

THE WAY WE GREEN

GREEN BUILDING PLAN



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EXECUTIVE SUMMARY

The purpose of the City of Edmonton's Green Building Plan ("the Plan") is to provide a set of actions aimed at improving the environmental, health, and socio-economic performance of all types of buildings in the city: commercial, institutional, industrial, mixed-use, multi-family residential and single-family residential buildings. This Plan has been developed to support *The Way We Green: The City of Edmonton's Environmental Strategic Plan*.

A STRONG CASE FOR GREEN BUILDING

The City's objective of greening its present and future building stock is driven and supported by a compelling case for action: green buildings and communities provide not only environmental benefits, but a variety of health, social, and fiscal benefits as well. Key drivers of the need for green buildings include climate change, energy and water security, waste reduction, healthy living and working environments, biodiversity and local economic development.

As a local government, the City of Edmonton can play a strong role in the green building sector through its authority in land use planning and development approvals, and through its role as a facilitator: the City has the capability and track record in public and industry education, incentives and capacity building. These activities can advance green building goals by helping to transform the local green building market.

Market surveys and research have shown that financial, environmental and other co-benefits can accrue from green building, and significant green building markets are developing in other jurisdictions. When using a life cycle costing approach, green building tends to result in a net positive financial benefit; factoring in "externalities"; or difficult to quantify benefits, strengthens the case further.

THE NEED FOR MARKET TRANSFORMATION

At the same time, there are challenges in advancing the green building market. The research and feedback from stakeholders suggests that Edmonton is in the early stages of green building market transformation, and that

the market is cautious and sensitive to cost premiums. And as in other jurisdictions, it is challenging for most developers to use a life cycle costing approach for decision making; many of the benefits of a green development project, such as lower energy costs, accrue to buyers and owners.

In creating this plan, the City and project team worked extensively with local industry experts and representatives, including those from the development and building industry, real estate, and others, as well as consulting the public. Considering the opportunities and challenges described earlier, the Plan has been developed with a focus on supporting and enabling green building market transformation. Within the immediate term, there are no recommendations that result in mandatory compliance with new green building policy or regulation that will result in significant cost implications to industry. The Plan proposes a set of initiatives, some of which build on existing City programs, that can evolve over time along with the market and economic conditions. More significant initiatives would be piloted to assess effectiveness, industry adoption and capacity, before rolling out fully or strengthening with any mandatory components.

THE PLAN

The Plan has been organized into five streams, with a set of recommended program elements under each stream; however, it will also be implemented as an integrated program, with the goal of making programs simple and convenient for users.

The five streams with major program elements are:

- 1. Core Green Building Program:** foundational and cross-cutting elements, such as outreach and education, that support all sector-specific green building program tools
 - › Financing tools that help address green cost premiums, through 3rd party financial institutions, utilities or the City
 - › Promotion of tools and programs to key audiences
 - › Staff & Industry Education, Training & Capacity Building
 - › Demonstration Projects: support, facilitate and develop leadership in green building projects
 - › Green Building Recognition Program: providing recognition to leading projects, developers and builders
 - › Bylaw, Policy and Process Review to assess where the City can streamline and improve its existing processes and policies to support green building
 - › Green Lease Program for City space, demonstrating how the business case for green leased space can work

2. New Homes Program

- › Building energy labelling: a voluntary program with linkage to MLS that would transition to mandatory labelling in the future
- › Green building checklist for new development, supported by green design resources, that is ideally supported by incentives
- › Green Home Buyer's Guide to build market awareness of the benefits of green homes

3. New Large Buildings Program (Large residential, industrial, commercial and institutional)

- › Green building checklist for new development, supported by green design resources, that is ideally supported by incentives

4. Existing Homes Program

- › Building energy labelling (similar to that for new homes)
- › Green renovation program to encourage green building renovations and make them easier for home owners

5. Existing Large Buildings Program

- › Green renovation program to encourage energy efficiency and green features in prioritized building sectors
- › Operations & recommissioning program: involving a leadership program for City buildings, possibly followed by a regulatory measure in the future, to ensure buildings continue to operate as designed

Recommendations on phased implementation of these programs is shown in the following table. This phasing may need to be adjusted as the City secures funding and resourcing for the program.

As program elements are rolled out, including pilot programs, the City will monitor and track the results; monitoring and performance metrics have been recommended in this Plan. Results of this monitoring would then be taken into account in how the program is updated.

PROVIDING INCENTIVES

Incentives are an important part of market transformation. The effective application of targeted incentives can improve the business case and accelerate the shift in the market. Three broad categories of incentives are being incorporated into the programs outlined in the Green Building Plan:

Recognition - recognizing industry for being innovative and forward thinking can help build industry capacity through competition and create awareness of the product which supports demand creation.

Coordination - providing permitting and approvals coordination for green and innovative projects signals industry that the municipality is able to efficiently respond to shifts in the market.

Financial - providing grants that reward builders for reaching performance targets can help off-set premiums for building greener.

