant money relative to their energy performance improvement (typically in the \$1,000 range)
- BC Hydro, Terasen Gas, VanCity, and numerous furnace manufacturers frequently offer financial incentives for energy efficient retrofits and appliance replacements

Some of the most significant barriers to home energy efficiency improvements that need to be overcome include:

- High initial cost for major retrofits and uncertainty regarding the potential savings
- Lack of awareness and information regarding home energy retrofit opportunities and benefits, partially because every house is unique
- Lack of awareness of do-it-yourself improvement opportunities, how to identify and locate quality goods and services, and government/utility programs and incentives
- Inconvenience
- Landlords are typically responsible for housing improvements but in most cases the benefits of improved energy performance are experienced by the renter

4.2 Strategies and Initial Actions

Home energy retrofits will depend upon resident demand, convenience, and financial benefit.

S4 Residential Buildings Strategy

A Develop a Shared, User-Focused Information Resource

Effective community outreach, creating a market for home energy efficiency, and promoting do-it-yourself improvements all will depend (in-part) on providing reliable, easy-to-access, and useful information to residents. While numerous information sources are available (Government of Canada, utilities, non-government organizations, etc.), there is no one place where Vancouver residents can turn to for easily accessible information that is relevant to them regarding home energy efficiency. Correspondingly, public institutions do not have a unified message on this matter.

In order to maximize convenience and effectiveness, current information and resources should be offered to residents in such a way that it is relevant to their needs and opportunities. It must take into account their housing type and tenure, language preferences, and information access modes.

This information should include:

- Opportunities for, and benefits to, improving the energy efficiency of their home
- How to identify and locate quality goods and services to improve the energy efficiency of their home
- How to undertake small do-it-yourself home energy efficiency improvements
- What rebates, grants, incentives, and financing is currently available for the improvements they are considering

S4 Residential Buildings Strategy

B Create a Market for Energy Efficiency

There are many large and small improvements that can be done to most homes that are both cost effective and environmentally beneficial. If large scale home energy improvements are to be achieved, it will be essential to create a market for them.

Community engagement (as described in Section 2.0) that makes citizens more aware and committed to the opportunities, incentives, and benefits of energy efficiency are an important start to creating a market, but these alone are unlikely to result in widespread home energy improvements.

Central to creating a market for these changes is to create business opportunities relating to the promotion of energy efficiency for companies involved in home renovations and financing. Contractors, hardware/appliance stores, and financial institutions are typically who the public deal with when considering a small or large home improvement project – these players will be the most effective in "selling" energy efficiency if they have the tools and there is a benefit for them to do so. Working with these natural "first contact points" helps to create demand, makes energy efficient choices more convenient, and makes energy efficiency more financially appealing because only the incremental cost for the more efficient option need be recovered through the cost savings.

Additional private partners could include realtors and private property assessors that support and recognize the value of energy efficiency in the services they provide to their customers.

INITIAL ACTIONS

- A.4i Build a partnership with utilities, contractors (and their associations), financial institutions, hardware stores, and other business interests to develop, maintain and cooperatively promote a shared, user-focused information resource and related materials (Web, print, etc.) on home energy efficiency improvements. Community outreach and marketing activities of all the partners would direct the public to this shared resource which in turn, would direct homeowners and renters alike to all of the relevant public resources and private services available to assist them in improving the energy efficiency of their home.
- A.4ii Develop and deliver a training session for all public and private sector staff that interact with the public to educate them about the "shared information resource" and to motivate them to promote energy efficiency improvements.
- S4 Residential Buildings Strategy
- C Support Do-It-Yourself Improvements

Major home energy improvements such as replacing an appliance, furnace, or windows are fairly expensive undertakings and will be difficult for many residents, especially renters, to seriously consider based on energy considerations alone. For those residents not already considering a major home improvement, there are a number of simple changes they can make around their home to measurably reduce energy consumption and save money.

Supporting these do-it-yourself improvements can include:

- Clearly identifying relevant small improvements and their benefits
- Providing user-friendly information to assist in identifying and locating quality products as well as information to make installation easy for those that fail to qualify as "handy"
- Providing incentives utilizing innovative and easy access delivery mechanisms

INITIAL ACTIONS

- A.4iii Work with utilities and building consultants/contractors to identify and guide the implementation of priority "do-it-yourself" home energy improvements
- A.4iv Develop and pilot a "do-it-yourself" home energy improvement incentive program

S4 Residential Buildings Strategy

D Retrofit Non-Market Housing

There are approximately 21,000 non-market housing units in Vancouver comprising nearly 9% of the total stock. BC Housing and non-market housing groups own and operate the majority of the units while the City itself is responsible for the remainder.

The City has committed to improving the energy performance of the non-market housing that it owns and operates as part of its Corporate Climate Change Action Plan. In addition, BC Housing is presently developing a pilot program to retrofit those non-market housing units that it owns and operates. If their pilot proves to be successful, they aim to expand the program to those units owned and/or operated by non-profit groups as BC Housing is largely responsible for funding their operations.

Using lessons from Toronto, there may be an additional opportunity to use these non-market housing retrofits as case studies and demonstration projects to catalyze greater retrofit activity in multi-family market housing.

S4 Residential Buildings Strategy

E Support Multi-Family Building Retrofits in Partnership with Central Decision Makers While individual households within multi-family housing developments, such as condominiums or rental apartments, will be able to cost effectively reduce their energy use through a variety of small improvements, deeper energy reductions will require more centralized and coordinated action.

Both Terasen and BC Hydro offer free walk-through audit services to identify potentially cost-effective energy efficiency improvements, many of which have payback periods of less than three years. For many buildings, these include activities such as:

- Heating, ventilation, and hot water system maintenance and control adjustments
- Common area (and external) lighting upgrades and washing machine replacements
- Improved windows, insulation, and air barriers when undertaken at time of building remediation (i.e. leaky condos)

In addition, the utilities and the Federal Government also have retrofit incentive programs.

To facilitate greater retrofit activity in multifamily buildings, government and local utilities will need to work closely with housing organizations such as property management companies, strata corporations, and homeowner/renter associations to determine what tools would be most useful to them when considering energy efficiency improvements. As only about half of the buildings with water egress problems (the "leaky condos") have already had remediation work completed, tools to support the remaining building owners and managers will be a high priority as many efficiency opportunities are much more cost effective when work on the building envelope is already planned for other reasons.

INITIAL ACTIONS

- A4.v Develop and distribute information on energy efficiency improvement opportunities and resources that should be considered when undertaking building remediation work for "leaky condos"
- A4.vi Development a comprehensive multi-family housing retrofit strategy in consultation with stakeholders and through an evaluation of similar existing programs

S4 Residential Buildings Strategy

F

Utilize Appropriate Regulatory Mechanisms

There are a number of regulatory approaches for building and appliance performance that, *if used appropriately*, could be very effective in reducing energy usage. While the City has only limited regulatory jurisdiction over energy efficiency in existing buildings, it should exercise those powers it does have (especially regarding new construction) while working with the Provincial and Federal Governments to ensure that they do the same (with regards to buildings, building components such as windows, and appliances).

The bulk of new housing built in the city will be multi-family developments. The City of Vancouver's recent action to update the Vancouver Building Bylaw to reference the 2001 version of ASHRAE90.1 will increase the energy efficiency requirement for multi-family and large commercial/institutional

buildings by approximately 13%. While this is the most aggressive building efficiency bylaw of any municipality in Canada, Vancouver is well positioned to pursue even greater performance levels from new buildings and is presently developing a comprehensive green building strategy. This strategy, expected to be complete by spring of 2006, will signal to developers the City's intention to require a further 12% energy performance improvement in new large residential and commercial buildings by 2010. The combined 25% improvement is consistent with current federal green building incentive money (CBIP) and LEED Canada prerequisites.

Vancouver developers are at the leading edge of the green building movement in North America. As a result of their learning associated with the planning of South East False Creek as well as through their own market assessment and initiative, 20% of all LEED registered green buildings in Canada are in Vancouver, where only 2% of the nation's population resides.

To help designers and developers gain experience with advanced energy performance standards, all wood frame and concrete buildings in South East False Creek will be required to meet R2000 (or EnerGuide 80) or CBIP standards respectively. In addition, the City is presently considering allowing buildings on some select sites in the city to exceed the maximum height limitations; buildings on these sites should be required to meet a higher standard of energy and environmental performance.

While the opportunities for the City to effectively regulate energy performance for existing housing is much more limited, a preliminary analysis of the market penetration and economics for high efficiency replacement furnaces in detached houses suggest this may be one opportunity for the City to effectively exercise its regulatory powers.

Most regulatory tools for energy efficiency rest with the Provincial and Federal governments. The BC Ministry of Energy and Mines is currently assessing appliance efficiency standards and is considering regulatory and taxation approaches to improved energy efficiency. Due to changes in technology and building practice, it will be important that these regulations are reviewed regularly to ensure that they continue to be an effective tool in supporting improved energy efficiency.

INITIAL ACTIONS

A4. vii Evaluate, consult, and report back on requiring high efficiency replacement furnaces in existing detached houses in Vancouver.

5.0 COMMERCIAL AND INSTITUTIONAL BUILDINGS

Goal

Reduce annual greenhouse gas emissions resulting from energy use from Commercial and Institutional Buildings by 8% (or 70,000 tonnes) by 2012

- 25% of medium and large commercial buildings improve energy efficiency by 20% through a combination of retrofits, equipment replacement, and operator training (17,000t)
- 20% of small commercial buildings improve energy performance by 15% through a combination of small retrofits and equipment replacement (9,000t)
- 85% of institutional buildings improve energy efficiency by 15% through a combination of retrofits, equipment replacement, and operator training (28,000t)
- 25% improvement in efficiency for new construction compared to 2000 by 2012 (5,000t)

5.1 Context

Energy use in commercial and institutional buildings in Vancouver accounted for just over one quarter of all of Vancouver's greenhouse gas emissions in 2000, essentially tied with light duty vehicles as the single largest source in the city. While many commercial buildings in Vancouver have implemented energy improvements with short payback periods, changing market conditions and aging building stock provide new opportunities for more ambitious energy use reductions.

Vancouver's business community and institutions have a history of embracing energy improvements that establishes the foundation for additional action. Of note, Langara College has received national awards recognizing its energy performance improvements and Vancouver schools have the lowest average energy usage in the province. The Building Owners and Managers Association (BOMA's) relatively new "Go Green" program is increasing awareness of energy use and its impacts amongst building owners and may provide a good, industry accepted mechanism for action.

While some local institutions have or are currently planning some significant energy improvement programs, the long-term ownership that is typical for institutional facilities means that there are still significant energy savings opportunities to be realized. Some important factors that provide optimism that significant additional improvements in energy performance and therefore reductions in greenhouse gas emissions are possible include:

- new institutional commitments to improved energy efficiency (City of Vancouver = 20% by 2010, the BC Building Corporation = 12% in provincial buildings by 2007; and Vancouver Coastal Health Authority is planning a comprehensive energy retrofit program)
- energy price increases
- renewed BC Hydro commitment to energy conservation through Power Smart funding as well as other utility and government incentive and assistance programs
- a significant portion of Vancouver's medium and large commercial buildings will require energy equipment replacements (due to age) in the next 5-10 years
- significant provincial funding for seismic upgrades in Vancouver schools has recently been announced (\$87.5 million for 16 Vancouver schools in the first 3 years) – as over 80% of Vancouver schools have been identified as requiring seismic upgrades, this presents a number of new and cost effective opportunities for efficiency improvements
- despite their high upfront costs, many energy improvements are very good financial investments over the medium to long term

 improved maintenance, operator training, and building recommissioning may all offer ways to realize immediate and very cost effective energy savings

While these new or renewed opportunities provide reason for optimism, it would not be responsible to assume that significant energy efficiency improvements are assured. Some of the barriers to be addressed include:

- Energy costs are not a significant portion of operational expenses and are not (yet) a significant factor in attracting or retaining building tenants
- Institutions (and small commercial owners/operators) have limited access to resources and strong core service/business responsibilities take a higher priority than emission reductions
- Commercial building owners/operators are not confident that capital investments in energy improvements can be recovered upon sale of the building
- Unlike the common practice amongst professionally managed buildings, the lease language
 for small commercial buildings may not provide the owner with a mechanism to recover retrofit
 costs from the tenants who would be benefiting from the decreased energy costs
- complexity/inflexibility/lack of familiarity with existing retrofit programs, funding, and retrofit services
- Lack of staff time to pursue opportunities
- Budgeting protocols often don't support investments in energy efficiency

5.2 Strategies and Initial Actions

S5 Commercial Buildings Strategy

Facilitate Access to Existing Resources

There are many existing programs, funding sources, and services available to facilitate energy efficiency improvements in existing commercial and institutional buildings yet access to these resources is limited due to lack of familiarity amongst building managers. In addition, managers may be sceptical of the resources available. Developing mechanisms to make it easier for staff to understand and evaluate what tools are available to them would compliment these programs and lead to greater uptake.

