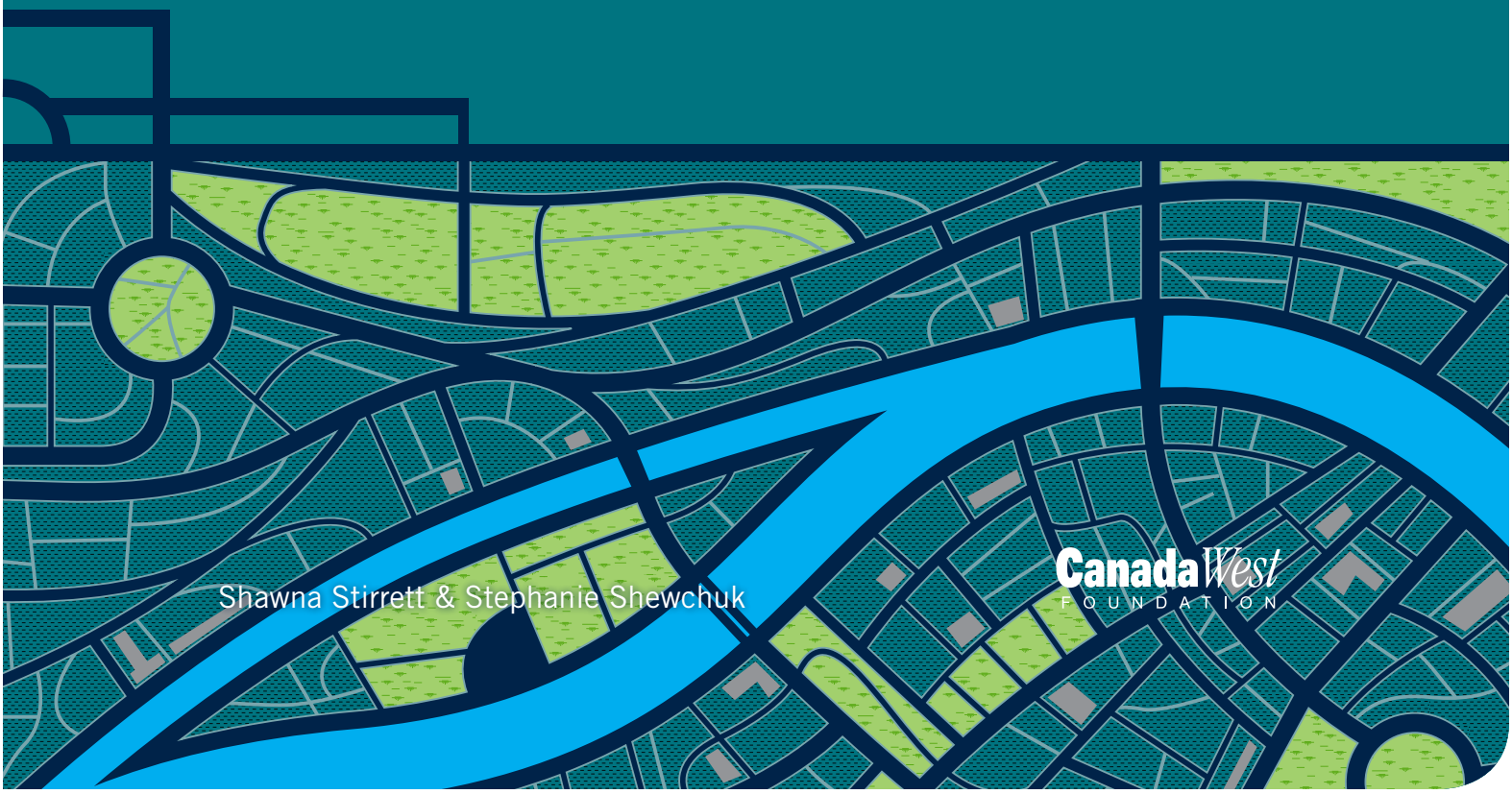
SEPTEMBER 2012

THE MISSING LINK PROJECT

environment

Bright Spots

Urban Environmental Initiatives in Western Canada



Shawna Stirrett & Stephanie Shewchuk

Canada West FOUNDATION

The Missing Link Project

PUBLIC POLICY AND URBAN ENVIRONMENTAL IMPROVEMENT

The Missing Link project is composed of three research reports and a conference on urban environmental policy. The project is investigating the critical role played by public policy in the transition from the idea stage to the on-the-ground implementation of environmental initiatives in Canadian cities.

This report was prepared by Canada West Foundation Policy Analyst Stephanie Shewchuk and Senior Policy Analyst Shawna Stirrett. The authors wish to thank the interview participants for sharing their urban environmental stories and the members of the advisory committee for donating their time and expertise. A very special thank you goes to Canada West Foundation Intern Michael Decker for his contributions to the report. Any errors or omissions remain the responsibility of the authors. The opinions expressed in this report are those of the authors and are not necessarily those of the Canada West Foundation's Board of Directors, advisors or funders.
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Executive Summary

Bright Spots: Urban Environmental Initiatives in Western Canada is the second of three reports summarizing the results of the Canada West Foundation's *Missing Link* project. As part of this project, the Canada West Foundation is holding the *Bridging the Gap: Shifting Urban Environmental Ideas Into Action Conference* on September 25, 2012 in Calgary. The conference will bring together practitioners and stakeholders to explore the missing link between good ideas for improving the urban environment and the role of public policy in facilitating their implementation.

This report provides background information for the conference by examining twenty-one urban environmental initiatives in seven western Canadian cities. The case studies range from very small, individually-led initiatives such as the Car Share Cooperative in Regina to community-level advocacy groups like Winnipeg's Bike to the Future to large city-level projects like Calgary's wind-powered C-Train and Vancouver's Green Building Strategy.

The intent in highlighting these examples is to showcase what is possible in the western Canadian context in order to set the stage for undertaking a critical analysis of what public policy conditions must be in place to encourage the effective use of urban environmental improvement tools in western Canada. While no attempt has been made to find all the points of commonality among these examples, a number of common themes emerged:

1. **Economics and context matter to the success or failure of urban environmental initiatives;**
2. **There is a normalization of environmental measures in cities as residents become more attuned to the importance of environmental management;**
3. **Success leads to success and previous practice is very important in encouraging environmental change; and**
4. **There are numerous public policy conditions that impact the success of initiatives and these must be examined in more detail.**

In short, initiatives appear to be most successful when there is access to funding, when government and community support is present and where previous practice has emphasized the importance of the environmental dimension of decision-making. These ideas, as they become mainstream, are inspiring change in cities across the country.

The next report in the series will build on these themes and examine the public policy conditions needed to make effective use of urban environmental improvement tools. The third report will recommend ways to create these conditions in western Canadian cities.

Introduction

When people think of protecting the environment, images of vast forests, quiet lakes and sandy beaches often come to mind rather than the glass office towers, asphalt parking lots and sprawling suburbs that characterize our big cities. Despite this, changes in cities can make a huge difference to the health of our environment.

Urbanism is one of the most significant global trends and western Canada exemplifies this. Upwards of 80% of Canadians live either in, or within an hour drive of, a major city and this has enormous implications on our ability to live more sustainably. Environmental initiatives in cities have a pronounced influence on the natural environment since the impact can be larger than in rural areas where the population is lower and more dispersed.

There are a range of tools that cities can use to reduce their environmental impact, including ones that focus on protecting the landscape and ecology of urban areas, promoting more environmentally-conscious urban design, encouraging less energy-intensive methods of transportation, preserving the quantity and quality of water in urban areas and reducing overall energy consumption.[1]

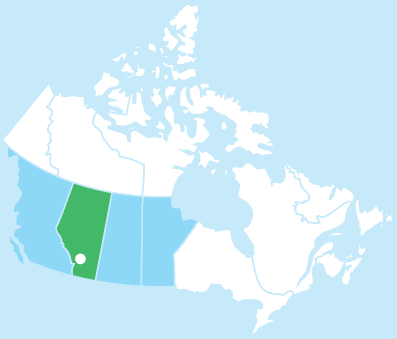
In order to explore how these tools are being used, this report highlights some of the urban environmental initiatives taking place in seven major western Canadian cities: Calgary, Edmonton, Regina, Saskatoon, Vancouver, Victoria and Winnipeg. Exploring what has already been done on the urban environmental front is beneficial for the planning and implementation of future initiatives because often a barrier to implementing good environmental ideas is not a lack of desire but a lack of awareness. It is hard for cities and organizations to do things differently or to experiment with environmental improvements, particularly when budgets are tight and community support must be gathered. It is instructive, therefore, to illustrate what is being done and to learn from these examples about what *could* be done.

The case studies highlighted here are examples only and are not indicative of everything that is happening to improve the environmental performance of cities (for an overview of common urban environmental practices see Appendix A). The purpose, moreover, is not to compare and contrast the cities with respect to their efforts at environmental improvement but to get a better sense of the geographic, cultural and social contexts within which these initiatives have flourished.

APPLES & ORANGES

One of the challenges inherent in any examination of cities in Canada is that we are inevitably looking at apples and oranges. Cities are products of their people, politics, history, geography, climate and many other factors, making direct comparison between them difficult. Even the notion of what constitutes a city is not consistent from. Vancouver, for example, is technically only 115 km^2 in size and has a population of just over 600,000 people. The area of land that is often *thought of* as Vancouver—known as Metro Vancouver—however, is 2,883 km^2, home to around 2.5 million people and comprised of 13 municipal districts.

[1] For an overview of urban environmental tools see: Shawna Stirrett and Stephanie Shewchuk. 2012. *Tools of the Trade: Urban Environmental Improvement Options.* Canada West Foundation



Calgary

ALBERTA, CANADA

City of Calgary (2011)

POPULATION 1,096,833

LAND AREA (square kilometres) 825.29

POPULATION DENSITY (per square kilometre) 1,329

Calgary Census Metropolitan Area

POPULATION 1,214,839

LAND AREA (square kilometres) 5,107.55

POPULATION DENSITY (per square kilometre) 237.9

POPULATION PROJECTION (for the year 2032)

2011 1,096,833

2032 1,930,775

Average Winter Temperature **-6.4°C**

Average Sunshine a Year **333 days**

Average Precipitation **412 mm**

Average Summer Weather **15.9°C**

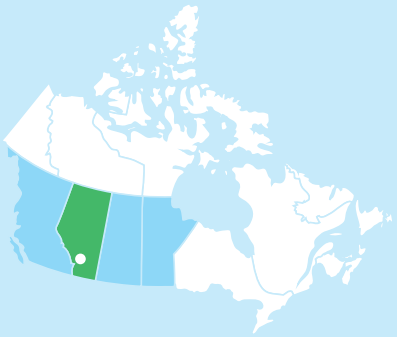
City of Calgary

$89,490

MEDIAN TOTAL INCOME IN CMA (2010)

$394,251

AVERAGE HOUSE PRICE 2011



Calgary

ALBERTA, CANADA

THE CITY OF CALGARY is located in the foothills of Alberta's Rocky Mountains, at the junction of the Bow and Elbow Rivers. Calgary is Alberta's most populous city and the economic activity driven by the oil and gas sector has helped develop it into a major business hub.

Calgary reached over a million residents in 2000 and continues to be among the fastest growing cities in Canada. With the population projected to reach over 1.5 million by 2020, development pressures are topping the agenda for municipal policymakers. The lack of significant natural barriers to urban growth has given rise to sprawling patterns of development. The challenge in coming years will be for planners and policymakers to meet the needs of the incoming population while efficiently utilizing the land and resources available.

At the City of Calgary, the Planning, Development and Assessment (PDA) department implements policy as it relates to the urban environment. Within this department, the Land Use Planning and Policy (LUPP) unit is responsible for managing future growth for the city as a whole and for overseeing regional issues and programs.

In recent years, the City has driven a number of processes to support urban environmental initiatives. The imagineCALGARY initiative began in 2003 as a visioning exercise that engaged external stakeholders through public consultation to yield a long-term urban sustainability plan. The plan was used by the municipality, residents, businesses and community agencies to guide future decision-making, although participation in the initiative was voluntary.

In 2007, City Council underwent a review of its land use and transportation policies in the aim of setting out a strategy for creating a more sustainable urban form. The consultation and research process, named Plan It Calgary, was conducted over the course of two years. The Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP) that flowed out of Plan It Calgary were approved by Council in 2009 and are the current policies that guide land use planning. These plans detail a vision for the growth and development of the city over the next 60 years and specify policies that will support the vision over the next 30 years.

In addition to the MDP and CTP, the Triple Bottom Line Policy Framework supports the sustainable development principles adopted by the City. The Framework is a Council-approved summary of existing City policies and plans regarding the economy, environment and society. The Framework has also been updated to align with the City's ten-year strategic sustainability plan, the 2020 Sustainability Direction. The 2020 Sustainability Direction describes the goals, objectives, targets and strategies that will help realize imagineCALGARY's vision for community sustainability, and links imagineCALGARY's long-term plan to the City's three-year business plans and budgets.

GARRISON WOODS, GARRISON GREEN & CURRIE BARRACKS DEVELOPMENTS

When Canadian Forces Base Calgary closed its military operations in 1998, it provided a unique opportunity for community redevelopment. Three new communities were conceived—Garrison Woods, Garrison Green and Currie Barracks, all located in the inner southwest area of the city. Canada Lands Company, a self-financing Crown corporation that is responsible for the management and redevelopment of surplus properties, was named as the developer.

These neighbourhoods were developed with the principles of New Urbanism in mind. New Urbanism (which is closely associated with "smart growth"), focuses on walkable streets, mixed-use development, higher density patterns of growth and transit-oriented development in the aim of fostering social connections in the area and reducing the environmental impact of development. In addition to adhering to New Urbanism principles, the Garrison Woods, Garrison Green and Currie Barracks developments were designed to maintain the natural and historic character of the area by preserving mature trees and vegetation and establishing public parks, special monuments and street names to reflect the military history of the neighbourhood. These redevelopments sought to attract people to the residential inner city by regenerating land that had outgrown its initial purpose.

Garrison Woods was the first community planned for redevelopment. Its design was approved by Calgary City Council in 1998 and the community was completed by the developer in 2003-04. Garrison Green was completed in 2009 and the redevelopment of the Currie Barracks site began in 2009-2010, with the first phase currently well underway. The developments were all linked in the sense that they each followed a similar design philosophy, with each trying to build on the experience of the previous development. Senior staff at the City were supportive of the general concept of these developments, since the administration had begun incorporating sustainable development considerations into its strategic planning.

There were public consultation processes held ahead of development to listen to and address the concerns of residential and commercial members of the wider community. The concern heard most frequently from area residents was a belief that traffic would increase as a result of the increased density of the new development. Traffic calming measures and a modified grid pattern were introduced as a means of reducing speeding and dispersing vehicles in the area.