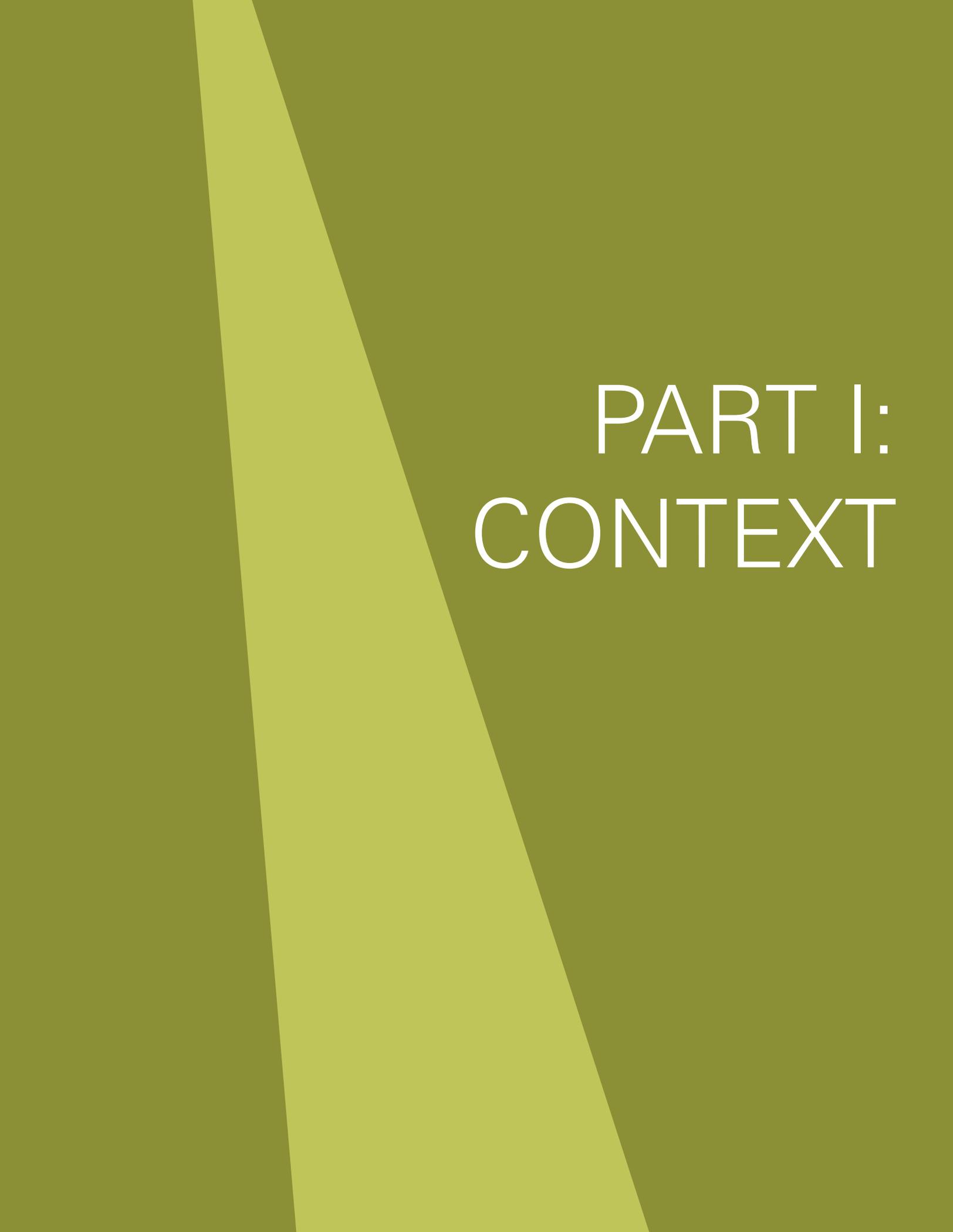
IMPORTANCE OF ADVOCACY AND COLLABORATION

For the most part, the Green Building Plan is built around programs that can be implemented by the municipality. However, addressing some of the barriers to Green Building will require involvement of other levels of government and collaboration with other agencies. Advocacy for changes to codes and collaboration with industry associations and nongovernmental organizations is key to transforming the market. In response, an advocacy and collaboration strategy is proposed as part of the Green Building Plan.

Five Year Plan

	2012	2013	2014	2015	2016	2017	>2017
Program 1 Core Programs							
Program 1.1 Promotion of Tools and Programs		Build on initial outreach for GBP	Integrated promotion strategy for GBP as a whole and programs by phase	Ongoing			
Program 1.2 Staff and Industry Education, Training & Capacity Building		Continue to engage staff on GBP implementation	Initial staff training on GBP	Ongoing			
Program 1.3 Demonstration Projects: Support, Facilitate and Develop			Establish criteria for developing and evaluating potential projects	Promotion of program	First demonstration project selected	Ongoing	
Program 1.4 Green Building Recognition Program				Establish process, eligibility, etc	Promotion of program	First annual recognition awards	Ongoing
Program 1.5 Regulation, Bylaw, Policy, and Process Review		Create a terms of reference for this project	Review period	Implement changes	Monitor		
Program 1.6 Green Lease Program				Assess costs and benefits	Launch	Review and revise	
Program 1.7 Financing Strategies		Identify & contact potential partners	Develop priority sectors	Launch	Expand program sectors	Ongoing	
Program 2 New Homes Program							
Program 2.1 Building Energy Labeling			Develop voluntary labeling pilot	Launch	Expand labeling program	Launch	
Program 2.2 Green Building Checklist	Complete and approve Green Building Plan, and launch program	Develop voluntary checklist with incentives	Launch	Monitor and work with industry to refine	Ongoing	Expand checklist criteria	Launch
Program 2.3 Green Home Buyer's Guide			Develop and pilot	Launch			Continue monitoring, review progress against objectives, and update program periodically
Program 3 New Large Buildings Program							
Program 3.1 Green Building Checklist		Develop voluntary checklist with incentives	Launch	Monitor and work with industry to refine	Ongoing	Expand checklist criteria	Launch
Program 4 Existing Homes Program							
Program 4.1 Building Energy Labeling			Develop voluntary labeling pilot	Launch	Expand labeling program	Launch	
Program 4.2 Green Renovation Program		Develop Green Renovation Guide	Launch	Integrated program	Launch		
Program 5 Existing Large Buildings Program							
Program 5.1 Green Renovation Program				Develop for priority sectors	Launch	Expand commercial program	Launch
Program 5.2 Operations and Recommissioning				Voluntary commercial program & City building program	Launch		

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PART I: CONTEXT

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the City of Edmonton's Green Building Plan is to provide a set of actions aimed at improving the environmental, health, and socio-economic performance of all types of buildings in the city: commercial, institutional, industrial, mixed-use, multi-family residential and single-family residential buildings.

1.2 GOALS

The Green Building Plan includes environmental, health, and socio-economic goals.

Environmental

This Plan has been developed to support *The Way We Green: The City of Edmonton's Environmental Strategic Plan*. *The Way We Green* addresses Edmonton's sustainability and resilience challenges relating to energy and climate change, water, food, air, solid waste, and biodiversity. Amongst these, energy and climate change were considered priority areas by the experts and stakeholders who helped develop *The Way We Green*, as these two critical issues pose the greatest sustainability and resilience challenges for Edmonton.