In addition, many facility managers do not have the time to pursue changes to these existing programs that would make them more "user-friendly". Many programs are designed and delivered by people without the opportunity to develop a good understanding of the needs of their target users. A shared advocacy strategy to propose changes to these programs would remove the burden for change from any single manager, create a strong unified voice for the desired changes, and ultimately could increase uptake of these programs to the benefit of all.

Some ways to achieve these that will need to be explored with both institutional and commercial building managers include:

- · A mechanism to facilitate peer-to-peer sharing
- Coordinated, external presentations on relevant topics
- Creation of a user-responsive database of funding and support programs offered by a wide range of institutions (GVRD, BC Hydro, Terasen, senior government, etc...)
- Access to a coordinated team of experts that could assist managers in developing and implementing a retrofit program and coordinate advocacy for changes to funding programs

INITIAL ACTIONS

- A.5i Establish a program and venue where managers and staff of different institutions can share their respective information and experiences on a regular basis regarding the successes and challenges of instituting retrofits. This group can be used to leverage resources across institutions and to advocate for program development and changes to most effectively and efficiently serve their needs.
- A.5ii Seek resources and partners to provide commercial and institutional owners with expert technical and program assistance to facilitate their access to existing resources and expedite building retrofits. For institutional buildings, this may include working with BC Green Buildings to actively deliver their programs and services in Vancouver.
- S5 Commercial Buildings Strategy
- B Use Existing Systems to their Potential

Complex energy and control systems, staff turn-over, and changing user requirements over time often result in a situation where building energy systems that are not being operated to their peak efficiency.

The efficacy of specialized building operator training in reducing the use of energy in existing buildings has been well proven in Ontario and 16 U.S. States by independent evaluators. Evaluations of programs from the Northwest Energy Efficiency Council and the Northeast Energy Efficiency Partnership programs indicate electrical savings per building operator averaging between 115,000 kWh/yr to 230,000 kWh/year and gas savings of 980GJ. The payback for building owners for these programs is only a few months.

The BC Ministry of Energy and Mines has been working with BOMA, Douglas Collage and other partners to provide this training for building operators in BC. The City should work with this partnership to promote program uptake.

Similar results have been shown when the building systems in an existing facility are recommissioned to match user profiles and maximize system performance. Recommissioning costs range from \$10,000 - \$50,000 and have been shown to reduce total energy consumption by 5-15% resulting in simple paybacks (based on energy savings alone) that are typically less than two years. Promoting building recommissioning may be another or complementary approach to maximize the efficiency of existing building systems.

INITIAL ACTIONS

A.5iii Work with the BC Ministry of Energy and Mines, utilities, BOMA, and other stakeholders to promote Building Operator Training and determine the potential for building recommissioning

S5 Commercial Buildings Strategy

A Create a Market for Energy Efficient Commercial Space

Building owners and managers respond to the demands of their tenants and potential tenants; if the environmental, and more specifically the energy, performance of buildings was important to potential tenants, these projects would become a higher priority for the owners and managers of these buildings.

For new construction, Leadership in Energy and Environmental Design (LEED) provides an unbiased, externally "certified" way of measuring and recognizing a new building's design from an environmental perspective. The rapid growth in recognition of LEED in Vancouver has begun to change the way new buildings are developed. A similar, commonly recognized tool for evaluating the energy performance of an existing building or office space would be an important first step in transforming the commercial building market. In order for such a tool to be effective, it may need to recognize the diversity of "starting points" and the incremental approach that is typically used when "improving" existing buildings. BOMA's newly released "Go Green – Comprehensive" which moves beyond just assessing opportunities for energy efficiency and into taking action on those opportunities already has industry support and could be or form the foundation of such a recognition system.

INITIAL ACTIONS

A.5iv Evaluate BOMA's "Go Green – Comprehensive" and other building energy performance rating systems for existing buildings and work with stakeholders to make recommendations on the adoption or development of one for the Vancouver market.

S5 Commercial Buildings Strategy

D Develop Mechanisms to Connect Long Term Investment Capital to Efficiency Opportunities

Many energy efficiency opportunities offer good investment opportunities but only for those committed to long-term investments with limited financial upside for the first 5-10 years. In both the institutional and commercial building sectors, there are real barriers to long-term investments that do not directly relate to core business activities.

Clearly demonstrating the return-on-investment potential and creating mechanisms to connect long-term investment capital to energy savings projects in an elegant fashion could result in significant energy efficiency retrofit activity. The challenge will be to create mechanisms that are not overly complex (legal or otherwise) or entail too much uncertainty.

Some possibilities are to connect the financial liability of the capital improvement to the property not the current owner, or to enable buildings managers to buy the services that energy provides (such as heat, cooling, etc) from third party investors that would "own" the infrastructure that provides those services.

INITIAL ACTIONS

A5.v Develop a generalized business case for longer payback retrofits and research possible financial and legal tools to enable long term capital to be invested in energy efficiency projects

S5 Commercial Buildings Strategy

E Senior Leadership Commitment

There are widely varying levels of activity and commitment to energy conservation even amongst organizations that are operating facilities in very similar regulatory, financial, and organizational environments. While they have similar access to resources, those organizations or institutions with demonstrated senior level commitment to energy performance find a way to make energy conservation projects work.

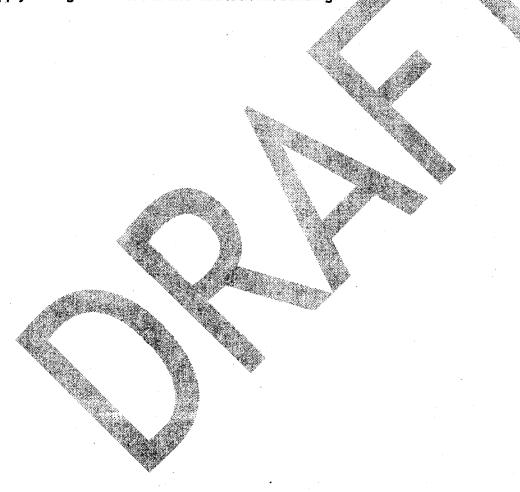
The City can work with the various organizations and institutions to raise the profile of energy conservation and promote senior leadership commitment to substantive action on reducing

greenhouse gas emissions. Possible initial members of a "leadership council" might include Chair of the Board for Vancouver Coastal Health, Vancouver School Board, BC Hydro, Vancity and others. The purpose of this 'leadership council' would be to advance the knowledge and understanding of energy and climate change issues among member organisations, to act as an advocacy group for responsive and adequate funding/financing mechanisms, and to recognise member accomplishments.

S5 Commercial Buildings Strategy

F Utilize Appropriate Regulatory Mechanisms

Similar to the regulatory mechanisms described in Section 3.1.6, the same approaches can be used to limit emissions from new commercial/institutional buildings and energy using appliances. The Vancouver Building Bylaw along with provincial and federal building and appliance standards are key tools that the City should utilize or advocate for. Vancouver's recent update of the Building Bylaw to require ASHRAE 90.1 (1999) and its Green Building Strategy (under development) also apply to large commercial and institutional buildings



6.0 Community Energy Systems and Supply

Community energy systems are those systems that use district heating and cooling, combined heat and power (cogeneration), distributed generation, waste heat recovery, thermal storage, local sources of renewable energy (such as biomass, micro-hydro, wind, solar etc), local integration, and other related systems to provide a local supply of low-emissions energy. In the long run, the overall strategy of optimizing and evolving the system is just as important as which technologies are applied at any given time. In particular, the elegant combination of simple technologies implemented using a systems approach is key. The system design must allow for incremental growth and enable today's proven technologies to easily integrate with or be replaced by new ones.

While some pilot opportunities relating to the Olympic Village, South East False Creek, and the Sustainability Precinct have the potential of yielding measurable greenhouse gas emission reductions by 2012, the real significance of community energy systems are that they establish a foundation for significant future greenhouse gas reductions. In addition, the community energy system approach would provide new economic development opportunities for local businesses and institutions while potentially impacting emissions globally by the successful demonstration and subsequent replication of this approach.

Goals

To develop flexible, low impact and renewable energy supply systems and delivery networks within the city over time in order to:

- Decrease emissions significantly in the long run;
- Increase the range of affordable energy supply options for the city in the face of rising energy costs;
- Claim economic opportunities associated with systems; and
- Institutionalize a progressive approach to energy within the city
- Reduce annual greenhouse gas emissions from new development in the Sustainability Precinct by 8,000t by 2012

Benefits

There are many benefits associated with the development of energy supply and local energy systems including:

- Reducing regional greenhouse gas emissions and air quality emissions through local, clean generation of energy;
- Economic development through investment and management of these systems;
- Supporting an ethic of innovation in the city and the development industry, as well as providing local demand for innovative companies, technologies, and expertise;
- Enhancement of the city's reputation as a "green" city;
- Innovations in technology and its application will play a central role in addressing global greenhouse gas emission reductions with the potential to create significant new export opportunities for local businesses;
- Establishing some forces to support more stable energy prices in the city; and
- Others

6.1 Context

Energy efficiency of buildings and transportation will only take the city so far over the long run – ultimately we need to develop "green" sources of energy – and there are many benefits to

developing some of these within the city:

- The carbon intensity of electricity will continue to rise along with costs in the short to medium terms;
- Natural gas for local consumption will eventually be drawn from global supplies, and as such, will become increasingly subject to significant market price fluctuations;
- The costs of the technology for alternative energy supply and distribution systems is decreasing;
- Terasen, BC Hydro and independent power producers are pursuing partnerships with cities, developers and others in the development of local green energy sources;
- Municipalities have unique opportunities to establish energy utility corporations within their jurisdiction.

Barriers

Some of the barriers to the development of energy systems in the city include:

- The initial cost of technology for solar, geo-thermal, waste heat, district systems or other energy sources is often greater than conventional electricity and natural gas solutions;
- BC energy prices are relatively low resulting in long simple paybacks for new systems longer term investment strategies, even with attractive returns, are more complex and less "market friendly":
- BC's utility regulations (BCUC) can make the creation and operation of local energy supply companies by private interests highly complex and resource intensive;
- Energy supply is not commonly considered as a core business of the City or expected to be addressed with innovations in the development industry; and
- Knowledge barriers exist in many areas.

6.2 Strategies and Initial Actions

In order to claim the opportunities that community energy supply and systems can offer the city to meet its environmental and economic goals, and to overcome the barriers to them, a four pronged strategy should be pursued.

S6 Energy Systems and Supply Strategy

A Technology and Business Model Research

The City should gather partners and commission a summary of existing research into the opportunities for energy systems in an urban context and use this study to prioritize systems that are already viable and can be implemented strategically, as well as identify additional required research. This study should at a minimum examine heating, cooling and electricity systems and technology and should focus on those systems where Vancouver has a competitive advantage.

The City should identify current alternative energy supply systems in use in the city and gather data on their performance and more widespread applicability.

The City should investigate potential business models for the development and operation of energy systems and identify opportunities and roles for City involvement.

Some municipalities (including a number of local examples) have established City-owned energy utility corporations in order to manage their involvement, interests and investments in alternative energy systems and related issues, including the purchasing of green power and future carbon trading opportunities.

INITIAL ACTIONS

- A6.i Undertake technology and business-case feasibility (and preliminary design) studies for an Energy Precinct anchored in the Olympic Village but incorporating the entire False Creek Flats. This area is expected to have significant development by 2010 that will require mostly new infrastructure to service, contains a promising mix of uses and energy profiles, and has a number of important stakeholders very interested in or already committed to "green development"
- A6.ii Undertake a preliminary feasibility study (including technological, economic, and environmental impact assessments) and customer interest assessment for deep water cooling for the central business district. Due to the nature of such systems applied at a large scale there may be a unique role for the City to play but the window of opportunity is limited as many of the chillers in the central business district are likely to be replaced in the next 5 10 years.
- S6 Energy Systems and Supply Strategy

B Pilot projects

The City should work with partners to identify several pilot projects for installation and monitor their performance and viability for more widespread application. High priority pilot projects include those with strong short term economics; large scale developments; developments with considerable earth work on City or Parks land, and those with time-limited windows of opportunity.

Priority projects for initial consideration could include:

- An energy precinct system (heating and electricity networks) associated with the Olympic Village, South East False Creek, and the False Creek Flats;
- The solar lighting pilot project currently under consideration with BCIT and BC Hydro;
- Waste sewer heat recovery (e.g.: Molson, SEFC, others).
- A6.iii Implement a solar public lighting pilot. This project has current momentum, provides a high visibility demonstration, and if successful will be cost neutral to a standard installation thereby offering good expansion potential.
- S6 Energy Systems and Supply Strategy

C Identify and Evaluate Infrastructure Systems Opportunities

The City should develop a strategy to reduce the costs of energy systems by installing infrastructure (e.g., pipes, wires, conduits) to support future energy systems in conjunction with ongoing infrastructure installation, maintenance and upgrading activities of roads, sewers and other infrastructure.