Some of the other development proposals proved to be more controversial. These included alternative standards for road infrastructure, such as narrower streets and lanes, lower proposed speed limits, and additional traffic calming mechanisms such as intersection "bulb-outs" to increase pedestrian safety and encourage active transportation in the community. These plans were met with resistance during the municipal approval process because they varied from the City's established transportation and engineering standards. In the case of the two Garrison developments, approval for the customized standards was granted after a persistent effort was made to get administrators on board with the vision conceived by the developer.

The Currie Barracks development ran into more pronounced difficulty in trying to get approval for its customized road infrastructure, even though a precedent had already been set by the two Garrison developments.

"There was a disconnect between planning and implementation," noted Linda Hackman, who worked as a Senior Planner at the City of Calgary when Garrison Woods and Garrison Green were being developed, and is currently Director of Planning and Urban Design at Canada Lands Company. "Time and patience on the part of the developer were key in getting the plans approved, as well as support from senior management and City Council."

Despite the issues of precedence that dogged each development in the approval process, these communities have been widely recognized for their commitment to sustainable development principles. Garrison Woods and Garrison Green have won a number of awards for neighbourhood design, and the Currie Barracks development has been recognized as being especially environmentally-sound. It was the first real estate development project in Canada to receive LEED Gold (Stage 2) environmental certification for Neighbourhood Development. LEED Neighbourhood Development gives LEED standard accreditation to developments that are located and designed in an environmentally responsible and sustainable manner.

The persistence on the part of the developer, Canada Lands Company, and leadership from senior management and City Council was integral in getting these developments from the planning to implementation stage. In contrast with profit-driven developers, Canada Lands Company has a mandate that emphasizes optimizing value, including the environmental and social considerations of the developments they undertake. Where other developers might have gone broke trying to cut the red tape, CLC's status as a Crown corporation enabled it to persist in driving a solution forward. Without CLC's strong commitment to develop unique and sustainable communities, Garrison Woods, Garrison Green and Currie Barracks might not have made it past the approvals process.

imagineCALGARY & PLAN IT CALGARY

imagineCALGARY began in 2003 as a long range visioning process for the City of Calgary. Its goal was to conduct a large scale public consultation process, guided by a core group of volunteers lending their expertise, to yield a future urban sustainability plan. The Mayor during this period, Dave Bronconnier, instigated the process after becoming the first member of the Sustainable Cities International Network, which had encouraged cities to undergo long-range urban planning to encourage sustainability. Calgary was the first city to undertake a planning initiative under such a scope, according to Patricia Gordon, who was the Project Manager of both imagineCALGARY and the Plan It Calgary initiative.

The process lasted 18 months and over 18,000 people participated, making it one of the largest visioning exercises of its kind in the world. The imagineCALGARY Plan for Long Range Urban Sustainability set out a detailed long-term vision, as well as targets and goals to achieve the vision in the five key systems of the city: built environment and infrastructure; the economy; governance; the natural environment; and the social system. A large network of partner organizations across the city was responsible for implementing the targets and goals within their organizations, although these targets were voluntary.

Plan It Calgary followed imagineCALGARY in 2007. Calgary's land use and transportation plans required renewal around this time and officials at City Hall sought to codify many of the targets and goals from imagineCALGARY into a statutory, integrated land use and transportation plan. Land use and transportation policies were typically designed separately in Calgary (although the previous transportation plan took a stab at integration, it lacked the land use policies required for success) so this was a new process that challenged the usual policymaking conventions.

The proposed integrated plan, which was comprised of the Municipal Development Plan (MDP) and the Calgary Transportation Plan (CTP), focused on the imagineCALGARY vision for the urban environment, outlining specific policies that would be implemented over the following 30 years. These policies advanced the vision of urban sustainability by promoting transit-oriented development and active transportation, increasing housing choice through higher density and mixed-use development, creating more walkable neighbourhoods and encouraging urban activity centres outside of the downtown core.

The environmental benefits associated with a smart growth approach to urban development are extensive. Supporting active transportation modes over single occupancy vehicles will lower greenhouse gas emissions and reduce air pollution. Transit-oriented development will likewise reduce the need for motor vehicles and encourage higher density patterns of development. Higher density and mixed-use neighbourhoods promote the development of active urban spaces while advancing a more efficient use of land and resources.

Gordon notes that the proposed land use and transportation plan attracted a wide variety of stakeholder interest. While gaining the support of many environmental, community and business groups, representatives from the development and home building industries, in particular, expressed reservations over intensifying growth within the existing built environment, as opposed to expanding greenfield development. At the heart of their concerns was a challenge to the business model that they had adopted over many decades that now required change.

Following a series of impact analysis studies, City planning officials emphasized the fiscal savings on infrastructure associated with denser patterns of urban growth, which was estimated to be over 33% on capital and 15% on the operations side. Support gathered for the vision and policies set out in Plan It Calgary once it was positioned to the public and members of Council as serving an economic, environmental and social bottom line. Taking into account the feedback from industry stakeholders and the public, Council revised some of the original proposals in the plan and approved the new MDP and the CTP in 2009.

Although imagineCALGARY and, in particular, Plan It Calgary encountered some obstacles, they were both generally successful for a variety of reasons. The thorough public consultations held in both cases helped determine the longer-term ambitions residents held for the city and gained support for future strategic directions, which was helpful in the instances where objections were raised. Key stakeholders and groups that were actively engaged in creating the imagineCALGARY plan emerged throughout the process to support Plan It Calgary. Impact analysis studies and research conducted alongside the consultation process supported the goals and objectives established over the course of each process.

Both processes demonstrate the necessity of making a solid, balanced case for change and persevering in the face of opposition. Since Plan It Calgary yielded statutory municipal policy, it was likely that it was going to be closely scrutinized and resisted by some members of the community who did not find favour with the proposed growth management approach. Underlining the economic benefits of the strategy, in addition to the social and environmental advantages, was critical to cultivating a positive public perception. The Plan It Calgary initiative helped draw attention to growth management and to make planning decisions more transparent.

WIND-POWERED C-TRAIN

The light-rail transit system in Calgary, popularly known as the C-Train, became the first public transit system in North America to be fully powered by wind energy in 2001. This initiative replaced the coal and natural gas that previously powered the system with wind energy. A group of dedicated windmills in southern Alberta provides the electricity, which is then purchased in an offset capacity by Calgary Transit. An offset is a reduction in greenhouse gas emissions made in one area to balance emissions made elsewhere. So, while the windmills in southern Alberta do not directly power the C-Train, the energy produced there offsets the electricity used by the light rail system.

There are numerous environmental benefits associated with this public transportation system. Generally speaking, attracting more people to public transit reduces greenhouse gas emissions by taking more vehicles off the road. The C-Train is the third busiest transit system in North America and transports an average of 280,000 commuters each weekday.[2] As the C-Train expands in coming years, more people will have the opportunity to take advantage of the larger network, which will further reduce emissions. If people walk or cycle to and from the C-Train station, active transportation is also indirectly encouraged by the system. The environmental impact of building and maintaining new and old roads will also be reduced as transit ridership increases.

The idea for the initiative came from Justin Thompson of Vision Quest Windelectric, who had watched the C-Train cars pass by his office every day. He saw little reason why the system couldn't be powered by wind energy in the place of fossil fuels. He and a colleague, Jason Edworthy, decided to pitch the idea to City Council and the City's energy utility, Enmax.

The resulting partnership between Calgary Transit, Enmax and Vision Quest Windelectric (which was purchased by TransAlta in 2002) was the driving force in getting the initiative off the ground. The idea of converting the C-Train to wind power was a natural fit at the time, explained Ron Collins, Communications Coordinator at Calgary Transit. "It was a case where an idea was championed and well-received by Council. It seemed like a win-win for everyone involved so it went ahead relatively seamlessly," he said.

Once the initiative was approved by Council, twelve dedicated wind turbines were built by Vision Quest Windelectric to provide the energy for the C-Train system. Enmax, as the City's power utility, manages the electricity distribution for the system, while Calgary Transit operates the light rail network.

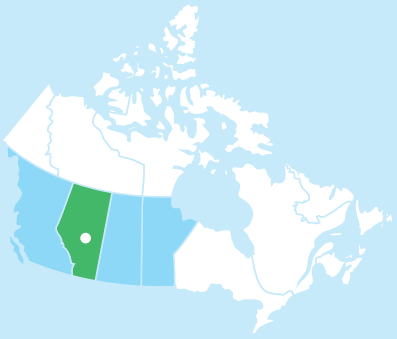
The initiative has been recognized for significantly reducing emissions and successfully demonstrating that renewable energy could be utilized in a large scale transportation network. In 2010, greenhouse gas emissions were reduced by 47,000 tonnes as a direct result of C-Train operations switching to wind power.[3]

Many people are not aware the C-Train system is run on wind energy, however. "We don't really toot our own horn, so to speak," said Collins. "But some people do know and they say they take the C-Train specifically because of its environmental benefits."

This example is instructive since it demonstrates that an idea championed effectively can take hold and create a new standard in the way public transportation is powered. Advocates for the idea presented a practical plan to a receptive Council, which had been looking for opportunities for environmental improvement. When the initiative first got underway, City Council acted as an early adopter of technology that was relatively new.

The C-Train remains one of the only wind-powered light rail systems in North America. By treading the path less travelled, the partners involved have demonstrated that it is not only possible to incorporate green energy into public transit operations, but that it can result in a resounding, if somewhat low-key, success story.

[2] Calgary Transit. http://www.calgarytransit.com/html/centennial_celebration.html
[3] Calgary Transit. http://www.calgarytransit.com/environment/ct_environment.html



Edmonton

ALBERTA, CANADA

City of Edmonton (2011)

POPULATION	812,201
LAND AREA (square kilometres)	684.37
POPULATION DENSITY (per square kilometre)	1,186.8

Edmonton Census Metropolitan Area

POPULATION	1,159,869
LAND AREA (square kilometres)	9,426.73
POPULATION DENSITY (per square kilometre)	123

POPULATION PROJECTION
(for the year 2032)

Average Winter Temperature
-8°C

Average Sunshine a Year
321 days

Average Precipitation
455 mm

Average Summer Weather
17.4°C

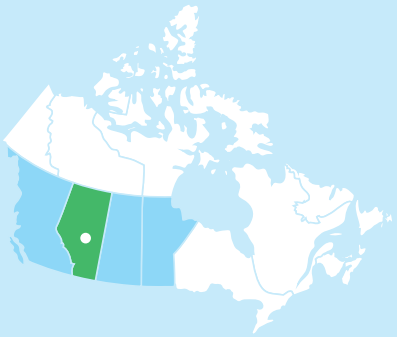
City of Edmonton

$87,930

MEDIAN TOTAL INCOME IN CMA (2010)

$325,322

AVERAGE HOUSE PRICE 2011



Edmonton

ALBERTA, CANADA

EDMONTON IS THE NORTHERN-MOST CITY IN NORTH AMERICA with a population of over one million. Edmonton is the site of jobs and services for residents of the surrounding municipalities, many of whom commute in and out of the city on a daily basis.

Geographically, Edmonton is located on the North Saskatchewan River and the river valley is one of the city's prized natural areas. Edmonton has the highest per capita area of parkland of any major city in Canada.

Land use planning in Edmonton has been informed by a number of recent policy updates. The City of Edmonton has conceived a City Vision to guide decisions, help set direction and align priorities for policymakers. This vision concentrates on Edmonton's unique position as the capital of Alberta and highlights art, ideas, research and energy as areas of further development.

The Way Ahead is the City of Edmonton's strategic plan that details the goals set for Edmonton's development over the 2009-2018 period. Along with the City Vision, The Way Ahead establishes six strategic goals to provide a clear focus for future growth.

In addition to The Way Ahead, which broadly sets out a strategic direction, there are a number of plans that relate to land use planning and the urban environment. The Way We Grow is the City's Municipal Development Plan and The Way We Move is the Transportation Master Plan. The Way We Live is Edmonton's "People Plan" that aims to improve the city's liveability. These plans focus on specific areas of operation but feed into the directions and goals established by the strategic plan.

The City of Edmonton is also a member of the Capital Region Board (CRB), which is composed of twenty-four municipalities in the region. A Capital Region Growth Plan was prepared by members of the CRB in 2009 in order to coordinate regional activity relating to the development of infrastructure, services and land use. The Plan, called Growing Forward, highlights integrated land use, inter-municipal transit, coordinated geographic information services and affordable housing as regional priorities.

Edmonton has the **HIGHEST PER CAPITA AREA OF PARKLAND OF ANY MAJOR CITY IN CANADA.**

RIVER VALLEY ALLIANCE

The River Valley Alliance (RVA) began in 1996 as a group of volunteers representing five municipalities in the Capital Region that came together with a vision for transforming an 88 km stretch in the North Saskatchewan River Valley into an integrated riverfront park. The Alliance has expanded over the years from a small grassroots movement to become a large nonprofit organization that has had a hand in establishing one of the most-visited park sites in Alberta.

Currently, the RVA is composed of seven municipalities—Town of Devon, Parkland County, Leduc County, City of Edmonton, Strathcona County, Sturgeon County and City of Fort Saskatchewan—working to preserve and enhance the Capital Region's river valley park system. At the City of Edmonton, the River Valley Alliance is an incorporated company with six Municipal Directors, seven Directors at Large and one Advisory Committee Chair.

The RVA has been successful in bringing a group of municipalities together to work toward the common goal of environmental preservation. Finding the best organizational model to effectively balance the interests of all parties involved was a consideration the Alliance dealt with, according to Rob Marchak, Director of Strategic Projects in the Sustainable Development department at the City of Edmonton. "Some of the counties, for example, have the population of one of our neighbourhoods in the city," said Marchak. Further to that point, the governing structures, institutional capacity and development pressures differ from town to county to city.

In order to provide structure to the organization's vision, the RVA has established a plan for preserving natural land in the river valley. The 'Plan of Action' features an integrated approach that involves each municipality in the Alliance while at the same time establishing seven distinct planning areas to accommodate the different needs of each area. The City of Edmonton also supports the protection of the river valley area by recognizing the RVA's Plan of Action in The Way We Green, the City's environmental strategic plan.[4]

The implementation of the Plan of Action is supported by $50 million in funding from the provincial government, as well as funds from the municipalities involved. The RVA is also applying for matching funds from the federal government. Over the past 50 years, more than $500 million has been invested in the river valley area by all levels of government, the business community, nonprofit organizations and private residents.

The Capital Region River Valley is one of the longest uninterrupted stretches of urban parkland in North America. Protecting and preserving this landscape enriches the quality of life for local residents by creating opportunities for recreation and offsetting air pollution. This area also provides animal habitat, protects wildlife corridors, and helps sustain the region's biodiversity. Approximately half of the river valley area has experienced some degree of change from development and use and, as such, landscape preservation will maximize benefits to the natural environment that may be lost through further development.