Health

In addition to the many benefits offered to the natural environment, green buildings can help improve human health as well. As Canadians spend upwards of 90 per cent of their lives inside buildings, an important goal of green buildings is providing healthy and pleasant indoor environments for all users. Green building features such as green roofs and rain gardens can also make for healthier outdoor environments as well.

Socio-economics

While economic feasibility is a requirement of any of the recommendations in the Green Building Plan, an important goal of the Plan is to create jobs and stimulate and diversify the local economy, in particular the building industry. A strategic goal of the Plan is to help industry in Edmonton be ready to meet the rising demand for more sustainable and cost-efficient buildings.



1.3 DEFINITION

The City of Edmonton's definition of a green or "sustainable" building:

A sustainable building integrates building materials and methods that promote environmental quality, economic vitality, and social benefits through the design, construction and operation of the built environment. Sustainable building merges sound, environmentally responsible practices into a discipline that looks at the environmental, economic and social effects of a building or built project as a whole. Sustainable design encompasses the following broad topics: efficient management of energy and water resources, management of material resources and waste, protection of environmental quality, protection of health and indoor environmental quality, reinforcement of natural systems, and integrating the design approach.

1.4 CITY POLICY CONTEXT

The current Green Building Plan is driven and supported by a number of City of Edmonton policies. These include:

1.4.1 The Way Ahead: Strategic Plan 2009-2018

Key policies in support of the Green Building Plan include:

- › To be the nation's leader in setting and achieving the highest standards of environmental protection and sustainability
- › Three Year Priority Goal: Improve city's urban architecture and urban form to ensure it meets environmental standards and exemplifies excellence in urban, architectural and landscape design.

1.4.2 The Way We Grow: Municipal Development Plan

Key policies in support of the Green Building Plan include:

- › Develop and implement design guidelines for new neighbourhoods including sustainable building design
- › Take a leadership role in facilitating the creation of environmentally sustainable buildings

7. The Way We Green

The Way We Green is the City's environmental strategic plan, and sets 12 long-term goals that describe a sustainable and resilient Edmonton.

Healthy Ecosystems — Land

1. Goal: Edmonton's communities are full of nature — a place where in the course of everyday life, residents experience a strong connection with nature.

Healthy Ecosystems — Water

2. Goal: Water quality in the North Saskatchewan River sustains healthy people and healthy ecosystems.
3. Goal: Edmonton's water supply meets its needs.

Healthy Ecosystems — Air

4. Goal: Edmonton's air sustains healthy people and healthy ecosystems.

Energy and Climate Change

5. Goal: Edmonton's sources and uses of energy are sustainable.
6. Goal: Edmonton is resilient to disturbances that could affect its energy supplies and distribution system.
7. Goal: Edmonton is a carbon-neutral city.
8. Goal: Edmonton is resilient to disturbances from climate change.

Food

9. Goal: Edmonton has a resilient food and agriculture system that contributes to the local economy and the overall cultural, financial, social, and environmental sustainability of the city.

Solid Waste

10. Goal: Edmonton generates zero waste.

Foundation for Success

11. Goal: The City of Edmonton strives for sustainability and resilience in all it does.
12. Goal: Lifestyles of Edmontonians contribute significantly to the city's sustainability and resilience.

1.4.3 The Way We Live: Edmonton's People Plan

Strategic policy directions in support of the Green Building Plan include:

- › Promote environmental best practices in urban design, construction and re-use of materials
- › Promote the use of the highest environmental standards through a civic culture of environmental planning, conservation, preservation and protection.

1.4.4 The Way We Green: Environmental Strategic Plan

Strategic actions in support of the Green Building Plan include:

- › Establish, implement and maintain a Green Building Plan for Edmonton.
- › Establish, implement and maintain world-class energy efficiency standards for all City-owned buildings, reflective of a winter city.
- › Encourage and require world-class energy efficiency standards for all new buildings constructed in Edmonton.
- › Establish, implement, maintain and encourage programs and incentives to significantly improve the energy efficiency of the existing building stock.
- › Adopt zoning regulations that promote energy efficiency

1.4.5 Plans/Projects with a Green Building Focus

Capital City Downtown Plan

Establishment of a Green Building and Development Strategy for private development in the downtown.

The Quarters Redevelopment

Quarters Plan proposes a high level of sustainable building practices be incorporated into the redevelopment of the area.

Station Point Greens

Targeting “net-zero” status while remaining affordable.

City Centre Airport

A sustainable community that uses 100 per cent renewable energy, is carbon neutral, significantly reduces its ecological footprint, and empowers residents to pursue a range of sustainable lifestyle choices.

Edmonton Energy and Technology Park

The EETP plan is a City plan heavily centered on the eco-industrial concept including specialized custom zoning that requires an Eco-industrial Design Plan to be submitted with or prior to each development permit to address green performance standards.

1.4.6 Renewable Energy Task Force

The Renewable Energy Task Force was created by Edmonton City Council to develop and deliver a report to the City of Edmonton that examines the opportunities, barriers and potential technical, economic, and policy solutions to the generation and use of renewable energy in Edmonton. The task force has one year to complete its work, with an anticipated completion date of late 2011.

1.4.7 Eco-industrial Toolkit

Industrial buildings and facilities are a very important piece of the building sector in Edmonton. An Eco-industrial Toolkit is currently in development that is aimed at embedding a systems approach and lessons from nature in the entire industrial life cycle. Eco-industrial principles address green buildings as well as sustainable infrastructure, stormwater, sewer, energy systems, and other resources. It is therefore envisioned that this Toolkit will act as the primary set of tools to address the industrial sector within the Plan – which is especially important given the very distinct nature of the industrial sector compared with other building types.

1.5 PLANNING PROCESS

The information and recommendations in this Plan are the results of the collaboration between the City of Edmonton, the Green Building Plan Working Committee, building industry representatives, and a consultant team made up of HB Lanarc, the Pembina Institute, DIALOG, and GP Rollo & Associates. Over the course of nearly a year, from the autumn of 2010 to the autumn of 2011, the City of Edmonton has coordinated the conversations, meetings and workshops that have led to the development of this Plan.