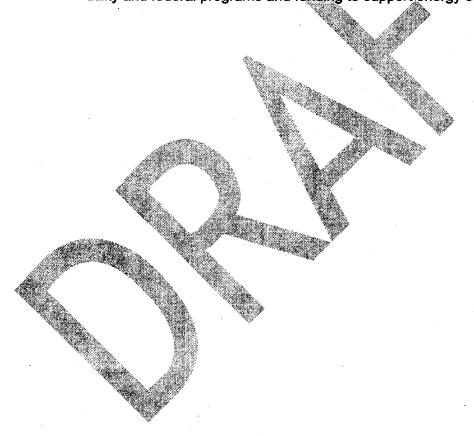
7.0 INDUSTRY

While industrial users frequently consume large amounts of energy and therefore can offer significant reduction potential, they only account for 5% of Vancouver's greenhouse gas emissions. The relatively low amounts of industrial emissions in Vancouver are a direct reflection of the fact that there is very little industry remaining within the city limits.

In many other jurisdictions, working with industry to identify opportunities to reduce energy use can play a very significant role in reducing green house gas emissions. While industry in Vancouver does not have a significant focus in this Plan, partnership opportunities for energy conservation, cogeneration, and waste heat recovery are worth exploring.

INITIAL ACTIONS

A7.i Develop a relationship with the remaining significant industrial green house gas emitters in Vancouver to develop an understanding of their energy use profile, their efficiency awareness and commitment, and to facilitate their connection with existing utility and federal programs and funding to support energy conservation.



8.0 Transportation Alternatives

Goal

Reduce total distance traveled by Vancouver registered light duty vehicles such as cars and small trucks by 10% (for a 90,000 tonne GHG reduction) by 2012

8.1 Context

In Vancouver, passenger vehicles were responsible for about 870,000 tonnes of greenhouse gases (GHG) in 2000, or about one-quarter of all community GHG emissions. This plan contains two independent approaches to reducing greenhouse gas emissions from light duty vehicles: 1) decrease the amount of driving Vancouver residents do, and 2) improve vehicle and fuel efficiency for those trips that require the use of a car. In this section of the Plan we describe strategies to reduce the total distance traveled by Vancouverites using light duty vehicles.

Driving less will mean switching some trips to alternatives (e.g., walking, cycling, transit and carpooling) and eliminating or linking some automobile trips. The City currently supports alternatives to driving through initiatives such as providing facilities for walking and cycling, supporting traffic calming and school traffic safety programs, providing general safety/awareness programs, managing parking and providing transit stop and priority facilities.

Policies and actions for transportation in Vancouver are guided by the Vancouver Transportation Plan (1997) and Downtown Transportation Plan (2002). The City's plans also support the Greater Vancouver region's long range transportation plan - Transport 2021 (1993). Increasing support of transportation alternatives, including a large increase in transit service, is a fundamental strategy in all of these plans and the approaches they propose are consistent with those described here. This Community Climate Change Plan complements existing transportation plans by providing a concrete greenhouse gas reduction target, by detailing specific actions that the City can undertake in the short term to expedite vehicle trip reductions, and by including new approaches that have been demonstrated as effective since the completion of the transportation plans.

In order to further facilitate the shift towards transportation alternatives, this plan details strategies and actions that the City can undertake to:

- be more proactive in ensuring adequate facilities and services are in place to support alternatives to driving;
- to actively promote and support individual decisions to use alternative transportation when it is practical; and
- apply a systematic and cooperative approach to transportation demand management.

8.1.1 Ambitious, Achievable Target

Targeting a 10% reduction in vehicle travel from "business-as-usual" forecasts within a seven year time frame is quite ambitious when compared to transportation plans from other jurisdictions in Canada and the United States. While this is an aggressive target, a number of tangible factors provide optimism to believe that it is achievable with adequate implementation resources and community engagement.

To start, while Vancouver is already a fairly dense city with numerous neighbourhood "mixed use" hubs, new growth is almost entirely occurring in parts of the city where people can live very close to

employment, shopping, services, and recreational opportunities. Mixed land use at higher densities helps support "access by proximity" and efficient transit services, making trips by walking, cycling and transit more viable. The growth in greenhouse gas emissions from passenger vehicles between 1990 and 2000 would have been much more significant if owners of Vancouver vehicles had not already started to reduce their vehicle use. Based on Air Care recorded mileage, both the average distance driven by Vancouver registered vehicles and per capita greenhouse gas emissions decreased during this period.

The table below further illustrates this trend away from the automobile towards alternative forms of transportation by Vancouver residents.

Change in Number of Vancouver Trips by Mode Over a 24-hour Period (1999 TransLink Trip Diary Study)

	1994	4 19	99	% Change ('94	- '99)
Mode	Trips	Share Trips	Share	<u>Trips</u>	
Auto Driver	780,000	50% 762,00	0 46%	- 2%	
Transportation Alternatives					
Transit	277,000	18% 311,00	0 19%	+ 12%	
Walk	232,000	15% 312,00	0 19%	+ 34%	
Bike	20,000	1.3% 44,00	0 2.7%	+ 127%	

The number of single occupant car trips declined slightly while transit, walking and cycling mode shares all increased significantly. This trend towards decreasing total auto driver trips occurred during a period of rapid population growth; while the number of people moving to Vancouver continues to increase, the forecasted rate of growth is only about half of that during the 1990's.

Complementing these historical trends towards alternative transportation are significant increases in resources planned or allocated toward supporting alternatives including:

- TransLink's 10-year Outlook, covering roughly the same time period as this Plan, targets the
 largest expansion of transit services ever in this region;
- Vancouver's new Development Cost Levy makes significant new resources available to support transportation alternatives in the city;
- Federal Government funding for transportation alternatives is increasing as demonstrated by Transport Canada's Urban Transportation Showcase program (awarded in 2003) that includes \$8.8 million in transit and related improvements in Greater Vancouver
- Vancouver has a proposed \$9.5 million of alternative transportation projects and programs under Natural Resources Canada's Opportunities Envelope and has requested \$4.5 million in funding support (decision pending, spring 2005);
- The *growing toolkit of innovative but proven approaches* for supporting transportation alternatives such as targeted marketing, car sharing, innovative use of parking, etc.; and
- The *integrated approach* proposed in this plan that clearly identifies *concrete actions* that the city can take and the resources required to do so.

While these trends and new resources all provide convincing reasons for optimism, they must be tempered by an awareness of the real challenges that must be overcome to achieve our target.

8.1.2 Transit Capacity and Other Challenges

Services such as U-Pass, Sky Train expansion, B-Line and Community Shuttle bus service have been very successful in shifting drivers to transit. The success of these programs, the conduciveness of Vancouver's layout to transit usage, and our rapidly expanding population have lead to a problem that most North American cities only dream about; transit demand is at or exceeding capacity for much of the day.

Overcrowding can result in passengers being passed by, and longer and less comfortable transit trips, which can be a deterrent to retaining existing transit users or attracting new ones. Although TransLink's 2005-2007 Three Year Plan calls for increasing transit funding, most resources will need to go towards meeting existing service needs. As a result, early implementation actions in this plan focus on other alternatives, especially active transportation.

Other common challenges to increasing the use of transportation alternatives include:

- fixed costs of automobile ownership "the payments are being made anyway, I may as well
 use it"
- inconvenience (real or perceived) including time, inclement weather, "cargo" capacity, etc.
- flexibility such as requiring a car for work purposes or needing to respond to unforeseen circumstances
- safety concerns (real or perceived) including driver behaviour, lack of dedicated routes, street crossings, and personal security on the street or at transit stops
- lack of secure and convenient end-of-trip facilities including bicycle parking, showers, lockers, etc.
- lack of awareness of alternatives and their associated benefits

The strategies and actions recommended in this Plan have been developed to address these types of barriers and make the use of transportation alternatives as easy and desirable as possible.

8.1.3 Cobenefits

Because transit is expected to be at capacity for the first half of the implementation period of this plan, many of the initial actions described in this plan focus on increased use of active transportation modes. In addition to reducing greenhouse gas emissions, increased use of transportation alternatives (especially active modes) results in numerous significant concomitant benefits including:

- Reducing other "common air contaminant" or smog emissions from vehicles helps to reduce
 respiratory health problems such as the risk and severity of aggravated asthma, respiratory
 infections, chronic bronchitis, etc.
- Promoting improved health and fitness A sedentary lifestyle is associated with a two-fold increase in the risk of cardiovascular mortality and researchers calculate that \$2.1 billion in direct health costs in Canada and 21,000 premature deaths were attributable to physical inactivity in 1999.
- Reducing environmental impacts on surrounding water bodies via the transfer of exhaust particulate, brake linings, tire wear, oil leaks, etc.
- Reducing the need for expanding road and bridge capacity.

- Helping to reduce the number of vehicle collisions there are significantly more deaths
 resulting from auto accidents in Vancouver than from homicide (73% more in 2002).
- Reducing impacts of automobiles on community liveability (e.g., noise, short-cutting, etc.).
- Improving goods movement (by reducing the number of vehicles on truck routes).
- Save money Based on the Canadian Automobile Association's 2004 "Driving Costs", the average annual cost of owning and operating a typical passenger vehicle, driven 16,000 km a year, is about \$9,500 (excluding parking costs). By comparison, the cost of a year's worth of monthly transit passes in Vancouver (3 zones) for two adults is about \$3,100, or over \$6,000 less.

8.1.4 Integrated Approach

Successfully implementing a program to increase the use of transportation alternatives requires an integrated approach; the effectiveness of efforts to promote transit, cycling, or other alternatives would be greatly undermined if those alternatives where not viable choices for people and similarly, providing alternatives without increasing people's awareness of and comfort with the options and their benefits would be similarly limited. Because of the integrated nature of successful comprehensive transportation alternative initiatives, it is very difficult to accurately quantify the effectiveness of individual strategies; program outcomes are very contextual.

The integrated strategies outlined in this plan include:

- 1 Increase Viable Transportation Alternatives to Single Occupant Vehicles
 - A. Continue "Smart Growth"
 - B. Increase Supply of Transit, Cycling, and Walking Infrastructure and Services
 - C. Increase Other Alternatives (car-sharing, van pools, etc)
- 2 Support the Use of Transportation Alternatives
 - D. Marketing of Transportation Alternatives
 - E. Enhancing Alternative Transportation Programs at Schools
 - F. Use Parking to Encourage Alternatives
 - G. Improving Safety Education and Enforcement
- 3 Systematic Approaches to Transportation Alternatives
 - H. Regional Travel Pricing
 - Coordinate with Regional Initiatives
 - J. Review Best Practices
 - K. Monitor Progress

8.2 STRATEGIES FOR TRANSPORTATION ALTERNATIVES

Reaching the planned emission reduction target for Transportation Alternatives will require some initiatives in existing City and regional transportation plans to be expedited. New opportunities that have emerged since the creation of existing transportation plans will also need to be explored. The strategies fall under three general categories: provide viable alternatives, support use of alternatives, and apply systematic approaches.

8.2.1 Increase Viable Transportation Alternatives to Single Occupant Vehicles

S8 Strategies to Increase Viable Transportation Alternatives

A INCREASE SUPPLY OF TRANSIT, CYCLING, AND WALKING FACILITIES AND SERVICES Shifting single occupant automobile trips to other modes requires an adequate supply of transportation alternative infrastructure and services that are safe, convenient and reliable. Lack of adequate supporting infrastructure and services can be a barrier to trying an alternative mode, or result in a negative experience if an alternative is tried but found to be inadequate. Although the City and TransLink already dedicate significant resources to alternatives, an increased focus on addressing existing needs and future growth is proposed.

With regard to on-street infrastructure, the City provides facilities for walking, cycling and transit priority. The need for additional infrastructure in these areas can be addressed most effectively by an increase in City capital funding, leveraged by additional contributions from other levels of government. For cycling, there are additional needs for both on-street and off-street parking, as well as off-street end of trip facilities (i.e., showers and lockers in buildings).