Going forward, establishing responsibility and ownership for future plan outcomes will be imperative to the organization's continued success. As it stands, working relationships among stakeholders have been effective and productive. "Each partner in the RVA takes responsibility and ownership of their infrastructure and development," noted Marchak. The commitments on the part of Alliance members are helping to preserve the river valley for years to come.

[4] The Way We Green – http://www.edmonton.ca/city_government/documents/TheWayWeGreen-approved.pdf

EDMONTON'S WASTE MANAGEMENT SYSTEM

The Edmonton Waste Management Centre (EWMC) is the largest collection of sustainable waste processing facilities in North America. The Centre, which is managed by the City's Waste Management Utility, includes the Integrated Processing and Transfer Facility, which recovers recyclable and compostable material from residential and commercial waste; the Materials Recovery Facility, where recyclables are sorted and baled; the Edmonton Composting Facility; the Global Electric and Electronic Processing Inc. (GEEP) Facility; the Residential Waste Drop Off Station; the Construction and Demolition Recycling Operation; and the Leachate Treatment Plant, landfill gas recovery system and biosolids lagoons. The Clover Bar landfill is also located on this site but it reached capacity in 2009 and is no longer used for waste disposal.

There are two facilities currently under construction at the EWMC that will soon be operational. The Waste to Biofuels facility, which is built, owned and operated by Enerkem Alberta Biofuels, will convert municipal solid waste into biofuels. The Greys Paper and Glass Recycling Facility will process waste paper collected from City offices and other sources into recycled paper products. Waste glass will be incorporated into bricks with a special coating that will reduce nitrogen dioxide at ground levels.

Edmonton's waste management system provides many environmental benefits. At the present time, approximately 60% of residential waste is diverted from the landfill through recycling and composting, with a goal of 90% waste diversion by 2015.

Gas recovered from the Clover Bar landfill is converted to electricity and used to power 4,600 homes per year. The Waste to Biofuels facility will convert 100,000 tonnes of municipal solid waste into 36 million litres of biofuels annually, helping to reduce Alberta's CO2 footprint by six million tonnes over the next 25 years. The Waste Management Utility has been able to sell carbon offset credits earned through the composting and landfill gas recovery activities of the Centre, generating approximately $3 million in 2011.

Connie Boyce, Director of Community Relations in Waste Management Services at the City of Edmonton, emphasized that the City's waste system evolved from a traditional municipal waste system to an innovative approach where waste is viewed as a resource, rather than a burden. This transition was prompted by a number of factors over the course of several years, commencing with the anticipated closure of the at-capacity Clover Bar landfill.

"The City searched for a new landfill site for ten years," said Boyce. "It was a very extensive process that involved a great deal of consultation with the public. We grappled with the NIMBY factor, as well as not being able to find a site with the proximity to the city that would make it economically viable. The City decided to look at a system that would be more environmentally sound and still affordable."

The shift in approach regarding waste management was outlined in a 30-year waste management strategy, which was approved by Edmonton's City Council in 1994. "We had people within the administration and on Council who were very innovative and who wanted to develop a strategy that was leading-edge," explained Boyce. "We also had a community that was very vocal and through the public consultation we discovered that the community wanted a more environmentally sustainable option."

The motivation of having to find a new landfill site caused the City of Edmonton to rethink the concept of municipal waste management. The City's waste system exemplifies how consultation, education and supportive members of the administration and community can influence municipal operations. Although the transition to a sustainable waste system did not occur overnight, the foresight and persistence of key officials, backed up by a responsive public, helped move policy along to accommodate a more environmentally sensitive approach that will inform all operations into the future.

EDMONTON & AREA LAND TRUST

The Edmonton and Area Land Trust (EALT) is a nonprofit conservation organization that was established in 2007. The EALT preserves natural areas by acquiring land through purchase or donation, through conservation easements and by public education and stewardship efforts.

Conservation easements are legal agreements between a landowner and a recognized conservation agency. The landowner, under the agreement, continues to own and manage the land to its intended conservation purpose. A conservation easement is a taxable benefit that may be associated with the land in perpetuity.

Land trusts benefit the environment by acquiring land that has significant ecological, agricultural, scenic or heritage value. Conserved areas provide wildlife habitat, protect against biodiversity loss, promote better air and water quality, and support established wildlife corridors and ecological linkages. In addition to conserving the natural environment, land held in trust provides recreational opportunities for all residents.

The EALT was formed through the shared objectives of a number of groups. The City of Edmonton was considering how to respond to intense development pressures and loss of natural areas and other groups were trying to establish a way to conserve valuable habitat in the region. Public consultations established that setting up a land trust would be, amongst other efforts, a valuable conservation measure for the City and the surrounding area. Residents wanted to see an independent organization which maintained conservation objectives in perpetuity, and which took a bioregional approach to conservation, rather than adhering to political boundaries.

The key organisations pushing for a land trust came together in 2006—the City of Edmonton, the Edmonton Community Foundation, the Urban Development Institute (Edmonton chapter), the Land Stewardship Centre of Canada, the Legacy Lands Conservation Society and the Edmonton Nature Club—to found the EALT. In 2007, the organization was incorporated, and in 2008 it began operations. In four years, it has secured five properties and is working on more acquisitions.

Dealing with land titles and securement is a process that involves a great deal of administrative and organizational commitment. During the first year of the EALT's operation, there was a significant amount of organisational capacity building required before it could become fully operational, said Pamela Wight, Executive Director of the EALT. This preparation included gaining charitable status, obtaining "eligible recipient" status for the federal Ecological Gifts Program, writing materials and designing the website, developing collateral materials and displays, networking and developing contacts, performing numerous outreach activities and responding to enquiries and requests, as well as following up on land leads.

Before land is actually secured, a land trust needs to commission an independent fair market value assessment to determine the value of the land for tax reasons, as well as engage legal and other professionals to work with sellers, donors, realtors, Land Titles, Environment Canada's Ecological Gifts Program and other involved parties.

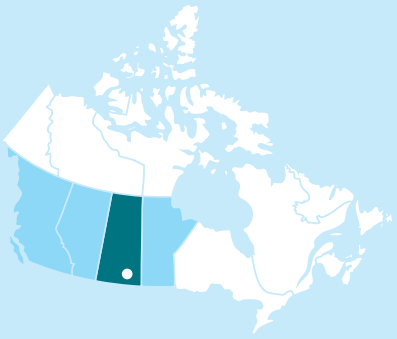
Upon acquiring land, the trust has a perpetual commitment and legal obligation to preserve its natural attributes and conservation values, which requires effort on a number of fronts. These include conducting a Baseline Data Report throughout the first year which forms a benchmark and a basis for the development of a Conservation Management Plan. This involves using a combination of professional biologists and experts as well as volunteers who have many other specialist skills. There may also be an initial need for survey professionals, fencing, signage, trails, removing noxious weeds, controlling unwanted motorised vehicle use of the property, or any number of other issues. After the first year or two, continual monitoring of the properties is required, as well as ongoing management and stewardship activities in order to uphold the conservation values of the property.

The fees associated with these activities are not insignificant, said Wight. She noted that conserving a natural area does not mean leaving it alone. Upfront costs, including many thousands in legal fees for land transfer and following the Ecological Gifts regulations, as well as commissioning a fair market value assessment, all add up substantially, whether the area is two hectares or two hundred hectares.

Once the transfer has been made, maintenance activities must be performed. Property taxes and insurance must also be paid annually. On top of this, there is little in the form of financial incentives for land trusts or conservancies to secure land. The financial benefit rests primarily with land donors, who are eligible for a tax receipt for 100% of the land value provided it is classified a certified ecological gift under the federal regulations, and they may offset their capital gains tax over a 5 year period.

The EALT has struggled to have sufficient operational funds to run the trust, as well as to develop an endowment to cover the future costs of each property. This also means that much of the organization's activity is performed by volunteers who assist with operations, as funding for paid positions is currently lacking. They have had some success in approaching supportive individuals and corporations for donations, but noted Wight, "it's difficult to round up support since the feeling of urgency and direct benefit from conservation activities isn't necessarily present for many people."

It is made evident by this case study that land conservation is no small endeavour. A commitment to environmental preservation among the many partners involved, and the persistence of staff and volunteers, has been a major source of support for the EALT's activities and its successes to date.



Regina

SASKATCHEWAN, CANADA

City of Regina (2011)

POPULATION	193,100
LAND AREA (square kilometres)	145.45
POPULATION DENSITY (per square kilometre)	1,327.6

Regina Census Metropolitan Area

POPULATION	218,690
LAND AREA (square kilometres)	3,408.28
POPULATION DENSITY (per square kilometre)	61.8

POPULATION PROJECTION
(for the year 2032)

2011: 193,100

2032: 251,974

Average Winter Temperature
-11°C

Average Sunshine a Year
321 days

Average Precipitation
364 mm

Average Summer Weather
23°C

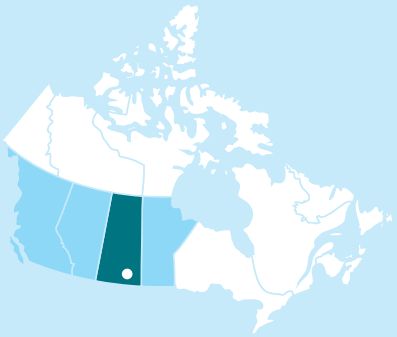
City of Regina

$84,890

MEDIAN TOTAL INCOME IN CMA (2010)

$280,972

AVERAGE HOUSE PRICE 2011



Regina

SASKATCHEWAN, CANADA

REGINA IS THE SECOND LARGEST CITY IN SASKATCHEWAN and the capital of the province. It is located on a flat plain in the southern part of the province and surrounded by rolling parklands. Being located away from major water sources and on the southern prairies, Regina is prone to weather extremes. Winters are cold and dry while summers are warm and sunny. The city has experienced significant population growth over the past few years as a result of the natural resource sector boom in the province, which has put development pressure on the city.

Regina is currently in the process of creating a new Official Community Plan (OCP) through a process called Design Regina. This long-range plan will map out how the city will grow physically, provide services, manage impacts to the environment and enhance social and cultural development over the next 25 years. This process was started in July 2009 and is currently in a consultation phase. Once the plan has been reviewed by City Council, it must be approved by the province of Saskatchewan. Once approved, it will be adopted as Regina's official community plan (tentatively scheduled for 2013). The existing Regina Development plan has been updated but not substantially rewritten since 1984.

Two major features of the community plan include a new Transportation Master Plan, a comprehensive and multi-modal policy and planning document being developed over 2012 and 2013, and a Comprehensive Housing Strategy, which will examine current and future trends in the housing market in Regina.

Every community in Saskatchewan is required to have an official community plan (OCP), according to the provincial *Planning and Development Act, 2007*. The purpose of an OCP is to provide a comprehensive policy framework to guide the physical, environmental, economic, social and cultural development of the municipality. Municipalities are required in their OCP to identify policies that address things like source water protection, current and future economic development and the management of environmentally sensitive lands.[5]

In addition to developing a new planning framework, Regina is also a member of the Partners for Climate Protection program, which is a network of municipal governments that have committed to reducing greenhouse gas emissions. This program sets milestones for action that include creating a greenhouse gas emissions inventory, reduction target and developing a local action plan. The City of Regina aims to reduce its emissions by 15% below 1990 levels for municipal operations and 6% for the community by 2012.

[5] http://www.municipal.gov.sk.ca/Programs-Services/Community-Planning/Official-Community-Plan

15%

The city of Regina aims to reduce its emissions by 15% below 1990 levels for municipal operations and 6% for the community by 2012.

REGINA CAR SHARE

The Car Share Cooperative in Regina is an illustration of what it takes to make environmental initiatives work at a grassroots level. The idea of creating a car share in Regina first came up over a decade ago but it was not until a few volunteers with a gift for grant writing came together that it really took off. The original process was something of an exercise in frustration according to John Klein, President of the Regina Car Share, because the cooperative was not able to hire a lawyer and so they had to keep submitting their paperwork to the municipal government until they got it right. Klein observed, "It was a frustrating time because the government was saying they were open for business yet a group of well-educated people could not figure out how to get it right." The project was eventually approved and has been operating since November 2009.

The Cooperative currently has 30 members and one car. They are entirely volunteer-based and have a volunteer board of directors. The way it works is that individual members pay $500 and business members pay $1,000 to be part of the cooperative. When a member wants to use the car they must reserve it online and then they pay for each hour of use plus a per kilometre rate. The car is parked at a central location in downtown Regina and members will be reimbursed if they need to put gas into the car. All of the car maintenance and upgrades are paid for by the cooperative.

While the Regina Car Share Cooperative is comparatively small to those in other cities (it is modeled on Vancouver's Modo Car Share), it does offer an environmentally sustainable transportation solution to people who are living and working in the city. Klein observes, "Car sharing is a realistic option that minimizes your 'footprint' while continuing to offer you the convenience and mobility that sometimes only a car can offer." This is particularly true in a relatively small city like Regina that does not have an extensive public transportation network and where over 20,000 people work downtown.

There are clear environmental benefits of using a car share program, including the reduced need for each individual or family to own a car, but there have been a number of challenges for the organization. One of the clearest challenges facing the cooperative right now is that because they only have one car, it is not possible to grow their membership or for members to rely on the car being available. The car is currently being used for less than five hours a day, which is less than their break-even requirements. Buying a second car is also difficult financially for the cooperative. Even buying the first car was a challenge as some of the grants received were restrictive in how the money was spent and raising private donations was a challenge. The current car of the Car Share Cooperative was actually purchased by an individual member and is being rented to the cooperative for the next three years.

An additional challenge has been a lack of awareness among the broader public. Community support for the cooperative is growing but it has been slower than organizers would have liked. They note that current growth in the cooperative is coming from people who have recently moved to Regina from other places in Canada where they are accustomed to car share programs. There is less familiarity with the concept from those who are from Saskatchewan although the group has been raising awareness and promoting the environmental benefits.

Finally, there have been some regulation challenges. Klein highlighted the fact that the City of Regina indicated its support for the program when it was approved, but when they tried to get a parking pass for the car in the downtown, the City refused to issue them one because they are considered a business and businesses, typically, are not allowed downtown permits. This challenge was eventually overcome but the route from A to B was not as straightforward as it could have been. Klein stated, "Things have been rocky at times but we have worked through the hiccups."

The real lesson that can be taken from the Regina Car Share Cooperative is that without government and policy support for environmental initiatives in cities, it takes a great deal of commitment and dedication on the part of volunteers to make these kinds of programs happen. It is not enough for cities to just indicate that they are open to environmental suggestions, there has to be a willingness to work with groups that are trying to drive change and to have a flexible attitude around how rules and regulations are enforced. Without a holistic attitude and a willingness to do things in a new way, on the part of government, groups trying to do things like establish a car share program are going to encounter policy barriers at every turn, which could be a disincentive to making environmental improvements in our cities.