More information on public and stakeholder consultation can be found in the Public Involvement Report (under separate cover).



Figure 1: Green Building Plan Process Chart

2.0 THE CASE FOR ACTION

The City's objective of greening its present and future building stock is driven and supported by a compelling logic for action, and an associated understanding of the risks in doing nothing. As the City of Edmonton takes steps to improve the environmental performance of the city's buildings, it will be important to articulate a persuasive case for action to staff, Council, the development community, and the public at large.

Fundamental to the case for action is that green buildings and communities provide not only environmental benefits, but a variety of health, social, and fiscal benefits as well as providing many points of appeal for various stakeholders. Some of the key rationales for green building follow. These should be emphasized as the City engages stakeholders and implements new policy and procedures to improve the environmental performance of Edmonton's buildings.

2.1 KEY DRIVERS

2.1.1 Climate Change

The balance of scientific evidence unequivocally shows the climate is changing, and the cause of this change is the surge in greenhouse gas emissions from human activity. The Intergovernmental Panel on Climate Change is the world's preeminent authority on climate science. The IPCC's 2007 Fourth Assessment Report, based on extensive review of the latest peer reviewed science, concluded global emissions need to peak around 2015. If the world is to avoid tipping points with dangerous disruptions such as severe agricultural collapses, water shortages, droughts, and sea level rise global emissions need to be reduced by 50 to 85 per cent below 2000 levels by 2050.¹

The economics are also increasingly clear. Commissioned by the British Government and authored by former World Bank Chief Economist Nicholas Stern, the *Economics of Climate Change* estimated the costs of reducing greenhouse gas emissions to a safe level were one per

¹ IPCC. Climate Change 2007: Synthesis Report. http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm



Photo: Centennial Learning Centre, PCL, Ray Steinke

cent of global gross domestic product; compared to a loss of up to 20 per cent of global GDP if we do nothing. Stern concluded that 'the benefits of strong, early action on climate change outweigh the costs.'²

Countries around the world continue to set targets and GHG reduction plans including the leaders of the G8 countries who have committed to reducing their collective emissions 80 per cent by 2050 (relative to 1990 or a more recent year).³ The Government of Canada has set a target to reduce emissions by 17 per cent below 2005 levels by 2020 and 60 to 70 per cent by 2050. Canada's 2020 target is tied to that of the United States, while other G8 countries are targeting even greater reductions. The Government of Alberta also has a Climate Change Strategy which has led to the direct engagement of municipalities on climate change, and the establishment of a Municipal Climate Change Action Centre in the province.

2.1.2 Energy Security

Over and above the threat of global climate change, green buildings can help strengthen energy security, by reducing dependence on conventional energy sources. This protects community members from forecasts of steadily rising prices due to:

- › Constrained supply and increasing demand
 - » The International Energy Agency's *World Energy Outlook 2010* indicates global energy demand will increase by 36 per cent between now and 2030,⁴ largely due to the growth in demand in Asia and the Middle East
 - » Supplies of many conventional energy forms, notably oil, are declining, and new sources have higher production costs because of their inaccessibility, e.g. oilsands, or tighter socio-economic and environmental standards, e.g. coal
- › Rising carbon prices are expected to incrementally increase energy costs.

² HM Treasury. Stern Review on the Economics of Climate Change. http://www.hm-treasury.gov.uk/sternreview_index.htm

³ Responsible leadership for a sustainable future, declaration of the 2009 G8 leaders' summit, 8/07/2009, 65. Available online at http://www.g8italia2009.it/static/G8_Allegato/G8_Declaration_08_07_09_final,0.pdf.

⁴ International Energy Association. World Energy Outlook 2010 Fact Sheet: Global Energy Trends. <http://www.worldenergyoutlook.org/docs/weo2010/factsheets.pdf>

Volatile energy prices are arguably as detrimental as price spikes because they create great uncertainty about the future, compromising budget forecasting and long-term planning. Owners and tenants of buildings are especially impacted by changes to natural gas and electricity prices, the two primary energy sources used to heat and provide power to buildings.

Natural Gas

The natural gas markets of Canada and the US are fully integrated, with major pipelines delivering gas to the US market at multiple points along the border. As such, the price of natural gas in Alberta is closely connected to the North American market, and price forecasts for the wellhead price of natural gas for the North American market are applicable to the Alberta context. The price that residential and commercial customers in Edmonton pay for natural gas is determined by a variety of factors including: wellhead price; local delivery costs; and, the price their natural gas retailer paid, comprised of current prices and publicly traded natural gas "futures" contracts that the retailer has purchased.

The price of natural gas has been somewhat volatile during the 2000s, with severe weather events exposing the vulnerability of the North American supply and distribution network to disruption as shown in Figure 2. Also illustrated in Figure 2 is the connection of the natural gas market to oil price and production and general global and US economic patterns. Because of the vulnerabilities in the natural gas market, wellhead prices could continue to fluctuate in the future although many people expect a low natural gas price within the short to medium-term due to the considerable increase in shale gas production in North America.

Electricity

Electricity prices in Edmonton and all of Alberta are expected to rise as new electricity infrastructure (e.g. transmission and distribution lines, and new power plants) are developed. One study predicts electricity in Alberta will cost \$0.15 / kWh by 2020.⁵

Green buildings can reduce community energy expenditures, buffering community members from volatile, rising energy prices.