- A8.ii Place greater priority on funding for pedestrians, cyclists, transit priority and other local transportation alternatives in future Capital plans.
- A8.iii Support TransLink's planned review, through MRTAC, of increasing flexibility in its Minor Capital cost-sharing program, to assist the City in leveraging capital funding for pedestrians, cyclists and transit priority.
- A8.iv Request the provincial government expand their Cycling Network Program, to assist the City in leveraging capital funding for cyclists.
- A8.v Request the federal government both expands funding for GHG reduction programs (e.g., Opportunities Envelope Fund, Urban Transportation Showcase, etc.) that assist the City in leveraging capital and operating funding for transportation alternatives while also making employer funded transit passes tax exempt.
- A8.vi Review and report back on public bicycle parking for the downtown and other major destinations, including:
 - An implementation schedule for Streetscape Amenities program racks and lockers
 - The feasibility of installing bike lock rings on parking meters
 - Improving information on the location of public bicycle parking
- A8.vii Review and report back on the following measures for bicycle parking and end of trip facilities:
 - Reviewing whether existing facilities and requirements will meet future demands
 - Considering a relaxation to allow the conversion of existing parking spaces to bicycle parking
- A8.viii Pursue the creation of bike stations (bike storage and service centres) at one or two strategic locations in the downtown through re-zonings, including reporting back on any incentives that may be necessary.

The plan recognizes the major role of transit in moving people around the City and region. It is important that transit be comfortable, fast, and convenient, with sufficient supply to meet demand. In addition to the need for increased transit supply in Vancouver, measures that enable buses to move faster will achieve multiple goals such as:

- o allowing the fleet to provide more service than would otherwise be possible;
- o providing a more competitive and reliable service to users; and
- o raising the 'status' of transit vehicles relative to other users such as the automobile.

Realising these goals will have the effect of making transit service more attractive to existing and potential new users. Measures that can be adopted to speed buses may include the use of express bus routes, reserved lanes, queue-jumpers, signal priority, and enhanced boarding procedures.

- A8.ix Request the TransLink Board to allocate sufficient transit resources to continue addressing Vancouver's existing service needs, residential and business growth, and demand for additional services such as U-Pass that achieve significant mode shifts from driving.
- A8.x Work with TransLink through processes such as the Vancouver/UBC Area Transit Plan to seek additional opportunities to implement measures that facilitate more rapid bus movement and loading in a targeted fashion.
- S8 Strategies to Increase Viable Transportation Alternatives
- B INCREASE OTHER ALTERNATIVES

There are a number of other viable alternatives to the single occupant vehicle that should be further supported in Vancouver. Car and van-pools effectively reduce greenhouse gas emissions for trips that are too far for walking and cycling and they are not dependant on transit service investments. In addition, car-sharing or car co-ops have been shown to effectively reduce automobile travel by having users pay "per use".

Initial Actions

A8.xi Support van-pooling initiatives of the Jack Bell Foundation by:

- helping to create awareness and use of the Foundation's recently enhanced online ride-matching service
- reviewing the feasibility of increasing the length of the northbound Georgia St. bus lane that is accessible to van pools

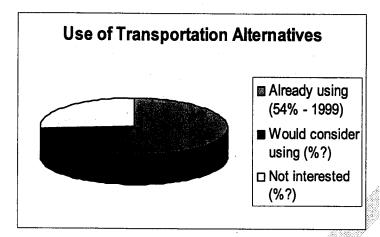
A8.xii Expand car-sharing by

- working with car-sharing organizations to address parking access challenges
- encouraging car-sharing in new developments
- seeking other opportunities to support expansion

8.2.2 Support the Use of Transportation Alternatives

- S8 Strategies to Support the Use of Transportation Alternatives
- C MARKETING TRANSPORTATION ALTERNATIVES

An expanded City role in Transportation Demand Management would include a marketing approach that looks at three main segments relating to use of Transportation Alternatives:



Already Using:

Increase the recognition of existing efforts through awards, events, etc.

Would Consider Using:

Identify and implement new initiatives to remove barriers, to shift to "Already Using"

Not Interested:

Improve awareness of the impacts of automobile use and benefits of alternatives, to shift to "Would Consider Using"

Conclusions on what is needed to create a major shift from the automobile to other transportation alternatives in the report "TransLink/BCAA Transportation Options Research (2003)" included:

- Ongoing communication campaigns to address:
 - Lack of awareness of viable alternatives, negative impacts of auto use, and what the positive impact would be if everyone converted one or two trips to other modes
 - Perception by some drivers that others (trucks, buses, industry, etc.) are much more significant sources of emissions
- Recognition that time and money are key factors underlying transportation choice
- Political will from all levels of government

To increase its effectiveness, the marketing approach should also:

- Include an integrated package of measures that contains both incentives and disincentives
- Market the co-benefits of GHG emission reductions
- Work closely with key partners, such as TransLink and others

Initial Actions

A8.xiii Incorporate the marketing of transportation alternatives in the community engagement program (Section 2.0 of this Plan) to help empower individuals to increase their use of non-auto modes. The Community Engagement Program should include highly visible community events, recognition and awards, and community grants to empower NGO's and community leaders to engage all residents of Vancouver in the use of transportation alternatives.

To help support the engagement of the community, improved information on walking and cycling travel times would be needed to:

- Provide comparative information for data collected on automobile travel times, to increase awareness of the competitiveness of walking and cycling for many trips
- Assist pedestrians and cyclists with route planning and trip time allocation

A8.xiv Develop web-based tools for estimating pedestrian and bicycle travel times and assisting with trip planning.

Strategies to Support the Use of Transportation Alternatives ENHANCING ALTERNATIVE TRANSPORTATION PROGRAMS AT SCHOOLS

According to TransLink's 1999 Trip Diary Survey, up to 8% of automobile trips over a 24-hour period are grade-school (Kindergarten to Grade 12) related. With these trips being short distances for most families, and of routine nature, they are good candidates for alternative modes. However, although the number of children being driven to school by parents decreased slightly in 1999, this level is still considerably higher than what it was in the previous decade. Focusing on school trips also provides an opportunity to foster life-long sustainable transportation habits in students, and obtain broader mode shifts, through the influence children have on family transportation choices. In addition, national data shows that two-thirds of Canadian children are not active enough for the purposes of optimal growth and development and childhood obesity is increasing at an alarming rate; the increased use of active transportation by school children would help to reverse these trends.

In Vancouver, the Way to Go School Program (sponsored by ICBC and local AutoPlan Brokers) provides elementary school children and their parents with assistance in developing their own strategies for helping to reduce school traffic. A comprehensive manual is provided for use by parent and school volunteers. Although the program has been successfully implemented in some Vancouver schools, its reliance on volunteers creates challenges with increasing its uptake and providing continuity from year to year. Increased support from the City, including removal of some of the barriers to volunteering, would greatly enhance the growth of the program. At the high school level, Better Environmentally Sound Transportation developed an award winning school trip reduction program called Off-Ramp. However, federal funding for the pilot project ran out, and the program has had to be placed on hold.

Initial Actions

A8.xv In partnership with the School Board, increase support of existing programs that encourage student and parent use of alternative transportation for trips to and from elementary and high schools, including:

- providing additional City staff support
- funding additional agency staff for school-based programs
- providing operating grants to help offset volunteers' administrative costs, and to fund programs and special events
- seeking funding partners to enable the provision of capital grants to schoolbased groups for cost-sharing additional bicycle parking facilities

S8 Strategies to Support the Use of Transportation Alternatives E USING VEHICLE PARKING TO SUPPORT ALTERNATIVES

Vehicle parking pricing and supply can help determine whether a single occupant automobile or another mode is the most desirable choice for making a trip. Although increasing parking pricing and reducing supply within Vancouver supports transportation alternatives, there are practical limits on how much the City can do on its own, without driving economic activity to other areas of the region. Limiting parking supply is most effective in areas that are well served by transit.

The City provides public off-street parking (mostly in the Central Business District), through the Vancouver Parking Corporation (operator of EasyPark parkades). Although there are already various initiatives that support transportation alternatives in City parkades, greater use of transportation alternatives would be supported by developing a coordinated plan that includes capital funding for bicycle parking and end of trip facilities in high demand areas.

Initial Actions

- A8.xvi Develop a comprehensive strategy to use parking supply and pricing for both on-street and off-street parking in the Metropolitan Core and other locations undergoing significant change (e.g. RAV stations) to support greenhouse gas reductions.
- A8.xvii Work with the Vancouver Parking Corporation to improve access, rate incentives and bicycle facilities at EasyPark parkades, to encourage greater use of alternatives such as bicycles, van-pools, car-pools and car-sharing.

S8 Strategies to Support the Use of Transportation Alternatives IMPROVING SAFETY EDUCATION AND ENFORCEMENT

Providing improved walking and cycling infrastructure by itself will not be enough to shift trips from driving, if pedestrians and cyclists do not feel safe using these facilities. Areas that Police and Engineering staff could review further include:

- Improving enforcement of unsafe behaviour by pedestrians crossing streets, by motorists and cyclists with respect to pedestrians, and by motorists with respect to cyclists
- Emphasizing related education and encouragement initiatives
- Considering legislative changes that would help increase enforcement resources, such as reducing the time traffic enforcement staff spend on court related activities

In addition, cycling can be encouraged by increasing the confidence and ability of cyclists to travel safely on streets where space is shared with motor vehicles.

- A8.xviii Work with the Vancouver Police Department to develop a strategy to increase pedestrian and cyclist safety through enhanced enforcement and education.
- A8.xix Work with TransLink, the Park Board, the School Board and other stakeholders to make Traffic Skills Bicycling Courses widely available and encouraged for children and adults.

8.2.3 Systematic Approaches for Transportation Alternatives

S8 Strategies for Systematic Approaches for Transportation Alternatives

G REVIEWING AUTOMOBILE PRICING

Methods of paying for road facilities and automobile operating costs, can act as a disincentive to using other modes of transportation. These include:

- Infrastructure and Service Costs Payment by individuals through fixed costs such as annual property taxes, versus fees more closely related to use
- Vehicle Insurance Costs Annual flat rate premium costs, versus distance-based premiums that reflect actual daily, monthly or annual vehicle use
- Fuel Costs Relatively inexpensive fuel costs in North America, versus significantly higher costs in other areas such as Europe

Initial Actions

- A8.xviii Encourage TransLink and the GVRD to complete in 2006, the following work outlined in TransLink's 2005-2007 Three Year Plan and 10-Year Outlook:
 - Regional Parking Strategy®
 - Regional Tolling Policy
- A8.xix Request the provincial government and the Insurance Corporation of BC work with the City and TransLink, on developing a local pilot project for distance based insurance.
- S8 Strategies for Systematic Approaches for Transportation Alternatives
- H COORDINATING WITH THE REGIONAL INITIATIVES

Automobile trips and their emissions are not confined to Vancouver's municipal boundaries. Policies and actions by TransLink, the GVRD and nearby municipalities will impact how successful Vancouver is at reaching its GHG emission reduction targets. Accordingly, coordinating Vancouver's initiatives other initiatives in the region will be important.

TransLink's OnBoard program helps Greater Vancouver employers reduce vehicle that they and their employees generate. Transportation alternatives explored through OnBoard include a discounted monthly transit pass through payroll deduction, car and van pooling, ride matching, car sharing, cycling, walking, parking management strategies, teleworking and shuttle buses. The City can take a more pro-active role in supporting these regional initiatives and encouraging TransLink to deliver them to Vancouver businesses, and residents that commute to worksites outside Vancouver.

- A8.xx Request TransLink include a review of GHG emission impacts/reductions in all major transportation plans, including the Vancouver Area Transit Plan.
- A8.xxi Request that the Greater Vancouver Regional District work with TransLink to develop a regional action plan to reduce vehicle GHG emissions, including identifying the potential role that the Air Care program could play.
- A8.xxii Work with the TransLink and its On Board program to help increase its effectiveness in supporting employer Transportation Demand Management, including work trips made by Vancouver residents to other municipalities.

Strategies for Systematic Approaches for Transportation Alternatives REVIEWING BEST PRACTICES

Strategies, knowledge and technology for addressing emissions from vehicles are continuing to evolve. The Federal government's Urban Transportation Showcase Program is currently reviewing a number of initiatives across Canada that demonstrate and evaluate integrated approaches to reducing GHG emissions. The City is one of TransLink's partners for their Greater Vancouver Showcase that includes initiatives such as a pilot TravelSmart marketing program. Final reports on the results of Showcase demonstrations should be available in 2007. Other programs being developed such as Seattle's "One-Less-Car" may also be applicable in Vancouver.

Initial Actions

A8.xxiii Continue to review and report on best practices for reducing passenger vehicle emissions.

Strategies for Systematic Approaches for Transportation Alternatives MONITORING PROGRESS

Translating the City emission reduction target into mode share targets will assist with monitoring and planning emission reduction initiatives. Important considerations are:

- Including a format that is comparable to regional Trip Diary data and federal Census transportation data
- Recognizing that each local area in Vancouver is unique, and should preferably have its own targets; this well help give residents, employees and employers a clearer understanding of how their community needs to contribute

Air Care data was used to help inventory the City's 1990 and 2000 emissions from passenger vehicles. However, planned changes that will decrease the frequency in which newer vehicles are required to report for testing, will make the period between odometer readings too long to be useful for further emission inventories. Accordingly, an alternative method of collecting odometer readings will need to be found.