FRIENDS OF WASCANA MARSH

The Wascana Marsh is a 223-hectare marshland located within the larger Wascana Centre, one of the premier attractions of Regina. The Centre contains within it the provincial legislative building, both campuses of the University of Regina, the Royal Saskatchewan Museum, the Regina Conservatory, the Saskatchewan Science Centre, the Norman MacKenzie Art Gallery and the Saskatchewan Centre of the Arts.

The first dam to store water in Wascana Creek was built in the 1880s. Since that time a number of construction projects have been undertaken to widen and deepen the lake to enhance water storage. This happened most recently in 2004. The marsh is described as the water and shoreline area of the upper pond of Wascana Lake and has been a valuable prairie wetland for the past 100 years. It was established as a wildlife refuge in 1913, designated a Federal Migratory Bird Sanctuary in 1956 and still remains a stopover point for over 115 species of birds.

While the Marsh has been an important environmental feature of Regina's urban space since the city was created, Lorne Scott, one of the founding members of the Friends of Wascana Marsh, noted that like many good things in communities the Marsh was taken for granted by the residents of Regina because no one had really highlighted its value.

This all changed in 2003 when Wayne Hellquist, CEO of the Saskatchewan Science Centre, brought people together to discuss how best to profile the marsh. The Friends of Wascana Marsh was created in 2004 with a vision to preserve and enhance the biodiversity of the marsh ecosystem through conservation initiatives, educational outreach and partnerships with the community.

The Friends of Wascana Marsh organize an annual festival with a dinner, speaker and silent auction that raises the funds for their educational and conservation work. The speaker is usually someone who can speak to the value of conservation, such as George Archibald, founder of the International Crane Foundation, who spoke last year. The festival also includes outdoor activities for local Regina students and a public day that includes bird watching, organized hikes and interpretive events. The festival is a go-to event in Regina with the dinner sold out, up to a thousand people participating in the public day and participation from local Councillors.

The Friends also organize a shoreline clean up, facilitate guided hikes in the summer, support a display pond area for captive and crippled birds, organize workshops and work closely with the Wascana Centre to manage and protect the area.

While the Friends do a great deal to protect the biodiversity of the Marsh, the really significant contribution they make is they educate and raise awareness about the natural value of wetlands to the community. This is done with a year-round volunteer base of around 25-40 members and an influx of volunteers for the festival.

There is the potential for more work to be done in the Marsh, particularly with respect to environmental research that could be done in partnership with the Science Centre and the University of Regina, but this would require additional volunteers and funding for the Friends. Additionally, the current mandate of the Friends does not extend beyond the boundaries of Wascana Marsh. Scott indicated that they do work with Ducks Unlimited, who has a similar mandate around the protection of wetlands, including a project in the upper reaches of Wascana Creek where it enters the city.

The strength of the Friends of Wascana Marsh as an environmental organization is that it has the support of the community and it has worked cooperatively with other partners in order to get things done. They have made a conscious decision to work with others—even those who sometimes compromise the ecological integrity of the Marsh—rather than be confrontational in their approach. Scott credits this approach to their success by noting, "We would like to partner with anyone who feels connected to the Marsh."

PERMACULTURE REGINA

Permaculture Regina is an excellent example of a grassroots initiative driven by individuals and the wider community. The group was formed in December 2011 when a number of individuals who had taken permaculture courses or had an interest in permaculture came together to create awareness and to promote permaculture in Regina. The tag line of the group is "changing the world one yard at a time."

Permaculture is an ecological design system that endeavors to incorporate sustainability practices into building homes, growing food, restoring landscape and building communities using the ethics of "care of earth, care of people and return of surplus." Individuals can take courses in permaculture design to learn about how to catch and use rainwater, what types of plants are most sustainable, growing food and much more.

The primary activities of the organization, which is just getting started, include organizing workshops on the fundamentals of permaculture design, working in community gardens and working on individual projects. The primary emphasis at this point is on raising awareness, creating a community of like-minded individuals and educating people on the benefits of permaculture.

Joanne Havelock, one of the founders of Permaculture Regina, noted that permaculture is really about practical applications of sustainable ideas and technology. Some of these ideas, such as rainwater harvesting, are very old and some of the ideas are new and incorporate modern technology as a way to live more sustainably. She emphasizes that:

> Permaculture is more than just a technique; it's a lifestyle choice that is about incorporating sustainable practices into every aspect of your life including choosing where you live, being connected to your food production, using your resources wisely, recycling and reusing materials and thinking about how your spending choices affect the environment.

Permaculture Regina is a nonprofit organization and relies on the support of volunteers to create awareness and to educate people about the benefits of its work. In this early stage of the group's history, most of the challenges are around the need to create awareness and developing the organization and projects. Havelock indicates that they currently have around 100 people in their network and that the reception from the people in Regina has been positive. As permaculture develops in an area, there are many opportunities for individuals to create economic activities that provide a way of living and promote a sustainable economy.

Permaculture Regina operates independently from the City of Regina but there are many areas of overlap and there is interest from some City employees to apply permaculture principles to the community gardens and landscapes of Regina. The City of Regina promotes water conservation, composting and has an active community gardens program. The support for an active farmer's market in Regina is another way in which the City, and its residents, are supporting local food production.

A potential policy barrier is that some City bylaws inhibit certain permaculture activities. One example of this is the use of rainwater and greywater for irrigation purposes. Permaculture encourages the use of properly handled greywater for irrigation but this is not currently permitted in the City's bylaws.

Another example concerns the role of animals. Permaculture considers animals to be part of the landscape and encourages their role in a sustainable lifestyle but some cities, including Regina, have a prohibition on keeping livestock—including chickens, turkeys, ducks, geese and pheasants—in the city. There are many reasons why cities may not allow livestock within city limits and changing those bylaws to incorporate permaculture principles would require strong community support, clear communication of the benefits and a cooperative relationship with City Council and administration.

What makes Permaculture Regina such an interesting example of an urban environmental initiative is that it is being done at the level of the individual and the community. Anyone who is interested in living a more environmentally sustainable lifestyle can incorporate the principles of permaculture into their daily routine and their community. While there are clear points of intersection with areas of public policy, permaculture is fundamentally about practical, hands-on environmental solutions that anyone can implement.

Saskatoon

SASKATCHEWAN, CANADA

City of Saskatoon (2011)

POPULATION	222,189
LAND AREA (square kilometres)	209.56
POPULATION DENSITY (per square kilometre)	1060.3

Saskatoon Census Metropolitan Area

POPULATION	260,600
LAND AREA (square kilometres)	5,214.52
POPULATION DENSITY (per square kilometre)	50

POPULATION PROJECTION
(for the year 2032)

2011: 222,189

2032: 303,444

Average Winter Temperature
-12°C

Average Sunshine a Year
320 days

Average Precipitation
347.2 mm

Average Summer Weather
17.8°C

City of Saskatoon

$80,570

MEDIAN TOTAL INCOME IN CMA (2010)

$306,629

AVERAGE HOUSE PRICE 2011

Saskatoon

SASKATCHEWAN, CANADA

SASKATOON straddles the South Saskatchewan River and is the largest city in Saskatchewan. Located in the mixed grasslands eco-region in the centre of the province, the city is surrounded by prairies and wetlands and experiences warm summers and cold, dry winters. Dominated economically by resources and agriculture, Saskatoon has been leading the country in economic growth for the last few years, which has led to considerable development pressure in the city. Saskatoon also serves as a major trade and service area for people in the central and northern parts of the province, an area with over 500,000 people.

Saskatoon's Official Community Plan was passed by Council in June 2009 and approved by the Minister of Municipal Affairs in July 2009. This plan "provides the policy framework to define, direct, and evaluate development in the City of Saskatoon, ensuring that development takes place in an orderly and rational manner, balancing the environmental, social, and economic needs of the community."[6] This plan is intended to guide growth and development of the city to a population of approximately 320,000.

Saskatoon's strategic plan was adopted in February 2012 and is intended as a road map for the city until the year 2022. It is also working on an Integrated Growth Plan that is intended to guide the city to a population of 500,000. These plans include strategic goals around quality of life, environmental leadership, sustainable growth and transportation solutions, to name a few. The plans outline near-term priorities and long-term strategies for each of these goals.

Some of Saskatoon's environmental priorities for the next 5-10 years include the promotion and facilitation of city-wide composting and recycling, the creation of complete neighbourhoods, creation of incentives to promote density and establishing mass rapid transit corridors.

The City also initiated the City Centre Plan Project in 2009, the purpose of which is to develop a new comprehensive plan for the downtown and adjacent areas. This project is currently in its third phase and is intended, when complete, to create a vision for the city centre that ensures that the downtown will remain the heart of commercial, office, retail and high density residential uses in Saskatoon.

Overall, Saskatoon is experiencing rapid growth in industrial and residential areas of the city. This is putting development pressure on the city and there is a need for significant upgrading of existing infrastructure, creation of new communities, revitalization of the downtown core and a shift in policies to promote more sustainable and environmentally friendly development.

[6] City of Saskatoon Official Community Plan. Accessed July 4, 2012. Page 1.

GREEN STREETS PROJECT

In early 2007, the City of Saskatoon began stockpiling HMAC and PCC rubble to save landfill space. Like many western Canadian cities, Saskatoon has struggled to keep on top of road infrastructure maintenance while also accommodating development pressure and the construction of new roads. This infrastructure backlog resulted in quite a bit of rubble as old streets were torn up and new material was required, and this was taking up valuable space in a landfill that was starting to fill up.

It was soon recognized by Duane Guenther, who was managing the reclamation yards for the City, that there was an opportunity to reuse this material. Reusing the material had the potential to save the City money—the costs of road construction and rehabilitation had increased due to the reduced availability of quality materials at the local level requiring them to rely on materials quarried further away from—but also solved the problem of what to do with all the rubble filling up reclamation yards.

One of the immediate challenges with this plan was that the City had a regulation specifying that building materials could not contain certain materials, of which concrete was one. This required a change in the specifications and Guenther observed, "We had to find a way to modify our specs to make room for it so thus the Green Streets projects was born."

The City put out an RFP for processing the aggregate but they quickly learned that conventional equipment resulted in low production rates and a poor quality product. In 2008, PSI Technologies implemented an impact crusher, which made crushing economically viable and generated high quality materials. By using real-time mechanistic testing, the materials processing was refined to produce the best combination of structural aggregates. This material was tested, analyzed and then applied in a typical road reconstruction application in the summer of 2009. During that time, 18,000m^2 of roads were rehabilitated using HMAC and PCC materials that had been crushed on roads that were exhibiting moisture problems and structural failure.

What they found is that using recycled material for road rehabilitation was not only possible, but actually improved the structural integrity of the streets. Guenther noted, "The crushed asphalt, since it has asphalt in it already which adds stickiness, creates a material that sticks together better, reduces the risk of moisture damage and has greater strength than rock by itself. Same thing with concrete, a little bit of residual cement in the concrete will hold together better." In their testing of the recycled aggregate they found that it was between 30% and 150% better as a building material than new aggregate.

The Green Streets project lasted from 2009-2011 and during that time they crushed 160,000 tonnes of concrete and asphalt, reducing that amount of material going to the landfill, and saved the City an estimated $1 million. It also resulted in a number of environmental benefits including a reduced need to source, mine and transport construction material from other places and a reduction in greenhouse gas emissions and infrastructure strain associated with transporting raw material from distant sources. Researchers on the project concluded that if this process were accepted as standard practice in Saskatoon, it has the potential to become aggregate neutral.

Since the Green Streets Project can be considered a success from an economic and environmental perspective, the question is thus raised: why it has it not been continued and established as a best practice? A number of barriers were identified including: high levels of turnover within the City of Saskatoon management, outdated engineering processes, the optics of sole sourcing, time required to change regulations and the lack of scientific expertise in City management. Guenther explained, for example, that the City is very reluctant to be perceived as favouring one company. This means that even if there is good scientific and financial data to support the fact that the company's work will be better for the environment and cheaper for the City, there will be pressure to use other, less sustainable, solutions for reasons of optics.

Another interesting challenge is the lack of technical expertise. Guenther notes that many road agencies are driven by traditional processes and lack training in new scientific materials. This means that they may not be able to judge a project at a technical level and therefore may not encourage the optimal solution. This results in a culture of risk aversion and, in the absence of political leadership, a tendency to stick with the status quo rather than exploring new ways of doing things that may improve environmental performance.

This urban environmental example is interesting for two reasons: 1) it highlights a potentially exciting way for cities to make use of old building materials that will save them money and be better for the environment; and 2) it illustrates some of the challenges that can face urban environmental initiatives when there is not a holistic, leadership-driven approach to new ideas. A holistic and technologically advanced approach is essential because good ideas can otherwise fall prey to existing rules and regulations that do not allow for change. Leadership is also essential because it is what gives government workers the courage to think outside the box of what has always been done. Guenther remarked, "We tried to put the scientific numbers behind Green Streets so it is very fact based. We have the facts of the material properties and the financial benefits and that tends to excite the politicians, which is the best way to get administration on board."

SASKATOON GREEN ENERGY PARK

The last time Saskatoon Light & Power was generating its own power North America was in the grip of the Great Depression. Since that time, it has been reliant on SaskPower, the provincial electricity utility, to provide the power that it distributes around the city. This all started to change when the City of Saskatoon adopted the Energy and Greenhouse Gas Management Plan that called for it to develop a diverse and environmentally sustainable energy system that used local renewable resources.

Saskatoon Light & Power came up with the idea of building a Green Energy Park that would use existing technologies to generate power through a variety of different projects. The first two projects that were proposed under this plan were a landfill gas collection system and a tall wind turbine, both located at the Saskatoon landfill. Construction has just begun on the landfill gas collection system and is expected to be up and running by March 2013. The wind turbine, however, has been set aside because, although it was approved in principle by City Council, the construction bid for the project was significantly higher than the proposed budget.

A connected project proposed for the Green Energy Park is a turbo-expander power generation facility, which is a small turbine that reduces high pressure natural gas to a lower pressure and captures the energy released during this process to produce electricity. This project is being developed in partnership with SaskEnergy and will also rely on the heat by-product of the landfill. This project is expected to be operational by the fall of 2013.

Potential future projects at the Green Energy Park could include fuel cells, solar power generation and a small hydropower station on the weir. These projects are currently on hold until they make more economic sense.

The combined capacity of the projects, both planned and under consideration, will be 15 megawatts, which is enough power for around 9,500 homes and will reduce around 150,000 tonnes of greenhouse gas emissions annually.