⁵ Canadian Broadcasting Corporation. Power Calculator. Source: MIT Energy Initiative study, provincial power-purchase agreements and utilities' financial statements. <http://www.cbc.ca/news/canada/features/power-switch/calculators/calculator-interactive.html>

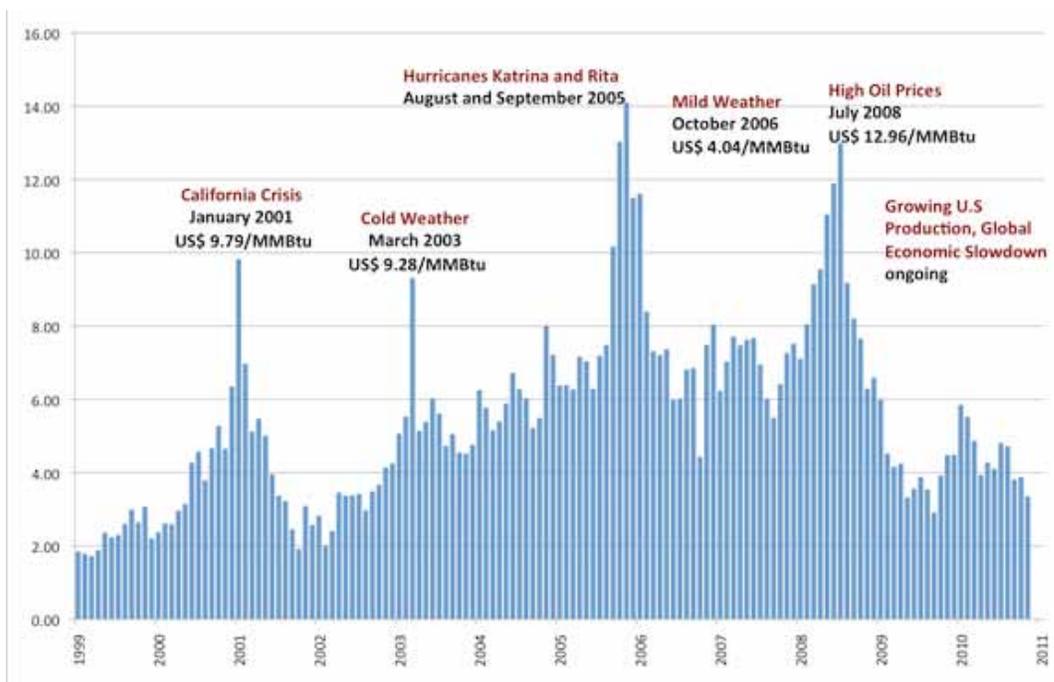


Figure 2: Natural gas price trends over the past decade. Source: National Energy Bureau of Canada. 2011. www.neb-one.gc.ca/clf-nsi/nrgynfmrtn/prcng/ntrlgs/cndnmrk-eng.html

2.1.3 Water Supply and Quality

Protecting the North Saskatchewan River as a source of potable water as well as for its ecological function is of critical importance. The river currently receives discharges from the Gold Bar Wastewater Treatment Plant, combined sewer overflows, storm sewers, and overland drainage flows. Recent efforts to minimize the impact of wastewater and combined sewer discharge have helped the river's water and ecological quality, but sediment loads from storm sewers have steadily increased as the city has grown.

Green buildings can help protect the water quality of the North Saskatchewan River primarily through the use of low impact development strategies. By adopting LID approaches at the building scale, storm water runoff and sediment loads discharged to the river can be reduced.

2.1.4 Solid Waste Diversion

The integrated waste management system of the City of Edmonton is focused on increasing waste diversion from landfill. Currently the City is achieving 60 per cent diversion of residential waste stream from landfill, which is more than twice the Canadian average. Edmonton's diversion rate is accomplished through recycling, municipal composting, and other waste reduction initiatives. A

90 per cent residential waste diversion from landfill is anticipated with the integration of the waste-to-biofuels facility, scheduled to open in 2015.

Edmonton's greatest waste management opportunities and initiatives lie within the non-residential waste streams and the potential to recycle a significant quantity of these waste streams which are currently landfilled throughout the region. To achieve this goal, the City is increasing commercial collection activities, and is also, in partnership with an industrial partner, constructing a paper and glass recycling facility that will achieve "closed-loop recycling" by processing waste paper collected from City offices and other sources into recycled paper products for sale back to the City.

Green building practices can contribute to this goal by reducing and recycling the amount of construction and demolition waste created within the city. Building design has the potential to reduce the amount of waste being generated from a building. In addition the City is ramping up their recycling effort with the start of operation in the fall 2011 of a mixed construction & demolition waste recycling facility with a rated capacity of 80,000 tonnes per year. The recycling initiative includes outreach to the demolition and building community to raise awareness and increase the ease of construction and demolition waste

recycling. In addition to accepting mixed construction and demolition waste, the recycling centre also accepts unpainted drywall, metals, unpainted and untreated wood, trees and brush, asphalt shingles (nails acceptable), and concrete that does not have steel reinforcements.

2.1.5 Using Regional Materials

Whereas the Pacific Northwest region and the Windsor-Quebec corridor have thriving manufacturing sectors that support the building sector, Alberta doesn't have a proportional volume of manufacturing support to reflect the amount of construction that takes place in the region. While some local products including insulation, dimensional and architectural wood and concrete are available locally, the situation has become worse in recent years with the closure of drywall and brick manufacturing plants.

Not only do regional materials help support the local economy, the use of regional products also reduces the pollution that is associated with the transportation of the materials from the distant manufacturing locations. Local factories also make it more feasible to implement recycling programs that return demolition and construction waste back to the manufacturer for reuse.

2.1.6 Encouraging Healthy Homes & Buildings

Green buildings can also provide healthful indoor environments. These buildings outperform typical new construction in terms of indoor air quality and other environmental quality attributes such as daylighting. Occupant health resonates strongly with citizens, providing a powerful rationale for local governments' green building programs. Moreover, it can be a major marketing advantage for green buildings.

2.1.7 Food Security

Landscaping that is integrated with green buildings also has an opportunity to contribute to food security through the provision of gardens, agriculture or edible landscaping. Urban food production also reduces the environmental impact associated with the transport of food over long distances. Adding these features to buildings in Edmonton is expected to contribute to the City Wide Food Agriculture Strategy.

2.1.8 Biodiversity

Green buildings, through both landscaping and building design, can contribute to improving the biodiversity of the city by providing appropriate habitat for urban flora and fauna, and limiting features that have a negative impact on animals such as designing to reduce bird strikes on building windows.

2.1.9 Developing the GreenTech Sector

Encouraging green buildings creates positive economic spinoffs, particularly in the sector of the economy that is providing green technologies, products, and services.