- A8.xxiv Update Vancouver's Transportation Plan targets, to include 2012 mode share targets that reflect the objective of reducing GHG emissions from passenger vehicles by 10%.
- A8.xxv Review the cost to provide extra funding for TransLink's next Trip Diary Study, to collect additional mode share and trip purpose data for each Vancouver community.
- A8.xxvi Request the provincial government and the Insurance Corporation of BC work with the City on developing a pilot project for collecting vehicle mileage data on an annual basis.

9.0 Vehicle and Fuel Efficiency

Goal

Reduce GHG emissions by 180,000 tonnes through improved vehicle, operational, and fuel efficiencies

- Federal fuel efficiency standards for light vehicles improve by 25%
- 20% Bio-diesel and 10% ethanol fuel blends commonly used in vehicles
- Other operational improvements such as more regular tire inflation, reduced idling, etc., gain significant minority public involvement

9.1 Context

Mobile sources such as cars, trucks, and heavy-duty construction equipment are expected to account for over 1.1 million tonnes of GHG emissions (over 35% of all Vancouver emissions) by 2012. While the support and promotion of alternatives to single occupant vehicle travel are key to both this plan as well as city and regional transportation plans, the fact remains that the automobile will remain the main mode for many types of trips. The single greatest and likely most cost effective approach to reducing greenhouse gas emissions in Vancouver (in the short term) is to advocate for, support, and promote improved vehicle and fuel efficiency.

This can be achieved by:

- advocating for more stringent fuel economy standards;
- promoting/supporting the purchase of more fuel efficient vehicles;
- encouraging more fuel efficient driver and maintenance habits;
- supporting the market uptake of more efficient and renewable fuels; and
- by working with fleets to promote best business practices for efficient vehicle operations.

The recent federal launch of the National Fleet Challenge that shares most of these strategies provides a timely opportunity for partnerships in improving vehicle and fuel efficiencies.

9.2 Strategies for Vehicle and Fuel Efficiency

S9 Vehicle and Fuel Efficiency Strategy

Advocate for Federal Fuel Efficiency Standard Improvements

While fuel efficiency standards are outside of the City's regulatory powers, working with the federal government to ensure they act on their own plans to increase fuel efficiency standards will be one of the most important actions that Vancouver can take to reduce greenhouse gas emissions.

The federal government has proposed a 25% improvement in fuel efficiency standards and during the last federal election all of the major political parties indicated they would adopt the recently developed California tailpipe GHG emission standard as a means of achieving this. According to the California Air Resources Board (CARB), the incremental vehicle cost to achieve the 25% reduction in 2014 would be between \$539 - \$851 (USD). Based on today's fuel prices, fuel savings for a typical Canadian car that travels 20,000 km per year would pay back that incremental cost in less than three years of driving.

The fuel efficiency of the Canadian fleet has not improved significantly since the mid 1980s. We are increasingly purchasing heavier and more powerful vehicles. However, improved technologies and

more stringent emissions regulations now provide us with clean and efficient vehicle options. Today, fuel efficiency standards in Asia and Europe are up to 45% more efficient than Canadian standards which are currently among some of the least stringent regulations in the world

Since the typical vehicle in the GVRD will be on the road for approximately 18 years, vehicles purchased today will have a long term impact on the region's emissions and standards must change soon and be updated regularly to take advantage of technological innovations.

Initial Actions

A9.i City Council should work with NGO's, municipalities, and other agencies to implement an effective advocacy strategy for federal government adoption of stricter fuel efficiency standards.

S9 Vehicle and Fuel Efficiency Strategy

B Support Efficient Vehicle Selection

While total vehicle usage (distance driven) by Vancouverites has decreased in recent years, our GHG emissions have continued to increase due to the fact that we are driving heavier, less efficient vehicles. Choosing a vehicle that is fuel efficient can reduce GHG emissions and save money. Social marketing will help inform consumers to the impacts their vehicle choice will have on climate change. The City and other organizations can use policy and regulatory powers to further encourage fuel efficient vehicles.

One approach to support the purchase of smaller and/or more efficient vehicles would be to raise consumer awareness of the long term impacts that their vehicle purchase has, promote considerations of fuel economy in purchase decisions, and provide information on how to access a larger or more power vehicle for occasional uses.

Many people purchase a vehicle that will meet all of their anticipated needs, regardless as to how often those "needs" actually occur, resulting in the regular use of a much larger and less efficient vehicle than is required. Promoting the use of rental or car-share vehicles to meet these occasional use needs would enable consumer to purchase a vehicle suitable to their normal requirements; the interest alone on the purchase cost savings may be able of paying the occasional rental costs.

Other efficient vehicle options available today include hybrids and diesel powered vehicles which are generally 20 – 40% more efficient than similar gasoline vehicles. Changes in diesel technology and emission regulation changes now result in diesel engines that are as clean as many of today's gasoline engines, and new technologies and regulations will continue to make diesels cleaner. In many European countries, diesels now account for up to 50% of new vehicle sales, while diesels make up less than 1% of passenger vehicles in the Vancouver region. Hybrids can offer significant increases in fuel efficiency, particularly for city driving. Toyota, Honda, Ford, and General Motors now offer vehicles with hybrid systems, and it is expected that other manufacturers will be offering more hybrids in the near future.

- A9.ii In its review of initiatives to improve the way parking can better support greenhouse gas emissions reductions (A8.xvi), the City should:
 - consider ultra-compact vehicle parking standards to increase parking availability for ultra compact vehicles and decrease parking costs as less space is required
 - incorporate parking access, incentives, and public awareness opportunities for high efficiency vehicles

S9 Vehicle and Fuel Efficiency Strategy

C Promote Efficient Vehicle Operations

Working with governmental, institutional and industry partners to promote efficient vehicle operations could have a significant impact on greenhouse gas emissions if new habits are widely adopted. Improved vehicle operations like keeping tires inflated and avoiding unnecessary idling is easy for individuals to implement, is free or cost effective, and can significantly reduce vehicle emissions.

Tire Inflation and Vehicle Maintenance

How well a vehicle is maintained will have a large impact on how efficiently it operates. Engines that are not maintained properly will not be as efficient as well maintained vehicles, and their fuel consumption may increase by up to 50%. Tires that are under inflated by only 10% can increase the vehicle's fuel consumption by 2% or more. Recent studies indicate that over 56% of vehicles had at least one tire under inflated by over 10%, and 23% of vehicles had at least one tire under inflated by over 20%. Simple maintenance is effective in reducing fuel consumption, increasing vehicle reliability, and lowering the long term maintenance costs for vehicle operators.

Idle Free Program

"Idling gets us nowhere" is a popular refrain for many idle free programs. According to Natural Resources Canada, restarting a vehicle will use less fuel than if it was left idling for 10 seconds, and idling can actually increase the wear and damage to an engine. Idling is also not an effective means to "warming up" a vehicle; today's modern engines do not need to idle for more than 30 seconds before driving, and idling will not warm up the other vehicle components. Due to changes in cooling systems, an idling diesel engine in a modern large truck will generally cool down much faster if it was shut off. Idling can burn up to 4 litres of fuel per hour, and therefore promoting idling awareness is a simple method for reducing emissions. According to Natural Resources Canada calculations, if each Vancouver driver reduced their idling by five minutes per day, we would avoid producing 22,300 tonnes of CO2 each year and would save approximately \$8 million annually in fuel costs.

The most effective method to reduce vehicle idling is citizen awareness. Currently, the GVRD and BEST are working on an education program for Vancouver schools. An idle free by-law with appropriate enforcement would complement this education program for the broader community.

Fuel Efficient Driving

The way a vehicle is driven can lead to significant increases in fuel consumption. It has been shown that vehicle operators who use fuel efficient driving techniques can reduce their fuel consumption by over 10% on average. The techniques used for fuel efficient driving are generally the same as defensive driving techniques, so drivers can also reduce their likelihood of having accidents.

- A9.iii The City should work with the National Fleet Challenge and the Automobile Retailers Association of BC to implement an expanded Tire Inflation Program aimed at improving awareness of tire inflation in the community through their members.
- A9.iv The City should work with the GVRD, Better Environmentally Sound Transportation, and Natural Resources Canada to implement an Idle Free Awareness Program for the region.
- A9.v The City should expand the idle free by-law and enforcement program to include all vehicles

S9 Vehicle and Fuel Efficiency Strategy

D Market Development of Innovative Vehicle Technologies

One opportunity to not only reduce Vancouver's greenhouse gas emissions but to have a much more significant global impact is by supporting the market development of clean new technologies. Some of the world leaders in innovative new transportation technologies are based in the Vancouver region. Seeking responsible applications for these emerging technologies will reduce our local emissions, stimulate the economy, and could help to make these technologies cost effective for developing countries and thereby have a major impact on greenhouse gas emissions world wide.

Natural Gas Engines

Natural gas is one of the cleanest and most efficient burning petroleum fuels available but most medium and heavy duty natural gas engines use spark-ignition engines which are not as efficient as diesel cycle engines. New technologies are expected to make the spark-ignition natural gas engines more efficient in the near future. Westport Innovations is a Vancouver based company at the leading edge of market development of diesel cycle engines for natural gas, and these engines will offer the benefits of clean combustion combined with the much higher efficiencies of a diesel cycle engine.

Hybrid Trucks and Busses

Medium and heavy duty hybrid electric vehicles have the potential for significant improvements in fuel efficiency, and they are particularly suited for city driving. A hybrid uses a combustion engine (gasoline, diesel, or other fuel), an electric motor, and a battery system to power the vehicle. The battery is charged by the engine during normal driving, or it is charged through the electric motor during braking. One way a hybrid is more efficient is that it recovers energy normally lost during braking, and this is why hybrids are more efficient in city driving versus highway driving. Applications like delivery vans, taxis, and urban transit buses can be ideal applications for a hybrid drive system since these vehicles "stop and go" for most of their operating day in city driving conditions.

Fuel Cell Vehicles

Fuel cells are often touted as the ultimate "zero emission" power system and the locally based Ballard Power Systems is considered the world leader in the development of this technology. However, the overall emissions of a fuel cell are very dependant on how the hydrogen is produced. "Clean", low-carbon hydrogen can come from solar energy, wind power, geothermal power, hydro electricity, and nuclear power, but there are other concerns with many of these sources. Today, most of the world's hydrogen is produced from natural gas, and there are issues with carbon dioxide production and the use of a non-renewable feedstock. There are some technologies being developed to sequester the carbon released during hydrogen production from natural gas, and improved processes will increase the efficiency of hydrogen production. The combination of these improvements with the increased efficiency of fuel cells over combustion engines may lead to the potential for significant reductions in greenhouse gas emissions.

- A9.vi The City should implement the Vancouver Fuel Cell Vehicle pilot program with Fuel Cells Canada
- A9.vii The City should work with the GVRD, TransLink, and other partners to further develop and pilot the use of medium and heavy duty hybrid electric vehicles

S9 Vehicle and Fuel Efficiency Strategy

E Fuel Market Transformation – Renewable Fuels

Today, most transportation uses non-renewable fossil fuels which release carbon into the atmosphere where it remains indefinitely and is not "recaptured". Eventually, these sources of energy will become difficult and uneconomical to obtain. Ultimately, we will have to find renewable sources of energy to power our economy. One of the most significant barriers to market adoption of proven clean fuel technologies is incompatibility with existing engine technologies and the cost of developing a new fuel distribution system. As such, renewable fuels that can take advantage of current distribution and engine systems will have a distinct advantage in the short and medium term. Today, there are two renewable fuel options available with the potential to change the fuel market immediately.

Biodiesel

Biodiesel is a renewable fuel that can be used in most diesel engines without any required modifications and can be distributed using the existing infrastructure.

Biodiesel is produced from vegetable oils, animal fats, used cooking oils, and even waste grease from the sewer system. One variation, which is most accurately classified as a synthetic diesel, can even be produced from wood waste. The carbon released to the atmosphere upon combustion of Biodiesel is recaptured when new plants are grown to provide additional feedstock for further fuel production. As an added advantage, biodiesel produced from a "waste" feedstock is another way of recycling and reducing waste.

Biodiesel is typically blended with petroleum diesel to make up 5% - 20% of the blended fuel (B5 - B20). Over the entire fuel cycle, from growing the crops to the end use of the fuel, pure biodiesel can reduce overall greenhouse gas emissions by 62% - 92% and a B20 blend will reduce GHG emissions by 12% - 18%. The use of biodiesel has been increasing over the past few years. Currently, there are over 300 fleets in the United States using biodiesel, and many fleets in Canada have run demonstration tests or are currently using biodiesel, including the City of Vancouver.