According to Kevin Hudson, Manager of Metering and Sustainable Electricity at Saskatoon Light & Power, the plan for the first two projects in the Green Energy Park is to sell the generated power to SaskPower. The Crown corporation offers a premium for power that is generated in an environmentally friendly manner. It is still up for debate whether Saskatoon Light & Power would connect the other projects directly to their grid. At the moment it makes more economic sense to sell to SaskPower and let them feed the power into their grid. The benefits of this plan are that it reduces the demand for power that is generated from conventional sources, like coal, and it will provide a revenue stream for the City of Saskatoon. In addition, the power is generated in the community where it is consumed, reducing the transmission losses that occur moving power over long distances.

The motivation for building the Green Energy Park is in some ways to show what is possible. The projects are not meant as demonstration facilities *per se* but the hope is that, if they are economically viable, they will be incorporated more broadly in the future. Support to do this work emerged from a large community engagement process in 2010 called Saskatoon Speaks. The idea was proposed by Saskatoon Light & Power and City Council and was largely embraced by the community.

The Green Energy Park has encountered challenges on the implementation side. The wind turbine provides one such example. The project was proposed and approved in principle by City Council. Hudson indicated that there was some community opposition to the project but the real deterrent was the cost of construction. Ultimately it was the requirement for up front capital costs that prevented the project from being carried out.

For the projects still in the development phase, Hudson indicates that they must be able to demonstrate the financial viability, a reduction in greenhouse gas emissions and strong social considerations for the project. In other words, they must adhere to the City's triple bottom line policy if they want to get any of these projects approved by Council. In this case Saskatoon's triple bottom line policy and its Energy and Greenhouse Gas Management Plan had a clear impact on the environmental decision-making.

While the power generating projects proposed in the Green Energy Park are not unique, what is interesting about this example is how coordinated and comprehensive the initiative is. Combining the different technologies together at the Green Energy Park allows for operational efficiencies to be achieved and requires only a single interconnection with the power grid. This also provides an opportunity to showcase the various technologies and supports public education opportunities for the community.

The Green Energy Park is in many ways a return to Saskatoon Light & Power's roots but now, building the first new power generating systems in over 100 years, they are re-imagining their role in the city in a more sustainable and environmentally sensitive way.

EVERGREEN NEIGHBOURHOOD

At 8.7 units per acre, Evergreen—Saskatoon's newest neighbourhood—is the densest neighbourhood in the city. It has been designed as a sustainable urban village with a commercial square in the center of the neighbourhood that is connected to the rest of the community with linear parks and an established trail system.

Evergreen was planned and developed by the City Land Branch, which is a City-owned developer that operates as a quasi-independent body from the City of Saskatoon. This means it operates like a private developer, including bidding and competing for projects, and it responsible for the capital costs of the project. The significant difference between it and a private developer, however, is that its profits go back into the City of Saskatoon to help fund other capital projects like bridges and affordable housing. This is a unique arrangement and one that has made it possible for the City Land Branch to propose new ideas and establish best development practices in the city.

The Evergreen neighbourhood incorporates a number of environmental features including a variety of housing options, streets aligned so the majority of residences receive the benefit of the sun's rays, LED street lighting, the re-use of natural materials on the site, and rain gardens to manage storm water.

The City Land Branch has made a concerted effort to provide a variety of housing options, including some directly connected to the commercial spaces, multi-family, multi-unit and single-family homes. This enabled them to get their density up to 8.7 units per acre, which is higher than neighbourhoods directly adjacent to Saskatoon's downtown core. The neighbourhood is not all housing, however. It also features a central neighbourhood park, connecting pathways and integrated natural features, such as two rows of old growth trees that have been preserved through a linear park and have inspired the name of the neighbourhood.

In addition to these planning features in the neighbourhood, the developer also placed an emphasis on encouraging and enabling a sustainable lifestyle for those who live there. This includes encouraging walking and cycling to the nearby commercial center; providing each household with a rain barrel, a composter and two Saskatoon berry bushes in an effort to promote sustainable landscaping; and promoting the use of public transit. The developer has also put in place an incentive for builders to construct Energy Star or LEED certified houses by offering a rebate on the administrative costs up to $500.

The Evergreen neighbourhood is a good example of how a number of small things can add up to some pretty substantial changes in how people live and their environmental impact. Derek Thompson, Land Development Project Manager for the City Land Branch reports that the LED street lighting alone will reduce greenhouse gas emissions by 156 tonnes. If every home uses the rain barrels, composters and Saskatoon berries, the reductions will be 147 tonnes. All features combined have the potential to reduce greenhouse gas emissions by 8,400 tonnes per year.

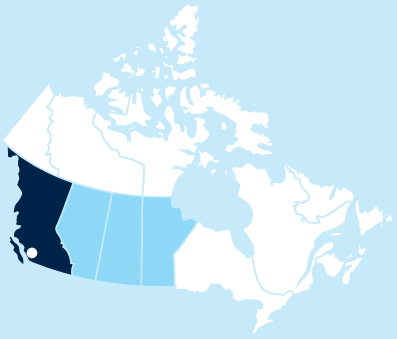
While the reductions in greenhouse gas emissions in the neighbourhood are impressive, what is perhaps more important is the reception of these types of changes by the broader community. Thompson noted that "Evergreen is *the* neighbourhood to be in in Saskatoon right now." By demonstrating the convergence of good environmental planning with lifestyle considerations, the City Land Branch is helping to create the new standard for neighbourhood planning in Saskatoon. As residents and governments see the benefits of developing neighbourhoods focused on environmental improvement, these types of developments will become the standard rather than the exception in Canadian cities.

When asked about barriers that arose during the planning of the Evergreen Neighbourhood, Thompson observed that this project was relatively smooth. He noted that this was the second sustainable neighbourhood they have developed. The first, Willowgrove, faced a number of challenges around zoning and regulations and took seven years to get through Council. Evergreen, in comparison, took around 18 months because Council and administration were already familiar with the ideas and the hard road around regulations had already been travelled.

Additionally, while numerous environmental benefits could be realized given the planning and development of the Evergreen neighbourhood, it is not clear that they will all be achieved. Thompson noted, for example, that the uptake by builders on the efficiency rebate for Energy Star and LEED homes has not been high. Similarly, it is one thing to provide households with rain barrels, composters and native bushes and quite another to convince everyone to use them. This speaks to the need for increased education and awareness around sustainable lifestyles and is perhaps an area for cooperation between the City and some of the local environmental organizations.

What makes the Evergreen neighbourhood development particularly interesting is that it represents a shift in neighbourhood planning in Saskatoon. Thompson noted, "Ten to fifteen years ago it was difficult to talk about anything environmental in this business." Developers proposing these types of changes in the past would have been considered outsiders but now there is a real appetite for this type of thinking both from residents and from City Council.

Thompson attributes this change in thinking to a growing sense that responsible management of resources matters in our cities and to a push for Saskatoon to be more sustainable by City administration and councillors. This happened about seven years ago and things have been happening quickly since that time. Once Willowgrove neighbourhood, which was sold on its lifestyle benefits, was developed there was a growing excitement and appetite for this type of development and the combination of consumer demand and Council support could go a long way to changing how Saskatoon plans its neighbourhoods in the years ahead.



Vancouver

BRITISH COLUMBIA, CANADA

City of Vancouver (2011)

POPULATION	603,502
LAND AREA (square kilometres)	114.97
POPULATION DENSITY (per square kilometre)	5,249.1

Vancouver Census Metropolitan Area

POPULATION	2,313,328
LAND AREA (square kilometres)	2,882.55
POPULATION DENSITY (per square kilometre)	802.5

Average Winter Temperature	5.7°C
Average Sunshine a Year	289 days
Average Precipitation	1,588.6 mm
Average Summer Weather	18.2°C

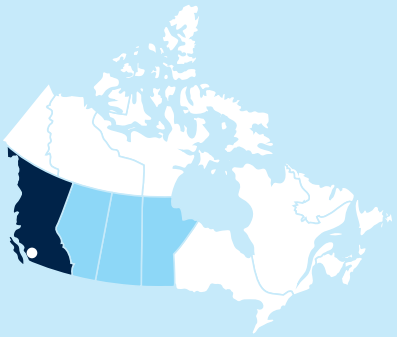
City of Vancouver

$67,090

MEDIAN TOTAL INCOME IN CMA (2010)

$778,545

AVERAGE HOUSE PRICE 2011



Vancouver

BRITISH COLUMBIA, CANADA

VANCOUVER IS LOCATED in the southwest corner of Canada. It is surrounded by water on three sides and overlooked by the Coast Mountains that rise out of the harbour. Vancouver, which is Canada's eighth largest city, has the mildest climate in Canada.

Vancouver is well known for its attractive natural landscape, which features both mountains and the ocean adjacent to the urban area. The City of Vancouver is one of Canada's densest urban districts, with much of the city's development characterized as mixed-use and high rise residential. Affordable housing shortages are an issue, particularly in the dense inner city.

The City of Vancouver differs from many other municipalities in Canada in that it is incorporated under the Vancouver Charter. This charter gives the City greater autonomy than other communities possess under British Columbia's Municipalities Act. In the region, the City of Vancouver and Metro Vancouver are two distinct bodies that set policy for the area.

The City of Vancouver has adopted the mandate of incorporating sustainability into all City operations and has established a number of plans and initiatives to this effect. In 2008, Council adopted the EcoDensity Charter in order to promote increased environmental sustainability, affordability and liveability through higher density. The Greenest City initiative was launched in 2009, with the aim of being a leader on climate change and creating a more resilient, healthy and prosperous city by 2020. The priority actions outlined in the Greenest City Action Plan are supported by the Greenest City Fund, which is a partnership between the City of Vancouver and Vancouver Foundation. The Vancouver Green Capital strategy also incorporates sustainability principles into economic development planning.

Metro Vancouver is comprised of 24 local authorities in the Greater Vancouver Area which operate together as a regional district to set policy, advance political leadership on regional issues and deliver regional services. The Metro Vancouver Sustainability Framework was adopted in 2008 to guide the region's future vision through its established role as policymaker, political forum and service provider.

The City, the Province of British Columbia and the Union of British Columbia Municipalities have each signed the Climate Action Charter (CAC). The CAC pledges that corporate operations be carbon neutral by 2012; greenhouse gas emissions will be measured and reported on; and compact, more energy-efficient communities will be created.

CAC

The City of Vancouver, the Province of British Columbia and the Union of British Columbia Municipalities have each signed the Climate Action Charter (CAC)

NEIGHBOURHOOD ENERGY UTILITY

Vancouver's Neighbourhood Energy Utility (NEU) is a community energy system that provides space heating and domestic hot water to new buildings in Southeast False Creek, including the Olympic Village.

NEU's three key components are the False Creek Energy Centre that supplies thermal energy in the form of heated water; an insulated hot-water distribution pipe system that distributes thermal energy to buildings throughout the Southeast False Creek community; and heat exchangers and meters that transfer thermal energy from the distribution pipe system to customer buildings for space heating and domestic hot-water supply. The False Creek Energy Centre is the first utility in North America to capture and use waste heat from untreated urban wastewater.

To generate energy, the NEU utilizes sewage waste heat recovery technology, with natural gas boilers used for backup during periods of cold weather. The underground pipe distribution delivers heat to individual buildings from the community energy centre and buildings are connected to the grid by energy transfer stations in each building.

There were two primary drivers that brought the NEU into existence, according to Chris Baber, NEU Project Manager at the City of Vancouver. The first was the requirement to lower the City's carbon emissions for the Southeast False Creek "SEFC" Official Development Plan Area, and the second was the need to make the low carbon technology affordable. The City hired two consultants to do a feasibility study for a district scale energy solution. The report was presented to Vancouver City Council outlining two viable low carbon energy source technology options: a biomass facility and a sewer heat recovery system. Upon extensive consultation with the public, a plan was approved for the development of the sewage heat recovery option, which fulfilled the two requirements of development and was preferred by the majority of residents.

The City of Vancouver took a strong leadership role in bringing this initiative forward. In addition to hosting the various public consultations and providing education on the proposed options, the City decided that it was necessary to introduce a Energy Utility System Bylaw to support the initiative. This bylaw established the terms of service for the utility and secured the connection of new buildings in the SEFC area to the system.

The system also allows customer buildings with solar thermal systems to supply energy to the NEU, at times when the customer building demand is less than what is supplied by the solar system. Instead of letting the excess energy that is produced by the customer building go to waste, a bylaw was created to facilitate the purchasing of the excess energy from the individual customer. The two-way energy-transfer allows any micro-producer of thermal energy connected to the system to sell their excess energy to the utility.

District energy systems, in general, reduce the need for a heating and hot water boiler equipment in each building and can more efficiently deliver heat across a building than a traditional system. By connecting multiple buildings, the NEU also benefits from economies of scale which enable the use of renewable energy technologies that would not be available to an individual building. The NEU reduces greenhouse gas emissions by over 50% compared to conventional energy sources. The NEU will reduce greenhouse gas emissions by 7,600 tonnes each year. In addition, the NEU eliminates heat-production equipment from the Southeast False Creek buildings, which means that there is more space available for green roofs.

While some environmental initiatives begin as grassroots campaigns, the example of the NEU indicates that, when executed correctly, a top-down approach can work well in bringing a new initiative to fruition. Indeed, if the City had not assumed a leadership role, the support for a district energy system would not have been in place. During the consultation process, it was apparent that further education would be required for the public to understand unfamiliar technology. Concerns about odour, contamination and location of the facility were allayed through consultation and the technology was championed by several key figures at the City. The success of the NEU has furthered interest in innovative technology and its operations serve an education function for the public, developers and other municipalities considering the implementation of a similar system.

UBC BIOENERGY RESEARCH & DEMONSTRATION PROJECT

The University of British Columbia Bioenergy Research and Demonstration Project was launched in 2010 as a means of creating a living laboratory designed to explore bioenergy technology. Located at UBC's Vancouver campus, the project encompasses a complete biomass gasification system, research laboratories and a building constructed using cross-laminated timber, which is a low carbon replacement for steel or concrete.

The project was driven by the British Columbia Bioenergy strategy, which was a subset of the BC Energy Plan. The Energy Plan was a vision for clean energy leadership, outlined by the provincial government, with a focus on environmentally responsible energy use. The BC government provided the financial support and the policy conditions necessary to get the project up and running. Nexterra, a BC-based biomass gasification technology developer and UBC were on board to provide the technological and research capacity needed for the operation of the project.

> "It was an alignment of the planets, so to speak," said Janice Larson, who was Director of Renewable Energy Development at the British Columbia Ministry of Energy. "It was a win-win for all the partners involved. It demonstrates the province's commitment to renewable energy development, furthers the development of a British Columbia technology company, and it helps the university become an even stronger leader in the renewable energy field."