2.1.10 Staying ahead of the Regulatory Curve

Increasingly stringent energy performance requirements are expected to be integrated in building codes over the coming decades. Wise local governments, developers and builders recognize that it is better to be ahead of the regulatory curve than behind it. The City can lessen the difficulty of adjusting to future code changes by encouraging greater performance in buildings now.

This is equally true for any future changes to land use and zoning bylaws that the City brings forward.

2.1.11 Upgrading Existing Building Stock

The majority of buildings that will be in Edmonton for the foreseeable future have already been built. Upgrading the environmental performance of these buildings serves to improve the quality, livability, affordability and retention of the city's building stock.

Upgrading of existing buildings also helps the city to keep some of its historical buildings. This connection to the past enhances the quality and beauty of the urban environment and is an important part of building an attractive and vibrant community.

2.1.12 Sustainable Living

Efforts to green buildings in Edmonton contribute to a larger effort to reduce the overall ecological footprint of the city, its citizens and its businesses. Green buildings directly contribute to this goal, but they also support other efforts in this area such as potentially making it easier for people to reduce their footprint through behaviour changes.

3.0 THE ROLE OF LOCAL GOVERNMENT

As the City of Edmonton looks to green its building stock, it is important to consider what roles the City is best equipped to undertake, and what will make the greatest impact. Different levels of government play a variety of roles impacting buildings.

3.1 REGULATORY AND APPROVALS

3.1.1 Federal and Provincial Context

Through the Constitution of Canada, the responsibilities of the government are divided into federal, and provincial or territorial jurisdictions. Each provincial government is responsible for the creation, modification and elimination of municipal governments and controls exactly which powers a municipal government is entitled to execute. The Government of Alberta enables local government primarily through the Municipal Government Act (MGA), and secondarily through various other statutes and regulations. Each local government is responsible for water and sewage, waste collection, public transit, land use planning, civic services (e.g. libraries) emergency services, animal control and economic development within its geographic boundaries.

3.1.2 Bylaws

Buildings and land use in Alberta are governed by a number of provincial acts and statues, including the Municipal Government Act, the Safety Codes Act and the Building Code. Taken together, these regulations provide the framework within which local governments are able to set their own bylaws with respect to green building measures.

Under the Municipal Government Act, local governments in Alberta may pass bylaws for municipal purposes respecting a number of areas, including “the safety, health and welfare of people and the protection of people and property.”⁶ However, Section 66(1) of the Safety Codes Act

⁶ Province of Alberta. 2010. Municipal Government Act. Alberta Queen’s Printer, Edmonton. <http://www.qp.alberta.ca/documents/Acts/m26.pdf>



Photo: © iStockphoto member InStock

states: “a bylaw of a municipality that purports to regulate a matter that is regulated by this Act is inoperative.” Therefore, the Safety Codes Act and the Building Code prohibits local governments from creating bylaws that interfere or present concurrent authority on a topic already regulated. However, local governments are able to create bylaws in areas that are not addressed or regulated by the Act and Building Code. It is within this area that bylaws for green buildings may be feasible for local governments to pursue including, but not limited to, the efficiency of water and energy using devices, the energy efficiency of existing buildings, energy generation requirements, water use and disposal, waste generation and disposal, and energy labelling requirements.

3.1.3 Land Use Regulation

Land use planning is the traditional domain of local governments. The regulation of land use has a direct relationship to the pattern of development, which significantly influences building energy performance. Buildings with less air-conditioned or heated floor space per capita, and those that share walls between units, typically use less energy per capita than buildings with more floor space. Likewise, a more compact single-family home uses less energy than a large single-family home. Area structure plans for industrial areas with a focus on eco-industrial practices, such as those in Maple Ridge, Winterburn and the Edmonton Energy and Technology Park, can assist with energy and resource sharing between buildings.

In addition, intense land use further outperforms sprawl in terms of the reduction of emissions and other environmental variables when transportation and the embedded energy of building materials and infrastructure are considered. For these reasons, good land use planning presents local governments with one of the greatest tools to impact a municipality’s energy profile.

3.1.4 Development and Building Approvals

The City is responsible for development and building permitting. The development and building permit process ensures proposed development conforms to local planning and design standards and meets the Alberta Building Code.

Alberta local governments are responsible for enforcing the energy components of the Alberta Building Code. It is widely expected that the Alberta Building Code will be updated within the next one to three years to include more stringent energy requirements.

3.1.5 The Safety Codes and the Alberta Building Code

The Safety Codes Act is intended to ensure that stakeholders in the safety system share the responsibilities for setting standards and delivering services. Consequently, the Act provides for consistent administration and delivery of safety standards and inspection services throughout Alberta. The Safety Codes Act applies to fire protection and the design, manufacture, construction, installation, operation and maintenance of: buildings; electrical systems; elevating devices; gas systems; plumbing and private sewage disposal systems; pressure equipment.⁷ Further details governing the safety of buildings are outlined and regulated in a subset of the Act in the Building Code.

The Building Code primarily impacts new construction or construction that requires a building permit. A subset of the Safety Codes Act governs the application of building permits. A building permit is required in the construction, renovation or addition of a building. However, the instances where a building permit is not required include:

- › construction, renovation or an addition that does not exceed \$5,000 if matters affecting health or safety are not at risk
- › painting, decorating, re-roofing or re-siding, provided there is no structural change to the building
- › Replacement or alteration of ducting serving a space heating appliance⁸

The current requirements in the Alberta Building Code for energy efficiency are limited to the following insulation levels. See Table 1.

Currently, there are no energy efficiency-related requirements for large buildings in the province.

Energy efficiency requirements within the building code are expected to be upgraded starting in 2012 for large buildings and 2013 for small buildings following updates to the National Building Code, which are currently in development and nearing final approval.