The City is working with a number of other local municipalities, the provincial government, the National Fleet Challenge, and other partners to develop and implement an initiative to transform the local diesel fuel market to incorporate biodiesel blends. This project is based around a large scale demonstration of the viability of this fuel and a commitment to its purchase by municipal fleets (as described in the City of Vancouver's Corporate Climate Change Action Plan). By "proving" this fuel, educating other fleet operators, and stimulating demand this partnership aims to address some of the barriers to widespread use of biodiesel, not the least of which is production cost. If the cost of biodiesel and other renewable fuels becomes cost neutral, the major obstacle for their acceptance in the marketplace will be removed and widespread adoption of these fuels would be possible. This project has received over \$265,000 of federal funding and will officially be launched at the Biodiesel 101 Workshop on March 30, 2005.

Ethanol

Ethanol has been used as a fuel additive for several years, and almost all gasoline engines today can run on a mixture of up to 10% ethanol (E10) without any modifications, and many vehicles can run fuel blends up to 85% ethanol (E85). Currently, most ethanol is produced from corn or grains with processes that require significant amounts of energy, and therefore the overall greenhouse gas reduction potential of ethanol is reduced. There are new more efficient processes being developed that use the non-food portion of crops (e.g. the cellulose found in wheat and corn stocks) to produce ethanol, and they have the potential to double the GHG reductions of ethanol blended fuels to 6-8% for an E10 blend. If these more efficient production processed are proven effective, ethanol could play a significant role in this renewable fuels strategy.

Initial Actions

A9.viii The City should continue to work with its partners on developing the local biodiesel market with the goal of obtaining a cost effective supply of biodiesel or similar renewable fuels.

S9 Vehicle and Fuel Efficiency Strategy

F Promote Best Practices for Fleet Operators

The City can work with the National Fleet Challenge and local partners to develop and distribute business case information on and promote the adoption of best fleet operations practices to reduce fuel consumption by fleet operators. These practices can include vehicle selection, maintenance, reduced idling, driver training, etc.

Because fleet vehicles log more miles than personal vehicles and are managed as business asset reducing operating costs is relevant to fleet owners and operators. One of the most significant barriers to the adoption of best operations practices is that operators lack reliable and relevant information about best practices and existing fleet efficiency tools. The business case for implementing fuel efficient strategies and technologies in many fleets is required for fleet operators to have confidence in the value of changing the way they currently operate their fleet.

The City can help to promote these best practices by demonstrating and documenting them in their own fleet and by working with its partners to deliver information on these practices to fleet operators. Another important role would be the development of a rating system to evaluate the environmental performance of a fleet's operations along the lines of the LEED rating system for buildings. Such a measurement tool helps fleet operators ensure they are using the best practices. It also has the potential to transform how fleet services are delivered by providing socially responsible fleet customers with an objective "certification" they can require of fleet service providers.

- A9.ix Work with partners and industry associations to expand the knowledge of hybrid vehicle benefits, develop business case tools, and provide financial programs to allow the further purchase and operation of hybrid taxis and courier vehicles.
- A9.x Review municipal policies and regulatory abilities to promote hybrid taxi use, with the aim of having all taxis part of a showcase hybrid taxi fleet in time for the 2010 Olympic Games.
- A9:xi Work with TransLink to leverage regional knowledge of hybrid bus systems, particularly the experiences gained from the 235 hybrid buses now operating in the Seattle transit systems, in order to determine the applicability and cost efficacy of this technology to the next cycle of regional transit fleet purchases.
- A9.xii Work with partners to develop a Green Fleet Certification program.
- A9.xiii Review municipal policies and regulatory abilities to promote hybrid taxi use, with the aim of having all taxis part of a showcase hybrid taxi fleet in time for the 2010 Olympic Games.
- A9.xiv Work with Natural Resources Canada, industry associations, and other partners to promote efficient vehicle operations and maintenance programs that include elements such as efficient driver training, tire inflation, engine maintenance, idle free bylaw observation, and route optimization.

10.0 Solid Waste and Landfill Gas

The solid waste green house gas emissions in Vancouver are largely caused by the decomposition of organic materials such as food scraps, yard waste, and paper at landfills. Vancouver and the GVRD have been successful in greatly limiting these emissions through initiatives such as recycling, a paper ban at landfills, and landfill gas recovery and cogeneration. In addition to these steps, Vancouver reduced its solid waste related greenhouse gas emissions nearly 80% (approximately 200,000 tonnes) between 2000 and 2003 by implementing the Vancouver Landfill Gas Recovery and Cogeneration Project.

Despite these successes, the products that Vancouver businesses and residents consume (food, clothes, cars, etc.) all require energy to produce, package, and transport to our city and homes. This "embodied" energy and its related green house gas emissions are significant but largely invisible under Vancouver's measurement system because most of these goods are produced outside of the city and the majority of the transportation is international or interprovincial trucking, rail, and marine. In general, the priorities for action to reduce these indirect solid waste emissions follow the well known hierarchy of *Reduce, Reuse, and Recycle*.

In the development of this Plan, the City requested that the Provincial Government expand its product stewardship initiatives by acting on its plans to add milk containers to the existing beverage container program and to add electronic products to the Stewardship program. Product stewardship places the responsibility for managing packaging, from creation through recycling, onto the industry that creates it.

10.1 Material Bans from Disposal

Because paper products consist of organic material, decomposition of paper in the landfill contributes to methane production, a powerful GHG. A significant amount of paper continues to be landfilled in spite of the existing ban and an extensive recycling network that provides an alternate disposal means.

A10.i The City should request that the GVRD strengthen enforcement of the existing paper ban at all waste handling facilities.

10.2 Beneficial Use of Landfill Gas

The Vancouver landfill currently collects landfill gas from all areas of the landfill where it is practical to do so. The landfill gas is beneficially utilized as fuel to generate electricity as well as heat a nearby greenhouse. In 2003, beneficial use of landfill gas at the Vancouver landfill reduced GHG emissions by approximately 200,000 tonnes per year due to the destruction of methane. There are further emissions reductions when one considers that the electricity generated is "green" and that less natural gas is used by the greenhouse for its operations.

A10.ii The City should continue to expand its landfill gas collection system when practical as the landfill develops and continue to search out new ways to maximize energy recovery and greenhouse gas reductions from landfill gas.

11.0 Implementation Considerations

11.1 Resourcing and Organizational Structure

A strong focus will be needed to meet the greenhouse gas reductions target established in this plan, starting immediately and continuing up until 2012. While broad community and stakeholder engagement will be required and implementing the City's own actions will involve the leadership of many departments, the City's Sustainability Group will have responsibility to coordinate implementation of this Plan.

While this Plan has been accompanied with a request to City Council for six full time positions and funds for the first year of implementation, further exploration will help to determine the appropriate long-term funding mechanism(s). Because a significant amount of the funding and activity will depend on external sources and partners, the City's resourcing mechanisms must be flexible enough to respond to opportunities as they arise.

In addition to City resources, this plan envisions external contributions will play a significant role in the success of its implementation. In preparing this Plan, City staff and Cool Vancouver partners were successful in securing considerable implementation funds from a number of sources.

- The BC Ministry of Energy and Mines has earmarked several hundred thousand dollars (final amount to be negotiated) of their Opportunities Envelope funding for building energy efficiency incentives in Vancouver.
- Environment Canada has committed \$200,000 over two years for community engagement through their Community One Tonne Challenge.
- o Federation of Canadian Municipalities committed \$100,000 for the plan development.
- o Western Economic Diversification, have committed \$230,000 towards the bio-diesel market transformation initiative the City is undertaking with several other partners.
- The GVRD has committed \$58,000 towards a variety of plan elements including the plan development, the expansion of car-sharing, and the bio-diesel market transformation (through a City fleet demonstration).

In addition to these, the City has a strong proposal for \$4.5 million of federal funds over two years currently under consideration by Natural Resources Canada for implementation of a variety of transportation alternative programs and projects.

Numerous other funding sources have been identified and early conversations suggest considerable interest in supporting initiatives described within this plan.

Emissions Reduction Measurement, Reporting, and Trading

As with every new program, measuring and evaluating performance will represent a vital ingredient in the success of this plan. The City will be required to build the measurement and evaluation tools from scratch, given that municipal climate change plans of this scale do not have any significant history. An effective performance measurement system is built on a foundation of several key elements.

- Clear and measurable targets
- Measurement tools and protocols that are reasonably simple to create and use by many people

- Reporting that is timely, oriented to the goals, and distributed regularly and widely
- Designed to foster both accountability and continuous improvement
- Transparency in its creation and execution

Many new initiatives that have seen both success and wide public support included performance measurement systems that engaged third party representatives. In part, this step was taken to ensure transparency and to build credibility. To some extent, such an approach has been an acknowledgement of the challenges of doing effective performance evaluation internally. For this initiative, the City must look to build its own internal capacity, especially given the need to assess what elements are having the desired impacts. The creation of a leadership council presents an opportunity to gain an added measure of public support for climate change initiatives and ensure transparency in their implementation. Done properly, this approach offers the best possible approach to performance measurement and evaluation.

The rest of this section highlights some initial questions related to measurement. One of the early steps in implementing this plan will be to establish additional, specific performance indicators for each of the elements to be implemented. At a minimum, these indicators should be in place no later than the first annual report.

Measurement

The methodology for determining Vancouver's emissions profile described in *Appendix A2* establishes the *general* approach for continuing to monitor our progress towards meeting our overall reduction target. The approach to light-duty vehicle emissions currently relies upon AirCare tested vehicle mileage data. This is not expected to be a useful data source in the future because AirCare's mandate is scheduled to expire in 2006 and, even if this mandate is renewed, their intent is to shift the testing frequency from two to three years.

In order to establish a base emissions profile for any given year in the future using our current approach, it will be necessary to work with ICBC to begin to collect vehicle mileage upon registration renewal and be willing to share this data on a geographical basis or to develop another method for determining light-duty vehicle greenhouse gas emissions.

While the emissions profile approach provides a useful general tool, it will be necessary to develop specific measurement approaches for individual initiatives. These specific measures will needed to determine the impacts of specific initiatives and will be necessary if the City decides to pursue emissions trading opportunities. In addition, the current emissions profile approach will not reflect the impact of a number of promising and important initiatives such an idle-free campaign or bylaw, or a tire inflation program because while they will reduce fuel consumption, they will not impact the total distance traveled by Vancouver vehicles.

Reporting

It is envisioned that the Sustainability Group will report back to Council on the implementation of this plan on an annual basis. A comprehensive emissions profile will not be prepared every year due to the effort required to do so, but should be undertaken at least once prior to evaluating our final success in meeting the 2012 reduction target.

Emissions Trading

The City must develop an improved understanding of emissions trading and its inherent protocols. Emissions trading may offer opportunities to finance additional or existing emissions reduction initiatives. Even if the City does not pursue this option in the near term, documenting the ongoing

APPENDIX A: Community Climate Change Action Plan

efficacy of specific emissions reduction measures in a way that is likely to satisfy the requirements of emissions trading will ensure that this potentially significant option available on an ongoing basis.

Climate Change Adaptations

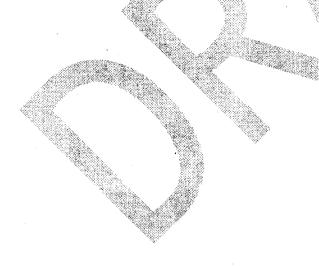
This Climate Change Plan provides detailed strategies and actions for reducing greenhouse gas emissions in an effort to mitigate global and local climate changes. While it is very important to mitigate the changes in our climate, it is also important to recognise that the climate has already begun to change and even under the best case scenarios is expected to continue to change until the amount of greenhouse gasses in the atmosphere stabilises. As such, it will be necessary to anticipate and prepare for the expected impacts of climate change that cannot be avoided.

The City should develop a better understanding of the range of anticipated climate change impacts, evaluate our health, water, energy, and other systems to assess their vulnerability to these changes, and develop an Adaptation and Resilience Strategy to reduce the negative consequences of those changes.

This might include planning for:

- Increased extreme weather events and the reliability of essential services;
- Longer, drier summers and wetter winters with reduced snow pack;
- Increases in instances in Vancouver of diseases from warmer climates;
- Increases in sea level; and
- Others

In the development of an adaptation strategy, opportunities to integrate it with existing health, health, infrastructure, and emergency plans must be pursued, including Police, Fire, the Health Authority, E-Comm and others.