General Electric is providing the engines for energy generation. The project is the first North American demonstration of a new biomass-fueled heat-and-power application that combines Nexterra's gasification system with GE's Jenbacher engines.

The project utilizes biomass, including wood chips and trees killed by pine beetles, to generate heat and power for the university, which will reach a level to power 1,500 homes. When fully complete, the project will additionally eliminate about 4,500 tons of greenhouse gas emissions from the university campus every year. The cogeneration system will produce two megawatts of cost-effective clean electricity and will also generate enough steam to displace up to 12% of the natural gas that UBC uses for heating on campus.

This project has taken a unique step in addressing the implications of the pine beetle problem in the province. Infestations of mountain pine beetles have destroyed swathes of forest in British Columbia and Alberta. Using it as biomass is an innovative way of reclaiming value from the degraded wood.

Although the environmental benefits are wide-ranging, concerns over the impact of energy-generation on local air quality can never be completely eliminated, said Larson. Compared to other, more traditional means of energy generation, less is understood about the environmental impacts, which need to be communicated effectively to the community to gain buy-in for large-scale projects. Larson emphasized that since this facility is research-focused, every aspect of the project can be tested and studied, providing data to support the development of new technologies.

As with any large-scale, multi-stakeholder project, it has not unfolded overnight. "Treat it as a marathon, not a sprint," advised Larson. "These types of initiatives require a lot of time, preparation, thought and planning. But when they succeed, they create a local community benefit as well as becoming a draw for researchers, companies and policymakers in other cities."

The UBC Bioenergy Research and Demonstration project is indicative of the success that can be brought about when government puts the policies and funding in place to support an initiative. This initiative benefitted from bringing the appropriate partners on board from the private sector and academia to realize the strategic objectives set out by government.

CITY OF VANCOUVER'S GREEN BUILDING STRATEGY

According to data from the City of Vancouver, buildings account for approximately 55% of total greenhouse gas emissions in the city. The Green Building Strategy was established in 2005 to manage the environmental impact of new and existing buildings in the area. Since then it has been updated to include guidance for homes and large buildings.

New homes, since 2008, are subject to bylaw regulations that aim to reduce community GHG emissions levels by 2020, while ensuring all new construction in the city is GHG-neutral by 2030. Guidelines for existing homes set to undergo renovation or remodelling have been published and are periodically updated to reflect new best practices.[7]

Greenhouse gas emission reduction is a straightforward means of reducing the footprint of buildings. There is also, however, a solid economic imperative to improving the efficiency of buildings in the urban area. Buildings that are more energy-efficient will cost less to run in the longer-term.

The City is undertaking these actions as a part of the goal of being the greenest city in the world by 2020. No timeframe for this goal was established until 2009, when Mayor Gregor Robson declared that these commitments would be met by 2020. Mark Hartman, Green Building Program Manager at the City of Vancouver, noted that the process is incremental in nature so that there is no dramatic shift in the year 2020, but rather the City is working toward that goal long in advance.

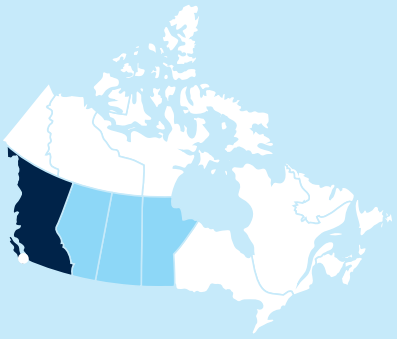
Vancouver is a somewhat unique case since it is a charter city and it possesses its own building code. As it relates to green buildings, the building code provides residents and companies with prescriptive measures on how to guide more environmentally sensitive development. Within the code, an incentive program exists. For example, according to Hartman, a person designing and building a large number of homes will pay extra in permit fees. There is an entitlement to a rebate if the EnerGuide score of the buildings is to a certain standard. Furthermore, the City has stated in the building code that all rezoning measures must meet six LEED gold energy points. As 75% of development in the city has to do with rezoning, the impact of these measures is substantial.

[7] A complete list of all actions outlined in the Green Building Strategy can be found at: http://vancouver.ca/sustainability/GreenBuildingStrategy.htm

City officials understood that developers and community members would have to be persuaded to get on board with new regulations passed by Council. Hartman emphasized that the Vancouver public is largely supportive of sustainability measures, but that the City works to communicate new strategy through outreach programs, like open houses and online feedback tools. There is also a great deal of ownership by the heads of City departments to fulfill the targets associated with being a more environmentally-sound city.

It is not to say that there has not been any resistance to the new requirements. Some buildings are more expensive to get up to standard than others and industry has been vocal in raising concerns over the economic bottom line. Council has been flexible in some instances and made some concessions to address these concerns. To better connect with these stakeholders, a Green Building Advisory Committee is composed of members of the development industry who liaise with Council and provide feedback on how best to meet the statutory targets from a development perspective.

As it stands, the City is meeting the various requirements set out in the Green Building Strategy and is on track to meet the targets set out in the Greenest City plan. The City drove this process along by establishing a consultative, cooperation process that brought the public and the development industry on board. This case study demonstrates that the process of establishing new regulations is not-fixed, and indeed requires the ongoing participation of all stakeholders when it is driven from the top-down. Additionally, setting targets and timelines is instrumental in "getting to where you need to go," as Hartman said.



Victoria

BRITISH COLUMBIA, CANADA

City of Victoria (2011)

POPULATION	80,017
LAND AREA (square kilometres)	19.47
POPULATION DENSITY (per square kilometre)	4,109.4

Victoria Census Metropolitan Area

POPULATION	344,615
LAND AREA (square kilometres)	696.15
POPULATION DENSITY (per square kilometre)	495

Average Winter Temperature
5.9°C

Average Sunshine a Year
317 days

Average Precipitation
665 mm

Average Summer Weather
15.5°C

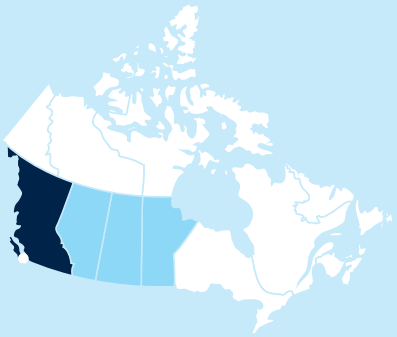
City of Victoria

$77,820

MEDIAN TOTAL INCOME IN CMA (2010)

$536,631

AVERAGE HOUSE PRICE 2011



Victoria

BRITISH COLUMBIA, CANADA

THE CITY OF VICTORIA IS LOCATED on the southern tip of Vancouver Island. Victoria, the provincial capital of British Columbia, is known for its temperate climate, natural landscape and large tourism industry.

The City of Victoria is a hub for residents of the Capital Region District, which is the fifteenth largest metropolitan region in Canada. The relatively mild climate and compact nature of the city allow residents many opportunities for walking and cycling. Public support for sustainability measures is robust in the region, influencing and informing policy at the municipal level.

The Victoria Sustainability Framework (VSF) was adopted by Council in 2010 following a consultation process with residents. Encompassed within the VSF, the Sustainability Action Plan identifies specific goals, resources and monitoring processes that will guide the City's sustainability activities from 2012-2016. The VSF is the overarching framework for the City's strategic plans and it directly influences both the Official Community Plan (OCP) and the Corporate Strategic Plan (CSP). The OCP is the result of more than two years of community consultation and will provide direction on decisions concerning housing, business, infrastructure and climate change. The CSP sets the broad direction for the City of Victoria and establishes priorities for action in its operations.

Other initiatives that tie into the sustainability agenda at the City are the Green Business and Green Homes programs. The Green Business program provides financial incentives up to and including $1,000 for businesses to learn how to reduce their emissions and save money on energy costs. The Green Homes Programs provides information on the benefits of setting up a secondary suite in your home, the benefits of starting a garden, and the connection food choices have to climate change.

The Planning and Development department at the City of Victoria is committed to a triple bottom line approach, meaning that economic prosperity, social development and environmental sustainability are considered to have equal weight in the decision-making process.

$1000

The Green Business program provides financial incentives for businesses to learn how to reduce their emissions and save money on energy costs.

DOCKSIDE GREEN

Overlooking Victoria's Inner Harbour, Dockside Green is a waterfront community that incorporates residential, office, retail and commercial space in a mixed-use development near the downtown core. The development is informed by holistic, closed-loop design principles with a focus on the ecological interdependence of systems.

The Dockside Green community has incorporated many features into its development to make it environmentally-sensitive. Its central location and proximity to the harbour pathway network encourages active transportation and reduces dependency on motor vehicles. A number of energy-saving features, such as Energy Star appliances and compact fluorescent lighting, have been included with the aim of using 45-55% less energy than the Canadian Model National Energy Code.[8] Passive design allows light into homes during cooler periods, while shades provide protection during warm days. Meters in each suite measure hot and cold water use, as well as heating bills and electricity usage. High performance water fixtures and appliances, like dual flush toilets and water efficient dishwashers are standard in every unit. Ecologically-sensitive materials like bamboo and salvaged wood have been used in the construction of buildings.

Several other environmental features are planned for Dockside Green. A biomass system using waste wood to produce bio-gas for heating and domestic hot water needs has been built on site. Storm water is being treated through a combination of green roof systems, naturalized creeks and waterways. Dockside Green treats 100% of its sewage on site and uses the treated water for flushing toilets and landscape irrigation.

The Dockside Green development came together after the City of Victoria put out a request for proposals for development of a ten-hectare parcel of land that had previously been zoned for a high tech industrial park. Ahead of construction, the City engaged the public through a consultation process to garner feedback about what type of development should occur on the land. After evaluating the proposals, the City decided that the development plan put forward by Vancity and Windmill Development Group would be most appropriate for the area. Many residents had noted that sustainability was an important consideration for new development and the successful proposal emphasized a triple bottom line (TBL) approach. In this case, the TBL approach addressed the needs of all members of City Council and the development proposal was consequently passed and the zoning modified to fit the parameters of the plan.

At the current time, approximately 30% of the total square footage of the development has been built. It was anticipated that the development would be complete by this time but financial considerations linked to the recent economic downturn have prevented a full build. Once fully complete, it will be the first community to achieve LEED Platinum certification for buildings developed in a master planned community.

"Timing is very critical," says Carola Bloedorn, former Director of Development for Dockside Green. "Dockside Green was planned as a ten-year build out but we couldn't have foreseen the extent of the economic troubles that have come."

While unforeseen circumstances can stunt progress, Bloedorn explained that there have been other challenges involved with the execution of the development plan. The different regulatory bodies, such as the City of Victoria, the Capital Regional District, and the BC Ministry of Environment, changed a number of their policies to support the Dockside Green development, which involved a great deal of influence and education to bring municipal and provincial officials on board. The changes were required to permit the construction of innovative infrastructure facilities, like the self-sustaining water treatment plant and the biomass facility.

[8] The Canadian Model National Energy Code sets out minimum requirements for features of buildings that determine their energy efficiency, taking into account regional construction costs, regional heating fuel types and costs and regional climatic differences.

Adding another degree of complexity, the Master Development agreement stipulated that many of the community's amenities would have to be provided up front, like the sewage treatment plant, as opposed to developed at the end, as can be the case in some instances. This meant that the funding and construction of these amenities would have to be accounted for at the beginning phases of the development, rather than the later stages.

In terms of dealing with these challenges, the City, the developers and other main stakeholders worked together to get the development up and running. The aforementioned policy changes provided a solid foundation for the project. At the same time, there were education processes taking place at the City to inform staff about how the project satisfied the triple bottom line requirements. Members of the Victoria West community also became educated about the project through the consultation processes and were extremely helpful in supporting the development.

"It's important to tap into the resources you have at the City and find someone who is basically the translator or the champion who is good at focusing the politicians," said Bloedorn.

"On the developer side, it's useful to be familiar with funding agencies that help facilitate sustainable development. A lot of developers don't have the experience with what assistance is out there."

Dockside Green will require another developer to come on board to finish construction of the project. Nonetheless, the project is a solid example of an initiative that effectively made the case to municipal and provincial staff and community members that a triple bottom line development should be built in the heart of Victoria.

CYCLING MODE SHARE IN VICTORIA

Victoria is often called the cycling capital of Canada for the number of trips taken by bicycle. The city's mode share for cycling trips to work is 5.6%, while most mid-sized and large cities in Canada have a bicycle mode share under 2% (0.8% in Toronto, 1.3% in Montreal, 1.9% in Vancouver and Ottawa-Gatineau).[9]

There are many environmental benefits associated with increasing the proportion of urban cyclists. Overall, the greater number of people who cycle instead of driving a vehicle, the fewer greenhouse gas emissions are released. Increasing the mode share of cyclists in urban areas leads to a significant decrease in noise pollution and traffic congestion. Cycling infrastructure uses comparatively much less space than is needed for roads and automobile parking, making more efficient use of available land and resources.

While the temperate Pacific coast climate does its part in encouraging cycling year-round, there are a number of other factors that have encouraged the uptake of urban cycling in Victoria. There is a range of advocacy groups that work to promote cycling and active transportation in the city, notably: Capital Bike and Walk Society, Greater Victoria Cycling Coalition and British Columbia Cycling Coalition. Specific cycling campaigns, like Bike to Work Week, are endorsed by cycling organizations, local business and municipal government. Likewise, education campaigns surrounding street sharing and cyclist skills training are widely available.

[9] Percentage of workers cycling to get to work in Census Metropolitan Areas (CMAs) (source: Statistics Canada, censuses of population, 1996 to 2006) – http://www.tc.gc.ca/eng/programs/environment-utsp-casestudy-cs77ebikeplanning-1177.htm

Cycling infrastructure—pathways, bike storage and changing facilities, for example—is also handily accessible for commuter cyclists. On road bike lanes and the Galloping Goose trail, which starts across the harbour from downtown, provide dedicated cycling laneways for commuters. Approximately 40% of jobs are located in the downtown area and thanks to the cycling paths, a large proportion of people are able to cycle to work if they so choose.

Although many cities make similar efforts to increase the number of commuter cyclists, it seems that Victoria's success stems from integrating the measures taken to promote cycling to make the general effort larger than the sum of its parts. In other words, the synergy between the various forces aimed at promoting cycling helps do more than each force is able to do independently.

"There's no central management in the cycling or walking community in Victoria," said John Luton, Executive Director of Capital Bike and Walk Society, and a former City Councillor. "But there are a number of organizations that are loosely connected or cross-pollinating to assist each other and sometimes people flow back and forth between the organizations."

The cooperation among the various organizations means that their presence is more pronounced in Victoria, particularly as it relates to lobbying Council. "When you're going up to lobby, it's so much better to say my 600 friends want this fixed, rather than my 6 friends," noted Luton.