⁷ *Ibid.*

⁸ Province of Alberta. 2007. *Safety Codes Act: Permit Regulation*. Alberta Queen’s Printer, Edmonton. http://www.qp.alberta.ca/574.cfm?page=2007_204.cfm&leg_type=Regs&isbncln=9780779726868

Table 1: Thermal Insulation Requirements for Small Buildings from the Alberta Building Code, Section 9.25.2.1

Location of Assembly in which Insulation is Placed		Minimum Thermal RSI	Resistance R-Value*
Wall assembly (except basements)	Building exterior	2.1	12
	Between building and attached garage	2.1	12
	Exterior of heated garage	2.1	12
Basement and crawl space	Perimeter walls (top 600 mm below grade)	1.4	8
Floor assembly	Perimeter	2.1	12
	Exposed cantilevers	3.5	20
Roof-ceiling assembly	Building - general	6.0	34
	Heated garage	6.0	34

* Approximation calculated from the RSI value.

3.2 PUBLIC EDUCATION

The public needs to understand the value of green buildings, to help build markets for green buildings and drive widespread adoption. Leading local governments are engaging in education, outreach and social marketing campaigns, often tied to local or senior government green building incentive programs.

Encouraging energy-efficient retrofits in existing buildings is especially important to meeting emissions reductions and energy security objectives. Educating about the value of energy efficiency can be combined with distributing information on 3rd party incentives for home energy retrofits.

3.3 INCENTIVES AND FINANCING

3.3.1 Incentives

Local governments have often provided incentives for green construction. Possible incentive tools reviewed during the examination of best practices included: grants, density bonusing, smarter development cost charge regimes, revitalization tax exemption bylaws, permit fee rebates, and others. There are three broad categories of incentives that are being considered as part of the programs: Recognition, Permit/Approvals Coordination, and Financial.

3.3.2 Finance

Local governments have played a role in helping to set up programs for financing green building improvements such as energy efficiency upgrades. This typically has involved

providing funding to a third-party, purpose-built, non-profit organization that undertakes activities to engage building owners and tenants, organize upgrades and arrange financing.

3.4 MARKET TRANSFORMATION AND CAPACITY BUILDING

3.4.1 Market Transformation

An important role that local government can play in advancing green building is in helping transform the local green building market. Market transformation theory is based on observing time and time again how innovations are adopted and diffused through society and the marketplace. New technologies like hybrid electric vehicles, or new practices like smart growth will, with consumer interest, be taken up first by innovators, then early adopters and successively larger and larger percentages of the market. Policies designed to overcome specific barriers can dramatically accelerate this process.

The market transformation curve in Figure 3 explains the intervention of some of these policies over time. Amongst many other design considerations, the context will determine what tool is most appropriate at what time and with what constituency. The different types of policies do not necessarily need to occur sequentially as shown in the market transformation curve. For example, local governments may choose to immediately regulate. However, experience shows that to be effective and successful, regulations need to be supported by industry and local government capacity – essential elements on the transformation curve.

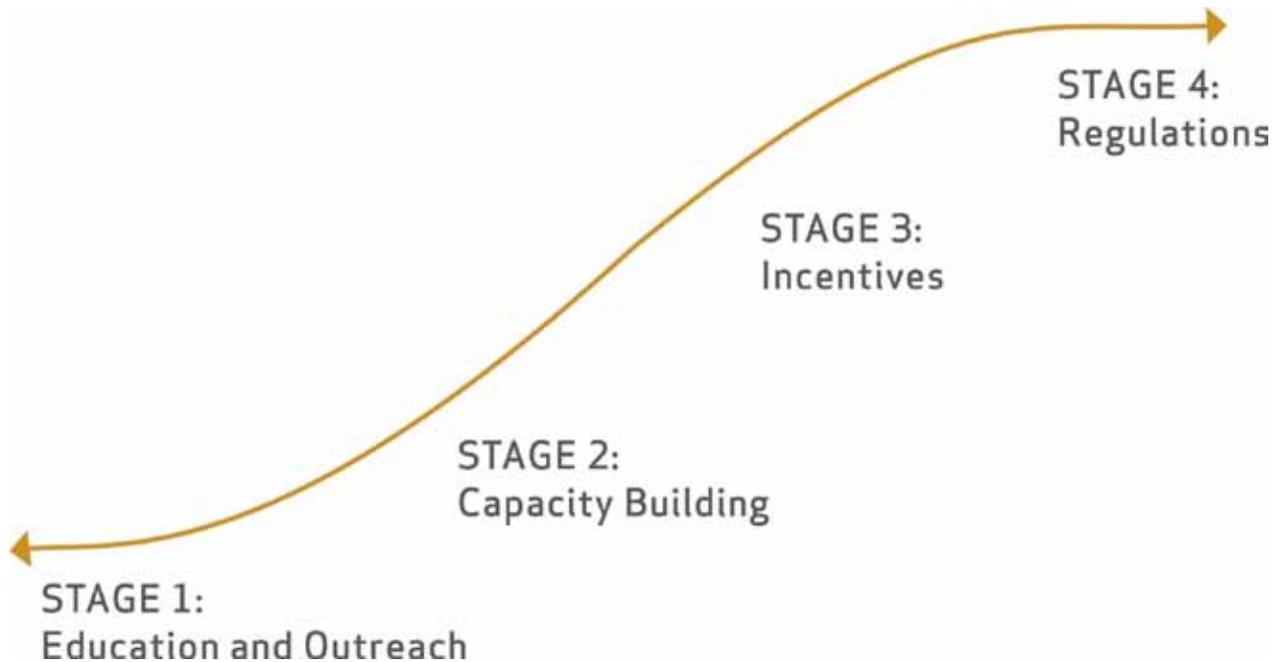


Figure 3: The Market Transformation Curve

3.4.2 Industry Capacity Building

One of the greatest barriers to widespread conversion to green, energy-efficient buildings is the ability of building professionals to incorporate innovative green technologies and building techniques into everyday practice. Continuous professional learning is vital to the advancement of green buildings.⁹ Local governments can encourage trades participation in programs designed to increase capacity in green technologies installation.

3.4.3 City Leadership Initiating Market Transformation

The City itself participates in the marketplace through annual expenditures over \$1.5 billion each year on construction, goods and services. This buying power can contribute to market transformation in the building sector as any building-related expenditures can be focused towards green products and services, thus driving increasing supply of these items.

The City already has a Green Building Policy (C532) and a Sustainable Purchasing Policy (C556) that can be and

are used to enable the City's actions in this area. More aggressive application of these policies could enable even greater contributions to market transformation than is currently taking place.