APPENDIX A1: The Cool Vancouver Task Force

The Cool Vancouver Task Force

Vancouver's Community Climate Change Action Plan was developed in cooperation with the Cool Vancouver Task Force (CVTF). This collection of knowledgeable individuals from a wide range of stakeholder groups in the City of Vancouver and the Region was created through a March 25, 2003 Council motion and was co-chaired by City Councilor David Cadman and the City's General Manager of Engineering Services. The City wanted its plan to be informed by the interests and knowledge of a wide diversity of stakeholders including:

- 1. Better Environmentally Sound Transportation
- 2. BC Hydro
- 3. Building Owners and Managers Association
- 4. David Suzuki Foundation
- 5. Environment Canada
- 6. Environmental Youth Alliance
- 7. Fraser Basin Council
- 8. Greater Vancouver Regional District
- 9. Ministry of Water, Land & Air Protection
- 10. Molson Canada
- 11. Science World
- 12. Simon Fraser University School of Resources and Environmental Management
- 13. Sinclair Environmental Solutions
- 14. Society Promoting Environmental Conservation
- 15. Terasen Gas Inc.
- 16. Tides Canada Foundation
- 17. Translink
- 18. University of British Columbia Sustainable Development Research Institute
- 19. Urban Development Institute
- 20. VanCity Credit Union
- 21. Vancouver Board of Trade
- 22. Vancouver City Planning Commission
- 23. Vancouver Coastal Health Authority
- 24. Vancouver Economic Development Commission
- 25. Vancouver School Board
- 26. Vancouver School Board District No. 39
- 27. Vancouver Board of Parks and Recreation
- 28. Vancouver Library Board
- 29. City of Vancouver Staff

Appendix A2: Community GHG Emissions Profiles Methodology

A. SUMMARY

Vancouver Greenhouse Gas Emissions (Annual Tonnes of CO₂)

	1990	2000	2012
Residential Buildings	1656,000	705,000	738,000
Commercial Buildings	749,,000	841,000	903,000
Industrial Facilities	179,000	160,000	160,000
Light-Duty Vehicles	822,000	873,000	907,000
Heavy-Duty Trucks	64,000	89,000	109,000
Non-Road Mobile Equipment	183,000	262,000	262,000
Waste	225,000	268,000	75,000
TOTAL	2,878,000	3,198,000	3,153,000

The Vancouver greenhouse gas (GHG) emissions profiles consist of seven main categories of emissions, each including a backcast to 1990, a 2000 emissions profile, and a "business-as-usual" forecast to 2012. Because 1990 is the target reference year, it was important to develop an accurate backcast and to document what was included or excluded from the data. The 2000 emissions profile provided a relatively "current" picture of where Vancouver was at and established a foundation for the 2012 forecast.

Readers will observe that important emissions sources such as marine, air traffic, and rail freight transportation are not included in the Vancouver municipal community profile. This exclusion is consistent with national and international protocols for determining municipal emissions profiles; these sources are largely outside of the regulatory jurisdiction of local governmental bodies.

In addition, note that this report discusses GHG emissions (carbon dioxide or CO₂ or CO₂ equivalent). Many references to emissions outside of specific climate change discussions actually refer to the numerous common air contaminants that make up smog and air pollution. For example, a vehicle's GHG emissions are a function of fuel economy and are not impacted by "emissions control" equipment which is designed to reduce common air contaminants.

Buildings: The emissions profiles for the three building categories (residential, commercial, industrial) were largely based upon data originating from the local utilities and the GVRD for natural gas, electricity, and fuel oil sales to buildings or facilities located within Vancouver. Details of data sources and assumptions are listed in the section "Data Sources for Buildings" to follow.

The **business-as-usual forecast** for residential and commercial buildings was based upon:

- the growth in GHG emissions from 1990 to 2000 relative to population growth (18%) during the same period; and
- the emissions in 2000 and the projected population growth for Vancouver between 2000 and 2010 (9.1% from BC Stats PEOPLE 28 forecast)
- It is important to note that the emissions forecast method described here is to 2010; simple linear extrapolation was used to modify to 2012.

For example:

Appendix A2: Community GHG Emissions Profile Methodology

- o residential emissions in Vancouver increased 7% between 1990 and 2000 while the population increased 18%
- o increase in residential emissions relative to population was 7%/18% = 0.416
- Applying this historical ratio of emissions growth relative to population change to the projected population increase of 9.1% (2000 – 2010) yielded a forecasted emissions growth of 0.416 x 9.1% = 3.8% increase in emissions to 2010
- o Extrapolating this change to 2012 is 3.8% x12/10 = 4.56% growth from 2000 to 2012

In the absence of a detailed study about industry in Vancouver, it was assumed that industrial emissions would remain the same in 2012 as they were in 2000.

Carbon Intensity of Electricity: While the conversion factors for translating natural gas and fuel oil into CO₂ emissions is relatively constant, the conversion factor for electricity varies depending on the relative annual blend of generation sources (largely hydro or natural gas generation in BC). For the 1990 and 2000 emissions profiles, a five year average conversion factor (referred to as the carbon intensity of electricity or the "electricity coefficient") has been used so that annual fluctuations in water supply do not skew the emissions profile.

Light-Duty Vehicles (LDVs): The emissions profiles for light-duty vehicles (cars, light trucks, minivans, sport utility vehicles, etc) are based upon Vancouver's share of regional fuel sales. Vancouver's share was determined based on the ratio of AirCare reported mileage of vehicles registered in Vancouver to the total mileage of all AirCare eligible vehicles registered in the region.

This approach, which as been discussed with and is supported by the GVRD, provides a GHG emissions profile that is grounded in physical reality (fuel sales) and reflects the impact of those actions and policies that a municipality can directly control or influence. For the purposes of climate change planning, it provides a measurement and feedback mechanism that reflects the success of planning compact, mixed use communities and supporting transportation alternatives such as transit, walking, and cycling. The City recognises that dealing with related issues such as traffic congestion requires a regional approach and measurement tool.

The business-as-usual forecast for light-duty vehicles used the same approach as described above for residential and commercial buildings; the historical growth in light vehicle emissions relative to population increases is used to project ahead to 2010 from 2000 and then simple extrapolation was used to project from 2010 to 2012.

Heavy-Duty Vehicles (HDVs): The emissions profiles and forecast for heavy-duty vehicles were based on Vancouver values (diesel portion only) derived from methodology in the 2003 GVRD report "2000 Emission Inventory of the Canadian Portion of the Lower Fraser Valley Airshed". A Vancouver specific measure was not developed because mileage data for HDVs was not readily available and HDV traffic does not reflect city specific approaches to planning and supporting transportation alternatives.

Waste: Organic waste such as food, yard trimmings, and paper produces methane when it decomposes. Methane has approximately 21 times the greenhouse effect compared to carbon dioxide. In 2002, the City implemented an award winning landfill gas recovery and cogeneration system that significantly reduced greenhouse gas emissions relating to waste.

B. INTRODUCTION

Taking inventory of the City of Vancouver's emissions and forecasting future emissions is the first step in the Partners for Climate Protection's (PCP) Five Milestone Process. Community emissions profiling was necessary to determine the greenhouse gas (GHG) emissions target in relation to the Kyoto Protocol and for future comparisons and monitoring towards meeting the target.

Cooperation with various members of the GVRD, TransLink's AirCare Division, and the utility companies was necessary to establish the GHG emissions inventory. The International Council for Local Environmental Initiatives (ICLEI) / Cities for Climate Protection (CCP) Protocol / Guidelines for Reporting, which was adopted by the Partners for Climate Protection (PCP), was used as a guideline for establishing the emissions inventories. Carbon dioxide (CO₂) was the only GHG required to be inventoried, except for the Waste Sector, which was based on equivalent CO₂ emissions from methane production.

A variety of sources were contacted for data and validation of figures. Different analyses and calculations were performed to determine Vancouver's Community GHG emissions for 1990 and 2000. Where possible, the figures were compared with other sources, like the GVRD, and the change from each category was compared with other indicators such as population growth both in Vancouver and the GVRD and the change in commercial and industrial floor space. The final figures established seem to be the most reasonable and repeatable for future emissions inventory work.

In general, sources did not have specific documentation and/or analyses especially designed to calculate and track GHG emissions for individual municipalities. The 1990 GHG emissions were more complicated to determine and derive than the 2000 GHG emissions, as much of the 1990 data was unavailable, not readily retrieved and/or were documented in ways that were not comparable with newer data. The backcasting methods and assumptions are summarized briefly in this appendix.

The following summarizes the data sources and methodology for the four main sectors of the City of Vancouver's Community GHG Emissions Inventory: C. Buildings, D. Transportation, E. Waste and F. "Other" (Non-Road Mobile Equipment).

C. Classification of Energy Use in Attached Housing

BC Hydro largely classifies electricity use in multi-family housing common areas as "commercial". Similarly, Terasen classifies natural gas usage in multi-family housing buildings as "commercial". To correct for this discrepancy in the emissions profile that was based on utility reported and classified energy usage, the City has had Sheltair estimate the amount of natural gas used in multi-family housing and the amount of electricity used in the common areas to adjust the emissions profile.

Sheltair reported that based on analysis in the BC Hydro Conservation Potential Review, it is estimated that 95% of space heat in common areas is provided by natural gas. In addition to space heating, there are lighting, ventilation and miscellaneous end uses (gas stoves, fireplaces, etc). Combining the unit energy consumption (UEC), fuel share and stock, the energy consumption for common areas in apartments is summarised in Table 1. As can be seen, it is estimated that 1 million GJ of electricity and a further 1.5 million GJ of natural gas are consumed.

Table 1: Energy consumption in apartment common areas (inc NG end uses)

	T		1
	Low Rise	High Rise	
Common Area Electricity Space Heat Fuel Share	5%	5%	
Unit Energy Consumption [KWh/Yr]			
SH, Elec	36,360	208,000	
SH, NG	51,942	297,142	
Lighting, vent	27,000	205,000	
Stock (number of Buildings)	3,780	785	
			Total
Energy Use in Common Areas [GJ]	Low rise	High-rise	
Elec (GJ)	392,155	608,720	1,000,876
Nat Gas (GJ)	671,496	797,739	1,469,236

Using a conversion factor of 0.04974 tonnes of GHG/GJ of natural gas, this suggested that the 2000 commercial GHG emissions where over estimated by 73,000 tonnes. In addition, using a 3.6GJ/MWh and a five year average carbon intensity of electricity of 0.041 t/MWh indicated that an additional 11,400t of GHG's (for a total of 84,400t) should be moved from commercial to residential profiles for 2000.

To backcast the impacts of this discrepancy in reporting classification to 1990, Sheltair calculated that between 1991 and 2001, the multi-family building stock increased by 29.9%. This change was used to estimate that the correction to be applied to the 1990 commercial and residential emissions profiles should be 70% of 84,400 = 59,000t.

D. DATA SOURCES FOR BUILDINGS

The buildings sector is separated into three categories: Residential, Commercial and Industrial.

Emissions figures from the use of natural gas and fuel oil excluded UBC and the University Endowment Lands (UEL). Emissions from electricity consumption excluded UBC, but included the rest of UEL; however, this is a very small amount compared to the rest of Vancouver's consumption, so it was not factored out.

2000

Sources & Comments for All Categories: Residential, Industrial & Commercial

Electricity:

Source: BC Hydro

Consumption was converted into equivalent CO₂ emissions based on a five year average of the most recent electricity coefficients obtained from BC Hydro: (1998 and 1999 figures from Ted Ferguson on March 3, 2004) and 2000, 2001 and 2002 figures from p.14 of the "BC Hydro Greenhouse Gas Report 2003" (http://www.bchydro.com/rx_files/environment/environment9777.pdf) A five year average of the electricity coefficient was used to reduce the effects of possible large annual fluctuations of the coefficient on the emissions calculations.

Natural Gas:

Source: Terasen

GVRD's conversion factors were used to calculate the CO₂ emissions based on fuel consumption.

Fuel Oil:

Source: GVRD

Specific Information for Each Category

Residential

Residential fuel oil consumption was based on total regional consumption prorated by GVRD's adjusted percentage population of Vancouver versus the GVRD in 2000.

Commercial

Commercial electricity consumption included trolley buses, Coast Mountain, SkyTrain & related offices and facilities, such as transit rectifier stations and SkyTrain stations.

Natural gas consumption included interruptible sales / transported and excluded "double-counted" sales already included in the industrial category (as determined by Terasen). For 1990, these inclusion criteria for electricity and natural gas were assumed to be the same.

Fuel oil consumption was based on total regional use prorated by the commercial floor space of Vancouver versus the GVRD in 2000.

Industrial

Industrial fuel oil consumption was based on volumes reported from the survey of only GVRD's permitted point sources in 2000. Since fuel oil emissions are such a small part of the total emissions inventory, no adjustment factor was estimated or added to account for non-permitted sources.

1990

Sources & Comments for All Categories: Residential, Industrial & Commercial

Electricity:

Source: BC Hydro

Consumption was converted into equivalent CO₂ emissions based on a five year average from 1998 to 1993 (base year figure obtained from the "BC Hydro Greenhouse Gas Report 2003") A five year average of the electricity coefficient was used to reduce the effects of possible large annual fluctuations of the coefficient on the emissions calculations.

Natural Gas:

Source: GVRD report (Residential & Commercial) & permitted point source backcasted and adjusted (Industrial)

GVRD's conversion factors were used to calculate the CO₂ emissions based on fuel consumption.