Many of these organizations are volunteer-run and encounter challenges in obtaining longer-term, dependable funding. The Capital Bike and Walk Society, for example, does not possess charity status and depends on consulting work to raise funds. Furthermore, the ability of members to participate in lobbying activities may be limited by the amount of time volunteers are able to dedicate.

Targeted advocacy efforts from responsive community members, combined with a relatively accessible downtown area and dedicated cycling pathways for commuters, has helped support cycling in Victoria. An increasing mode share helps to normalize cycling as a mode of transportation, as non-cyclists may be influenced to consider cycling by seeing it done safely and easily by others.

CITY OF VICTORIA'S CLIMATE ACTION PROGRAM

As a result of signing the British Columbia Climate Action Charter in 2007, the City of Victoria approved a Climate Action Program consisting of a Community Climate Action Plan, and Corporate Carbon Neutral Plan, which is moving the City toward its goal of having carbon neutral municipal operations.

The Community Climate Action Plan will provide a comprehensive risk-based approach for achieving the community greenhouse gas emissions reduction target of 33% by 2020 from 2007 levels, while also helping Victoria adapt to the effects of climate change.

In the community planning process, researchers from UBC, with sponsorship from BC Hydro, explored a variety of different GHG and energy use reduction strategies, and investigated how much these strategies would cost per tonne of CO2 reduced. The data were then fed into the innovative Climate Action Navigator, an interactive online tool that was developed to engage multiple community stakeholders in the decision-making process for the Community Climate Action plan.

"With the Climate Action Navigator, the City of Victoria has the most effective, evidence-based engagement tool in the province, and perhaps the country. It can be used by diverse community stakeholders to select locally appropriate strategies and actions to reduce energy consumption and greenhouse gases in a community," said Roy Brooke, Director of the Department of Sustainability at the City of Victoria. The City of Victoria is now incorporating the results from these stakeholder forums into the Community Climate Action Plan.

With respect to the Carbon Neutral plan, Victoria joined other municipalities across the province in voluntarily committing to a goal of being carbon neutral in all municipal operations by 2012. The City has committed to measuring and reporting on its greenhouse gas emissions profile, and will work to create more compact and energy-efficient communities. To this end, the City has established a Cut the Carbon initiative and is set to release its Carbon Neutral Plan by the end of this year detailing specific projects in a number of strategic areas.

The four strategic areas that have been identified to reduce energy use and carbon emissions in the City's operations include: making buildings smarter; greening the fleet; energy-wise street and traffic lights; and reducing waste. The City has already made steps to reduce its carbon emissions as it relates to these areas. Making municipal buildings smarter includes the use of motion sensors, timers and energy monitors. In addition to reducing the size of the City's fleet, older vehicles have been replaced with electric or hybrid cars and with vehicles that use biodiesel and natural gas. All traffic lights are now LEDs, which reduce energy consumption by over 90%. To reduce waste, organics collection has been added to the existing recycling programs in City buildings. Each year over 360 dump truck loads of asphalt and 316 garbage trucks of dirt and leaves are recycled.

To ensure that progress is being made, in accordance with the Climate Action Charter, the City is taking these steps to move toward carbon neutral municipal operations:

1) Measuring total energy use and greenhouse gas emissions generated from all municipal operations. This step is complete and is done annually.
2) Reducing energy use and greenhouse gas emissions in the areas of building operations, fleet and equipment, traffic and street lights and waste.
3) Offsetting and balancing its remaining carbon footprint through investments in one or more local carbon reduction projects, such as the new Kitchen Scraps and Garbage program that reduces emissions in the community, or through the purchase of certified carbon offsets.
4) Reporting on the City's energy use and carbon footprint, measuring savings and discussing the progress made toward this goal.

Winnipeg

MANITOBA, CANADA

City of Winnipeg (2011)

POPULATION	663,617
LAND AREA (square kilometres)	464.08
POPULATION DENSITY (per square kilometre)	1430

Winnipeg Census Metropolitan Area

POPULATION	762,759
LAND AREA (square kilometres)	5303.09
POPULATION DENSITY (per square kilometre)	137.7

POPULATION PROJECTION
(for the year 2032)

2011: 663,617

2032: 952,200

Average Winter Temperature
-12.9°C

Average Sunshine a Year
318 days

Average Precipitation
514 mm

Average Summer Weather
25.4°C

City of Winnipeg

$72,050

MEDIAN TOTAL INCOME IN CMA (2010)

$236,306

AVERAGE HOUSE PRICE 2011

Winnipeg

MANITOBA, CANADA

Winnipeg is located near the center of North America and is dominated geographically by Lake Winnipeg—one of the largest lakes in the world—and the expansive skyline of the Canadian prairies. The city is a historical and cultural meeting place, sitting at the confluence of the Assiniboine and the Red Rivers, and is home to 6 in 10 Manitobans.

The population of Winnipeg has been relatively steady for a number of decades but in the last few years there has been an increase in population, due in part to increased immigration. This increase in population growth has led to development pressure such that the city has not seen in a long time.

The City's development planning operated on a model of incremental change to match relatively flat population growth for some time. Population growth, however, ingendered a rethink of the development plan. To get this underway, the city initiated a public engagement process, which involved over 40,000 Winnipeggers. A strong message that emerged was that citizens were concerned about sustainability and had a strong desire to move initiatives along from the planning stage into implementation.

The development plan that resulted from this process, called OurWinnipeg, presents a 25-year vision for the city and is accompanied by four direction strategies: Complete Communities, Sustainable Transportation, Sustainable Water and Waste and A Sustainable Winnipeg. OurWinnipeg took effect in August 2011 and replaced Plan Winnipeg 2020 Vision as the official development plan that guides growth and change for Winnipeg. This plan is required by the City of Winnipeg Charter, which requires the City to adopt, through bylaws, a development plan for the future.

There are a number of priorities for planners in this new development plan including: water-sensitive urban design (critical for a city located on a flood plain); a strong emphasis on creating complete communities; and developing a cohesive urban structure and sustainable transportation solutions—including opening the city's first rapid transit line in 2012.

The sustainability direction strategy deals with the social, economic and environmental dimensions of sustainability and seeks to set a direction that will work in times of growth and change so that a community can be built for the future. Winnipeg's vision for a sustainable community is "Living and Caring Because We Plan on Staying."

The City of Winnipeg is also one of more than 200 Canadian municipalities committed to the Federation of Canadian Municipalities (FCM) Partners for Climate Protection (PCP), which means developing and implementing a climate change action plan that details how specific greenhouse gas emissions targets will be met and how progress will be measured.

THE FORKS' TARGET ZERO

The Forks is Winnipeg's meeting place. The junction of the Assiniboine and Red rivers, which is located in the heart of downtown, has been a meeting place for over 6,000 years and is Winnipeg's number one tourist destination today. The site offers dining, shopping, a farmers' market, activities and entertainment year round. It is also home to a very ambitious environmental goal: zero garbage, zero net water consumption and zero carbon emissions. This goal is known as Target Zero.

The Forks, Winnipeg, Manitoba

The reasons for this goal, according to Chief Operating Officer Paul Jordan, was that in 2007, The Forks came up against two challenges: there was increasing public pressure to become more environmentally sustainable as an operation and, for the first time in history, their utility bill for heating the 100-year-old market building exceeded $500,000. This was not just a blip either as energy costs were projected to keep rising while revenues were relatively flat.

In the face of this relatively grim economic picture, the board and management examined several options and decided to go after the low-hanging fruit of cost savings first, which included the operating cost of heating and cooling the market building. They underwent an extensive feasibility study and came to the conclusion that nothing could be done differently in terms of the building's efficiency—because it is a historic building—and so they looked instead at where their energy was coming from. As Jordan noted, "nothing could be done at the end of the pipe so we decided to start at the beginning of the pipe."

This led to a replacement of the old HVAC system with a closed loop geothermal heat pump system. The system operates through 168 closed vertical loops that go 300 feet into the ground, a redesigned market-place with 53 heat pumps and two large-plate radiators on the bottom of the Assiniboine River. This $4.5 million system eliminates up to 1.5 kilotonnes of greenhouse gas emissions annually and, at current energy rates, will pay for itself in 8-10 years.

Other initiatives included action on water consumption, fuel sourcing and waste management. They realized that some of the best water in the world was being used to water lawns and flush toilets, which not only was environmentally damaging but was costly to boot. This led to a change in the irrigation system so that it draws from the river rather than municipally treated water. Low flow toilets and waterless urinals were also installed. They are currently looking at a system that would use rainfall collected on the roofs to flush the toilets in the future.

Similarly, The Forks management team identified that they were spending an enormous amount of money on fuel for equipment, trucks and so on and at the same time they were paying for the removal of the cooking oil from fast food vendors on site. As such, the decision was made to purchase a small reactor that allows them to convert that waste oil into fuel for their equipment. The Olympic Ice Resurfacer, for example, now operates on fuel from vegetable oil and has reduced expenditure and waste in two areas.

Waste management at the facility was also reviewed. The Forks was spending approximately $70,000 a year in garbage removal and around 80% of that was compostable material. They tackled this by installing two large composting systems on the site, which reduces the amount of waste they are paying to have transported away, gives them rich compost for use on the site and has become a revenue source as well. It has become a revenue source because other organizations, like The University of Winnipeg, are paying The Forks to treat their compost.

The impact of Target Zero on The Forks has been remarkable, both environmentally and financially, and it came about in large part because of the leadership and the willingness of the management and the board to look at new models. One of the hardest parts of the project, according to Jordan, was finding the upfront capital and having to engage in a new way of thinking about capital investments and environmental benefits.

The extensive changes at The Forks warranted the involvement of all three levels of government. The geothermal heat pump system, for example, required radiators on the bottom of the Assiniboine River, which meant extensive work with the Department of Fisheries and Oceans and Manitoba Environment to ensure that regulations were adhered to. When asked about the challenge this presented, Jordan emphasized that governments at all levels were receptive to the idea once the plan and target goal were explained. The Forks avoided regulatory pitfalls and barriers by doing extensive upfront work and feasibility studies so that full information could be communicated to government partners.

The primary challenge that was articulated about this process was that it was often hard for government workers to think about new ways of doing things. Government, in this case, was unfamiliar with some of the technological advancements. This challenge was overcome by clearly demonstrating the merits of new systems from the beginning and working with government officials to navigate new territory.

The Forks was in the unique position of being the first to do a large-scale project like this Winnipeg. This made some of the government regulatory challenges more pronounced since once the row has been furrowed it will be easier, cheaper and more straightforward for other communities and organizations to follow their lead because now more government and systems expertise is in place.

Perhaps the most significant point that The Forks example illustrates is how environmental and economic benefits can coincide. While there was some environmental motivation for the transformation of The Forks and the creation of the Target Zero initiative, the economic considerations were very pressing. It was when the board realized that these two goals were not mutually exclusive that the real transformation happened. As Jordan noted, if environmental projects are not financially sustainable, then no one is going to do them. He stated, “For a project to be environmentally sustainable, it needs to be financially sustainable.”

MANITOBA HYDRO PLACE

In May 2012, Manitoba Hydro Place, the newly built headquarters for Manitoba Hydro, became the first and only large office tower in Canada to receive LEED Platinum certification from the Canada Green Building Council, the highest and most rigorous level of certification that can be achieved. The building officially opened in 2009 and its 22 storeys occupy a full city block in Winnipeg's downtown.

The story of this building is one of cooperation, leadership and vision for a better future. It all started in 2002 when Manitoba Hydro purchased Winnipeg Hydro in order to access the distribution rights to downtown Winnipeg. Part of the negotiation process for that deal was that Manitoba Hydro had to build their new headquarters downtown, instead of in the suburbs as they had originally planned. This was part of a larger plan at the City to revitalize the downtown core.

Once they knew they were going to be building downtown, the question became what type of building they should have. According to Tom Akerstream, the Project Manager for the building, Manitoba Hydro's Power Smart Program was a catalyst to demonstrate that you can build an efficient, environmentally sustainable building that has high quality of space. They wanted this to be a flagship for other people to copy. They also had the leadership and support necessary to think expansively about this issue with the longest serving CEO of Manitoba Hydro in place and government support extended for revitalization and sustainability initiatives.

An integrated design team was pulled together—a process that took about a year—and a number of advisory committees were created. The external advisory committee consisted of business owners, City officials and other members representing the downtown core. The internal advisory committee consisted of 30-40 people from within Manitoba Hydro. Akerstream emphasized how critical this piece of the puzzle was because having a good design and a good team is essential to making any project a success. He noted, "It is all about relationship building and getting the team to create something special."

Once the teams were in place, they set to work reviewing potential building sites in the downtown area. They looked at sunlight, wind, transportation access, local amenities like food services and large conference/meeting spaces, and how integrated it was with the downtown area. They also held consultations with the public on which sites they thought would be best. This process not only confirmed that they were on the right path but also provided public support and buy-in for the process.

After the site was selected, they put out a call for architectural designs and articulated a number of goals for the building, including a target of being 60% more energy efficient than a standard office tower built to current standards, having a high quality of space and being integrated with downtown. This resulted in a design that emphasized high ceilings, a fresh air ventilation system, a green roof and a noticeably absent cafeteria so that employees would enliven the downtown core on a daily basis. With respect to the cafeteria, Akerstream stated, "We wanted them to go out in the street and help the downtown economy."

One of the most striking things about the planning and design of Manitoba Hydro Place was how holistic the thinking was around sustainability and integration. This started at the very beginning with the deconstruction of the existing buildings on the Portage Avenue site. The careful deconstruction of the existing buildings allowed for 95% of the materials from these structures to be reused, recycled or salvaged, the noise and dust normally associated with demolition was not present and the costs savings were significant. Similarly, as they wanted to encourage sustainable forms of transportation, only 150 parking spots were built in a building that houses 2,000 employees. The main floor gallery was designed as a public corridor so that people traveling in downtown Winnipeg could experience the building and cultural events could be held in the space. Every aspect of the building was designed to work with the natural environment and the people who live there.

Construction began on the building in 2005 and some of the most striking energy efficiency features include:

- low-iron glass on the building windows maximizes natural daylight and reduces the reliance on artificial lighting;
- a geothermal system with 280 wells provides heating and cooling for the building;
- a solar chimney on the north face of the building provides passive ventilation;
- three six-storey winter gardens on the south side of the building help precondition intake air using solar thermal energy and waterfalls for humidity control; and
- an advanced Building Management System coordinates and controls all systems to ensure the structure responds to changes in climate, environment and operational requirements.

Since the building opened in 2009, a number of things have become apparent. For one, they have exceeded their energy efficiency goal and are actually 70% more efficient than a conventional office tower, which provides an estimated cost savings of $500,000 annually. They've found that 72% of their employees are now walking, biking or taking public transportation to work—a significant culture shift given that 95% of them used to drive to work. There has also been a positive trend in the reduction in employee sickness and absenteeism compared to the previous buildings due in large part to the frequency and the quality of the fresh air ventilated through the building.