Fuel Oil:

Source: GVRD

Specific Information for Each Category (or Categories)

Residential & Commercial

As Terasen did not keep historical records back to 1990, Residential and Commercial natural gas figures for 1990 were obtained from the GVRD through their 1993 report by B.H. Levelton & Associates and Western Research: "1990 Air Emissions Inventory for the Lower Fraser Valley: Area Sources". The natural gas consumption figures of the report were converted to CO₂ emissions using GVRD's conversion factors.

Note: According to the GVRD, BC Gas account areas did not strictly follow municipal boundaries, so gas volumes for specified municipal areas may not be entirely accurate. However, the figures from the 1993 report are more in line with other indicators, such as trends of available data, as compared with other disaggregation methods from regional totals.

Both Residential and Commercial fuel oil consumption were based on GVRD's 1995 adjusted Vancouver percentage population compared with the GVRD.

Commercial

For Commercial electricity consumption, BC Hydro's records combined the Commercial & Industrial Categories into "Small Commercial / Industrial" & "Large Commercial / Industrial", therefore the approximate percentage split was projected back to 1990 using actual, available 1995 to 2002 data. Figures included BC Hydro's subcategories: "Irrigation Consumption", "Street Lighting" and "BC Hydro Own Use". Figures also included transit and related facilities (details in the 2000 Commercial Section).

Industrial

For Industrial electricity consumption, details are in the Commercial Section: A trend line of proportions was plotted from actual, available Hydro data to approximate the Commercial / Industrial split. Figures included BC Hydro's subcategory: "Transmission Consumption".

Appendix A2: Community GHG Emissions Profile Methodology

For Industrial natural gas and fuel oil consumption, only GVRD's Permitted Point Sources' combined natural gas and fuel oil CO₂ emissions were available. Therefore, the same fuel split as year 2000, which was based on actual CO₂ emissions data, was used to determine the approximate 1990 natural gas consumption and fuel oil consumption separately. Since fuel oil emissions are such a small part of the total emissions inventory, no adjustment factor was estimated or added to account for the non-permitted sources.

However the non-permitted sources' natural gas consumption was a substantial portion in relation to the permitted sources. To account for the large portion of emissions not in GVRD's Point Source figures, the percentage difference between a) Terasen's 2000 Industrial natural gas consumption (which includes all industrial sources, permitted and non-permitted) and b) GVRD's 2000 Permitted Point Source natural gas consumption (which only includes GVRD-permitted sources) was added to GVRD's 1990 Point Sources natural gas consumption total. The adjustment resulted in a decrease in emissions from 1990 to 2000, which is more in line with the approximate, actual industrial floor space decrease during the same period, than the significant increase that would have occurred without the adjustment.

E. DATA SOURCES FOR TRANSPORTATION

The Transportation Sector was split into two categories: Light-Duty Vehicles (which weigh 5,000kg or less) and Heavy-Duty Vehicles (which weigh over 5,000kg). This split was necessary because AirCare data (along with ICBC and regional fuel sales data) was used for the Light-Duty Vehicle analysis, but AirCare only tests vehicles that weigh 5,000 kg or less.

Because most Light-Duty Vehicles (LDVs) consume gasoline, only gasoline consumption was used in the analysis of LDVs. All other fuels, including diesel were not included because the total use in the LDV category is insignificant. Similarly, most Heavy-Duty Vehicles (HDVs) consume diesel, so all other fuels were not included (more details in the Heavy-Duty Section). The gasoline and diesel used in the Transportation Sector are clear fuels, which would have very little overlap of fuel consumption with the Other Sector, which included mostly marked fuels (more information in Section D. "Other").

The LDV analysis was based on determining Vancouver's proportion of regional (GVRD) gasoline consumption, which is directly related to Vancouver's CO₂ emissions. Vancouver's proportion was based on the gasoline consumption of Vancouver-registered vehicles compared to GVRD-registered vehicles. Tracking Vancouver's proportion of emissions helps to reflect changes made to reduce vehicle emissions by vehicles that have an insured address in Vancouver.

The HDV analysis was based on GVRD emissions modelling, because AirCare data was not available for HDVs.

<u>Light-Duty Vehicles (LDVs)</u>

The following are steps taken to analyze the LDV emissions:

 The regional GVRD gasoline sales were determined from the gasoline fuel tax proceeds of the Greater Vancouver Transportation Tax (GVTT) Area) for 1990 and 2000.
 Source: BC Consumer Taxation Branch via Translink for the total regional gasoline sales

Appendix A2: Community GHG Emissions Profile Methodology

Note: 1990 figures did not include Maple Ridge & Pitt Meadows (and were not available separately), so an adjustment factor was added (based on population and approximate proportion of registered vehicles).

- 2) The boundaries of Vancouver and the GVRD were defined by the first three digits of the postal code (Forward Sortation Area (FSA)).
 Source: Canada Post for Vancouver's FSAs & GVRD for the database of all postal codes and confirmation of GVRD's FSAs.
- 3) Vancouver's portion of the total GVRD regional gasoline sales for 1990 and 2000 was determined by analyzing mileage (odometer readings) for different vehicle types from AirCare data, total insured vehicle counts from ICBC, and fuel efficiency estimates for different vehicle types from the GVRD. Since AirCare data was not available for 1990, Vancouver's 1990 portion had to be estimated using a combination of the earliest few years of AirCare data available and 1990 ICBC vehicle counts (adjusted to include Maple Ridge and Pitt Meadows).
- 4) Vancouver's total 1990 and 2000 proportion of gasoline consumed was compared with the total 1990 and 2000 regional gasoline sales to determine Vancouver's total 1990 and 2000 gasoline consumed.
 - Note: The benefit of using the gasoline consumption proportion of Vancouver compared to the GVRD to distribute the total GVRD gasoline sales is that any uncertainties in data analysis should be shared (and relatively proportional) between both study area groups.
- 5) Vancouver's equivalent CO₂ emissions for 1990 and 2000 were calculated from the total amount of gasoline consumed respectively Source: NRCan for the gasoline to CO₂ emissions conversion factor

Note: There is a small overlap with non-road mobile lawn and garden equipment which use gasoline, but this would be a small percentage and it is assumed that the proportion would be relatively consistent across the region, and thus taking proportions would factor out most, if not all of the error, thus making it negligible in the emissions profiling (more details are listed in Section D. "Other")

Heavy-Duty Vehicles (HDVs)

The HDV part of the Transportation Sector basically included emissions from vehicles that weigh over 5,000 kg. The emissions were calculated with GVRD's modelling (GVRD's 2003 report: "2000 Emission Inventory for the Canadian Portion of the Lower Fraser Valley Airshed: Detailed Listing of Results and Methodology" http://www.gvrd.bc.ca/publications/file.asp?ID=684 has more details).

Only the diesel portion was included in the emissions, because the majority of vehicles weighing over 5,000 kg are diesel-powered and similarly, the majority of vehicles 5,000 kg or less are gasoline-powered. All gasoline consumption was distributed in the Light-Duty vehicle analysis. While not perfect, gasoline use in the Heavy-Duty category is comparatively small. The impact of the error is reduced further if one accepts that the proportional difference of this category between the municipalities is also small.

F. DATA SOURCES FOR WASTE

The Waste Sector GHG emissions profile is based on:

- methane produced at landfills converted to equivalent CO₂ emissions; and
- emissions from the Burnaby Incinerator as reported by the GVRD.

2000

The "waste in place" method was used to establish the 2000 emissions for the Waste Sector. Totals were prorated by Vancouver's percentage of waste in place for each landfill site: Vancouver Landfill, Port Mann Landfill = 0 (closed around the mid 1990's), Cache Creek Landfill, and GVRD information for Waste to Energy (WTE) Facility (Burnaby Incinerator).

1990

1990 emissions were based on "waste in place" at the Vancouver Landfill. It was assumed that all Vancouver waste went to the Vancouver Landfill (via the Vancouver South Transfer Station (VSTS)), so Port Mann Landfill, Cache Creek Landfill, Burnaby Incinerator were all assumed to be zero, as no values were tracked for 1990.

G. DATA SOURCES FOR "OTHER" (NON-ROAD MOBILE EQUIPMENT)

The "Other" Sector consists of what the GVRD has classified as "non-road mobile equipment", which includes industrial, construction, lawn/garden, and agricultural equipment etc. Marked fuels are the predominant fuel consumed in this category, so there is little overlap with the clear fuels that were analyzed in the Transportation Sector. Note that for some lawn and garden equipment ("lawn care equipment"*), gasoline consumption (clear fuel) in this sector was double-counted with the Light-Duty vehicle analysis, and diesel consumption (clear fuel) with GVRD's Heavy-Duty vehicle analysis; however, the amount is small ("estimated to be not greater than 1% for onroad gasoline and 2% for onroad diesel" (Source: page C-14 of GVRD's "2000 Emission Inventory for the Canadian Portion of the Lower Fraser Valley Airshed: Detailed Listing of Results and Methodology")) and assumed relatively consistent across the region. The double-counting is thus considered negligible, especially since Vancouver/GVRD proportions were used in the gasoline consumption analysis in the Transportation Sector.

* Note: the ICLEI/CCP Protocol does not require lawn care equipment to be reported, but since it is such a small amount of the total inventory and the GVRD's figures included lawn care equipment, they were included in the "Other" category of Vancouver's GHG emissions profiles.

Source: GVRD for disaggregation of figures for Vancouver's portion of "Other" emissions for both 1990 and 2000.

APPENDIX B: Community Climate Change Plan Consultation Process

APPENDIX B: Community Climate Change Plan Consultations

On May 4, 2004, Council approved the *DRAFT* Community Climate Change Action Plan for use as a starting point for broad community and stakeholder consultation on the development of a final plan for Vancouver. Since that time City staff have worked with Karyo Communications to engage stakeholders and the public in the Plan development using a number of approaches:

- o Public events and workshops supplemented by an on-line questionnaire
- o Stakeholder consultations in each of the core areas of the Plan
- Special interest group presentations and discussions
- Qualitative and Quantitative research

The remainder of this Appendix provides a brief summary of these consultations.

Public Events

The public consultation on the Draft CCAP was launched on May 31, 2004 at an event at Library Square with over 300 members of the public in attendance.

Karyo supported the Sustainability Group in holding two public workshops at the Roundhouse Community Centre in the fall of 2004. These workshops, which were widely advertised in community papers and through public service announcements, engaged over 140 members of the public in a total of 6 hours of facilitated discussions about the Draft Plan and priorities for moving forward.

The first workshop was an introduction to the Draft CCAP and invited comment not only on what it addressed but also what it failed to address. While there were many suggestions for additional actions that could or should be taken and barriers that were identified, feedback was largely positive.

The second workshop presented the feedback received from the previous workshop and invited participants to help Staff understand what actions that citizens of Vancouver could personally take to reduce greenhouse gases. In small, facilitated groups, participants talked about opportunities and barriers to energy reducing behaviours on the road, at home, at school and at work.

At these workshops and through the Cool Vancouver website, over 50 surveys were submitted.

Stakeholder Consultations

In addition to regular Cool Vancouver Task Force meetings, numerous discussions were held with representatives of a broad spectrum of stakeholder organizations in the development of the CCAP. The organizations engaged in these discussions included:

APPENDIX B: Community Climate Change Plan Consultation Process

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			Vancouver School	
Health			Board	

APPENDIX B: Community Climate Change Plan Consultation Process

Special Interest Groups

In addition to meetings with the public and stakeholders, presentations were made (upon invitation) for information and feedback to special interests groups including:

Society Promoting Environmental Conservation (40 in attendance)
Environmental Design Resource Society (30)
Pacific Energy Innovation Association (25)
Simon Fraser University – Senior Geography Class (25)
Connecting Young Environmental Professionals (30)
Buildex Conference Session (40)
British Columbia Electrical Association AGM (40)

Social Marketing Research

To compliment this consultation process, to establish a behavioral baseline to evaluate and measure progress and participation in the future, and to help inform a detailed community engagement strategy, Karyo Communications and the Mustel Group have been conducting a comprehensive social marketing research initiative including:

- Qualitative focus groups and analysis concentrating on household decision makers, mothers, youth, seniors, and multi-cultural residents
- A census weighted, quantitative telephone survey of 600 Vancouver residents on behaviors, barriers, attitudes, and motivators – the survey is complete but detailed analysis and market segmentation is still in progress
- Facilitated workshop with over 160 city youth to solicit their ideas on actions to address climate change and to identify their role in sustainability action

In addition, three more facilitated workshops are planned to help refine the emerging community engagement strategy including one with City staff and key community influencers to develop a multicultural model for social marketing.

Conclusion

A key element of the Community Climate Change Action Plan is community engagement. If Council decides to proceed with implementing this Plan, the community will help shape a shared vision for our city, be encouraged and supported in taking action, and their activities, questions, and requests will continuously shape the evolution of the Plan.