In terms of the actual building process, there was a not a strong role for government in this project.[10] Akerstream emphasized that the City of Winnipeg was instrumental in determining the downtown location of the building. This decision was approved by the provincial government, after which they stepped out. That being said, there are a number of areas where projects like this one intersect with government regulations (including matters such as building codes, for example). One of the challenges of building an energy efficient building is that building codes are often not flexible and adaptive enough to accommodate new technologies. This forces builders and tradespeople to continue operating within the status quo rather than encouraging them to learn about and adopt new technologies.

Similarly, many traditional incentives are counterproductive in a project like this. Mechanical and electrical companies are usually paid according to a percentage of the equipment they install, which does not motivate them to think about how to reduce equipment and the need for energy. If we want to see more buildings like this one, we need to think about how to reward the final outcome rather than the amount of equipment in the building. Changing the incentives will help make sure that everyone is working toward the same sustainability goals.

[10] Manitoba Hydro is a Crown corporation owned by the Province of Manitoba. Technically, then, there was a very strong role for government in the process. What is meant by this statement is that once the decision was made to build Manitoba Hydro Place, other government agencies were not intimately involved in the process.

Three important lessons emerge from this environmental case study. The first is that one of the keys to good environmental design is a long-term, holistic approach to buildings and their environment. This rings true for city planners, developers and project managers. If time is taken at the front end of a project to ensure that the design maximizes energy efficiency and is well integrated into its environment, the project is more likely to be a success. Secondly although Manitoba has one of the cheapest energy rates in North America, Manitoba Hydro was able to make a case for energy efficiency based on the quality of the building in addition to the sustainability of it. This indicates that while cost considerations are important, they are not the only compelling factor in building sustainably. And finally, this example illustrates what is possible and provides a shining example of how quality of space and energy efficiency can be complementary. This will be one the most compelling legacies of this building because as Akerstream pointed out, "We have had over 11,000 people tour the building and thousands of engineers from around the world have come to see what we have done. We are educating others about what's possible."

BIKE TO THE FUTURE

In the Summer of 2006, Winnipeg's cycling and motoring communities came into a conflict at a an event known as Critical Mass. Originally started in 1992 in San Francisco, Critical Mass is an informal gathering of cyclists on the last Friday of the month who travel through the streets of their city and raise awareness for self-propelled transportation.

The conflict happened when the police, after repeated attempts to obtain advance notice of the route for July, decided to crack down on cyclists breaking traffic rules during Critical Mass. This resulted in over 20 offence notices being issued, cyclists being arrested and video of police tactics leaking out to the media.

This event thrust cycling into the public spotlight in a dramatic way and left everyone involved—the police, the City of Winnipeg, the cycling community and motorists—with a desire to do things differently. It was this incentive for change that gave rise to Bike to the Future, a voluntary group of residents working to "make cycling in Winnipeg a safe, enjoyable, accessible and convenient transportation choice year-round."

A group of cyclists originally met in September of 2006 and held a forum on what was needed to make cycling safer and better in Winnipeg. This resulted in a report and recommendations to the City and the provincial government. Following this, a municipal election provided an ideal opportunity to initiate change and Bike to the Future was subsequently created. The group's first act was to distribute a questionnaire to all municipal candidates concerning their vision for cycling and how they would improve cycling infrastructure in Winnipeg.

Bike to the Future was incorporated as a nonprofit organization in February 2007 and was already recognized at that time as one of the "most effective lobby groups" by the *Winnipeg Free Press*. One of the reasons they were so effective, according to Curtis Hull, former Co-chair and active member of Bike to the Future, was because of their desire to work with other agencies to bring about change rather than fighting against them. He noted that, after 2006, it was clear the "we had to do this in a more positive way. We have been successful because we've built a strategy of positive engagement."

The primary activities of Bike to the Future are information, education and support for the cycling community and advocacy on cycling related issues such as infrastructure development. The support for cyclists is extensive and includes everything from cycling route maps, a Bike to Work Day, education on cycling safety, stimulus funding for active transportation and even bicycle valet services for those cyclists who want to bike to sporting and cultural events.

The advocacy strategy of Bike to the Future is very inclusive and very holistic. They have made an effort to work with any and all organizations that have points of common interest in their cause. This includes, but is not limited to: the City of Winnipeg, Winnipeg Trails Association, the Green Action Centre, Manitoba Eco-Network, Manitoba Public Insurance, the Province of Manitoba, Mountain Equipment Co-op, Assiniboine Credit Union, One Green City, Manitoba Medical Association, Winnipeg Rapid Transit Coalition and the Planners Network Manitoba.

The results of these activities are also impressive. Hull notes that bicycle ridership is considerably up in Winnipeg—it increased by 64% in the last five years—and rates of commuter cycling are also up. They have consulted extensively with the City to put in place bike infrastructure and to improve pinch points in the network. In 2010, this resulted in investments of over $21 million by different levels of government into 35 different projects throughout the Winnipeg area in order to enhance the cycling network.

Perhaps even more impressive is that Bike to the Future has helped create a strong awareness of cycling at the municipal and provincial levels. Hull observes that City planners now take cycling into account in development plans and the provincial government has created an Active Transportation Coordinator position in addition to amending the Highway Act to allow for infrastructure changes in other municipalities.

This is due in part to the strong relationships that have been developed. Hull notes, "It is always better to be in the room than to be outside pounding on the door. If you get invited into the room and you say your piece enough times people will begin to listen." Additionally, he observes that many individuals in Bike to the Future have become topic area experts by travelling to other cities and attending conferences at their own expense to learn about how other jurisdictions are addressing cycling infrastructure challenges. This means that when they are speaking to City planners and urban designers they are able to point out reasonable accommodations and solutions that have been tried in other municipalities.

Winnipeg has come a long way with respect to cycling in the last few years but it has not been without challenges. One of the biggest ones, according to Hull, is securing the funding for cycling infrastructure. He notes that people generally see the need and merit of the ideas but hesitate to commit the money. "If there is a $30 million budget for the project and the cycling portion will add $500,000, they will say, 'Oh, I don't know if we can do it.'" Part of the reason for this, he believes, is that government spending is fragmented and the cost savings to the health system of having more people leading active lives, for example, will be realized by a different order of government. This lack of cohesiveness encourages spending decisions to be myopic and siloed.

Bike to the Future is an interesting example because it illustrates what can happen when a number of different groups come together to achieve common goals. In this case, the desire of the cycling community to increase cycling awareness and encourage a more connected network of biking infrastructure dovetailed with the desires of the provincial and municipal governments to have safer roads and to be seen to be taking positive action following a dramatic summer of biking and motorist conflict.

Conclusion

The quality and the diversity of environmental initiatives in western Canadian cities is impressive. They range from the actions of a few individuals who are working to make their communities better to large-scale initiatives that encompass an entire city. The case studies highlighted in this report are but a sample of the types of things that are happening in cities across the region, country and world. Because cities are home to the majority of western Canadians, urban environmental initiatives can have a significant impact on the natural world.

In researching the types of environmental initiatives happening in western Canadian cities and in speaking to those on the ground, a number of consistent themes emerged.

One, money and context matter. Almost everyone who we spoke to across western Canada indicated that finding the money to make their environmental initiative happen was a challenge. Small, individually-driven organizations spoke of the difficulties of accessing grants and funding support for their initiatives whereas city-level representatives indicated that the competing priorities of residents and governments are a persistent barrier. Additionally, the economic and development pressures, as well as the convictions of residents, in a city have a noticeable impact on the leadership of the politicians and the community acceptance of environmental considerations in a given municipality.

Two, there has been a normalization of environmental initiatives in urban areas. This is due in part to changing expectations of Canadians who now expect that their cities will consider the environmental and the social implications of municipal policy decisions. This includes many of the common environmental initiatives, like recycling and curbside composting, as well as more advanced solutions such as landfill gas recovery and district energy systems. Improvements in environmental technology and the widespread application of those innovations have done their part to encourage environmental initiatives in cities.

Three, success begets success. One of the consistent themes to emerge from this research is the importance of previous practice. Those who were the first to challenge established practice emphasized how difficult it was to change thinking and standardize innovation. Once partners, stakeholders, contractors and governments saw the success of a new way of thinking, however, repetition became easier and easier. Once it was clear that new technologies and ideas could result in environmental improvement and be financially successful, it became considerably easier to replicate and expand on that success.

Finally, as a number of the case studies demonstrate, there are many political and public policy barriers to implementing the good urban environmental ideas that we know would make our cities more liveable and more sustainable. These barriers exist despite the good intentions, best efforts and commitment of many public servants and politicians. Many of the challenges have more to do with the complexity of government administration than they do with intent or lack of awareness.

The environmental initiatives underway in western Canadian cities, such as those highlighted here, are changing the character and the footprint of the cities and those who live within them. There are incredibly interesting and innovative things happening and some best practices are emerging that will help inform future development while further awareness of successful environmental initiatives will normalize and encourage innovations in this area in the future.

The third report in *The Missing Link* project series will examine the public policy conditions needed to make effective use of urban environmental improvement tools and recommend ways to create these conditions in western Canadian cities.

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Appendix A:

Common Urban Environmental Practices in Western Canadian Cities

A number of environmental practices have become standard in the western Canadian cities examined in this report though variations exist in the manner and extent to which they are employed. All of the cities use water meters, for example, and offer some form of public transportation and recycling. Other less well-known initiatives are also becoming standard such as the use of landfill gas recovery systems, triple bottom line policies and community-supported agriculture. The following chart illustrates some of the common urban environmental practices found in western Canadian cities.

	CALGARY	EDMONTON	REGINA	SASKATOON
Bike Pathways	✔	✔	✔	✔
Percentage of commuters in the Census Metropolitan Area who cycle to work (2006 census)	1.3%	1.1%	1.4%	2.4%
Car Share Programs	✔	✔	✔	✔
Community-Supported Agriculture	✔	✔	✔	✔
Curbside Composting	✔	No	No	✔
All residences?	Still in the pilot project stage	N/A	N/A	Voluntary, subscription-based program for curbside collection of leaf and yard waste Currently there are a total of 3,000 subscriptions available every year
Curbside Recycling	✔	✔	No	No
All residences?	Single family households up to and including four units	All residences	Planned for 2013	By 2013 recycling collection will be from the same location as waste collection
Dedicated HOV/BRT Lanes	✔	✔	✔	✔
Landfill Gas Recovery	✔	✔	✔	Pilot project
Amount of energy produced	Equivalent to taking 16,000 cars off the road, planting 24,000 acres of trees or using 180,000 fewer barrels of oil	Enough gas is captured each year to satisfy the electricity demands of approximately 4,600 homes	They do not collect the electricity but they burn the methane gas	Potential to reduce annual greenhouse gas emissions by over 90,000 tonnes per year (equivalent to taking over 16,000 vehicles off the road) and provide enough power for up to 2,600 homes
Public Transportation System	Bus; LRT	Bus; LRT	Bus	Bus
Cost	$2.75 standard	$3.00 standard	$2.50 standard	$3.00 standard
Rate of ridership	96 million trips in 2011	80 million trips in 2011	Information not available	Information not available
Rain Barrel Subsidy	Yes – $65	No	No	Yes – $50
Water Metering	✔	✔	✔	✔
Average Residential cost	$1.4876/$m^3$	0-10m^3 $1.6084/$m^3$	$1.35/$m^3$	First 600 cubic feet $2.54
Green Building Policy	Sustainable Buildings Policy	Green Building Policy/Strategy		City is planning to study whether or not to establish environmental and sustainable standards for all civic buildings
Green Procurement Policy	Sustainable, Environmental and Ethical Procurement Policy (SEEPP)	Sustainable, Environmental and Ethical Procurement policy (SEEPP)		The City's purchasing department tracks sustainable purchasing performance and reports the number and type of sustainable contracts issued
Greenhouse Gas Reduction Policy	Calgary Community Greenhouse Gas (GHG) Reduction Plan	Greenhouse Gas Emissions Reduction Plan	Partners for Climate Protection program	Energy and greenhouse gas management
Pesticide Reduction Policy	Integrated Pest Management Plan	Integrated Pest Management Plan	Integrated Pest Management Plan	Integrated Pest Management Plan
Triple Bottom Line Policy	✔	✔	✔	✔
Urban Farming Policy	Food System Assessment and Action Plan Calgary Community Farm Initiative	Food and Agriculture Project	Community Gardens	Saskatoon Food Charter

	VANCOUVER	VICTORIA	WINNIPEG
Bike Pathways	✔	✔	✔
Percentage of commuters in the Census Metropolitan Area who cycle to work (2006 census)	1.7%	5.6%	1.6%
Car Share Programs	✔	✔	✔
Community-Supported Agriculture	✔	✔	✔
Curbside Composting	✔	No	No
All residences?	Available to those who already receive yard timmings collection services	N/A	N/A
Curbside Recycling	✔	✔	✔
All residences?	Single-family, duplexes and some smaller multi-family dwellings	All residences	Single family dwellings and apartment buildings that are 4 units or fewer
Dedicated HOV/BRT Lanes	✔	✔	✔
Landfill Gas Recovery	✔	✔	✔
Amount of energy produced	The total energy requirements of 3,000 to 4,000 homes, and results in a reduction of more than 230,000 tonnes per year CO_2 equivalents or the emissions of approximately 45,000 automobiles	The facility now produces close to 1.6 megawatts of green power – enough electricity to supply about 1,600 homes	Equivalent to the annual greenhouse gas emissions from 21,700 passenger vehicles
Public Transportation System	Bus; LRT; Ferry	Bus; LRT; Ferry	Bus; LRT
Cost	$2.50 for one zone	$2.50 standard	2.45 standard
Rate of ridership	233 million paid trips	25 million trips in 2011	Information not available
Rain Barrel Subsidy	Yes – $75	A rebate program is being considered that would allow property owners to apply for a rainwater management rebate that would be applied to their annual stormwater utility bill	Yes – $50 on sale, regularly $120
Water Metering	✔	✔	✔
Average Residential cost	$2.803/100 cubic feet	$3.00/100 cubic feet	0-272m^3: $1.35
Green Building Policy	Green Building Strategy	✔	✔
Green Procurement Policy	✔	✔	✔
Greenhouse Gas Reduction Policy	Greenhouse gas emission reduction plan	Climate Action Program	Green Fleet Plan
Pesticide Reduction Policy	Integrated Pest Management	Integrated Pest Managment	Integrated Pest Management
Triple Bottom Line Policy	✔	✔	✔
Urban Farming Policy	Vancouver Food Policy Council	Community Gardens Policy	Community Gardens Policy

Appendix B

List of Contributors

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Baber	**Chris**	Project Manager	Neighbourhood Energy Utility
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