3.4.4 Community Leadership

In addition to the City taking leadership in directly contributing to market transformation, communities within Edmonton can also contribute in this area.

Examples of this include holding friendly competitions between neighbourhoods or community leagues to engage people in performing green upgrades to their houses and buildings. While this is a potentially important component of green building market transformation, the return on investment of resources into this type of program needs to be considered and compared with other best practices such as building energy labelling.

3.4.5 Government Regulation, Approvals and Enforcement

In order for full market transformation to be realized, there needs to be capacity within governments to require, monitor, approve and enforce new green building regulations and guidelines.

⁹ Canadian Urban Institute. 2008. Sustainable Building: Canada on the Move. http://www.canurb.com/media/pdf/SustainabilityReport_Canada.pdf

3.5 CITY OF EDMONTON PROGRAMS & INITIATIVES AND REGULATIONS

The following are some of the City's former and existing programs, initiatives and regulations aimed at promoting more sustainable building construction and operations. See Appendix B for details on these programs.

- › Built Green Rebates
- › Furnace Rebates
- › Energy Star-rated Appliance Rebates
- › Solar Electric Pilot Program
- › Home Insulation Rebates
- › Secondary Suites, Garage Suites and Garden Suites Grant Program
- › Renovation and Energy Efficiency Resource Brochures and Publications
- › Free CFL Light Bulbs Program
- › Water Efficient Fixtures Bylaw
- › Community League Energy Upgrades Challenge
- › Sustainable Building Policy for City of Edmonton Buildings – Leadership in Energy and Environmental Design (LEED) Silver
- › Guidelines for Residential Infill in Edmonton's Mature Neighbourhoods
- › Transit Oriented Development Guidelines
- › Low Impact Development Guidelines

4.0 BENCHMARKING: HOW GREEN ARE EDMONTON'S BUILDINGS TODAY?

Benchmarking the performance of Edmonton's building stock is an important preliminary step in helping guide the development of a Green Building Plan. This benchmarking analysis establishes baseline information on the performance of Edmonton's buildings in a number of key categories, and then compares this with baseline performance in other comparable cities, as well as with high performers in and outside Edmonton. The goal of this exercise is to identify the best opportunities for improvement. It is important to note that some benchmarking data is challenging to obtain; however the good news is that while benchmarking performance is useful in tailoring the program and tracking results, it is not necessary to take action.

Key benchmarking categories examined are:

- › Energy and Emissions
- › Household Water Use
- › Green Building Certification



Photo: City of Edmonton

4.1 ENERGY AND EMISSIONS

Energy consumption and GHG emissions are important indicators of building performance. The benchmarking analysis looks at energy consumption in buildings across building type – homes (single-family and duplex), multi-family / unit residential buildings (MURBs), and industrial/ commercial/ institutional (ICI) buildings.

4.1.1 Energy Use for Homes

Figure 4 shows energy intensities for homes by census dissemination area.

Figure 4 indicates that there is a relationship between home age and energy consumption, whereby older homes use more energy per square metre than newer homes. This suggests that there may be an opportunity and rationale for targeting certain areas or neighbourhoods for potential energy retrofit efforts.

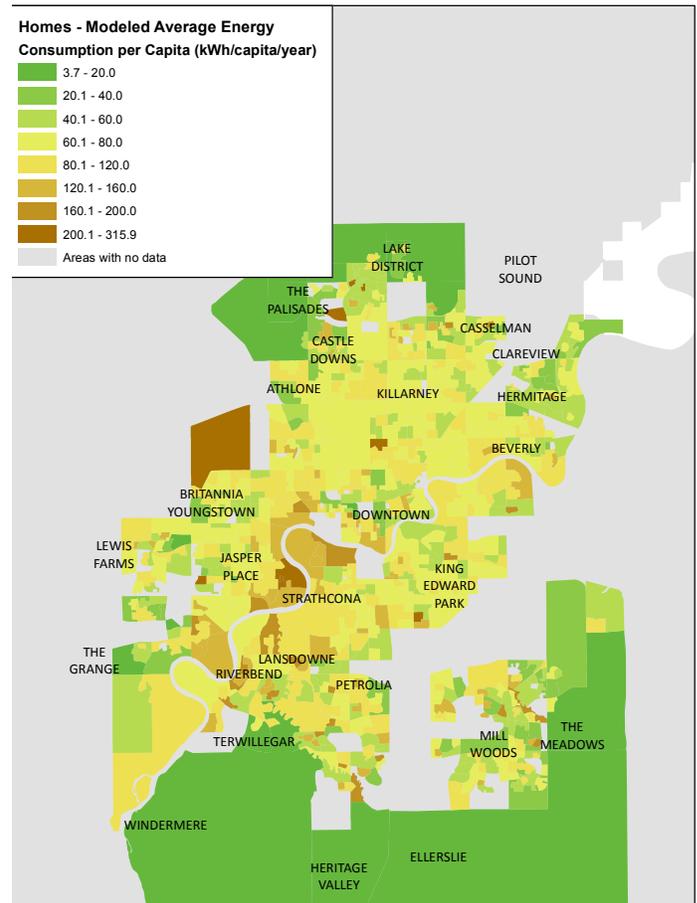
Building energy mapping methodology

Within each Dissemination Area (DA) unit of analysis, the total building energy consumption is estimated by multiplying the total floor area of each building type by average energy intensity for that type; the average energy intensity is then calculated by dividing energy by floor area for that DA. Energy intensities for each building type are based on NRCan data, and modified by the average building age for that area.

4.1.2 Energy Use for Larger Commercial Buildings

The energy use pattern for larger commercial buildings is complex (See: Figure 5). It is difficult to compare the energy efficiency of larger commercial buildings, as available energy use data does not separate energy used by the building, and the energy used for the commercial, industrial, or institutional functions of each building, since these functions can vary significantly from building to building. This is especially the case for industrial facilities, which can entail very large energy consumption for processes. Analysis of the contribution of building types and energy uses to overall energy consumption is beyond the scope of this report.

Figure 4: Home Energy Use by Census Dissemination Area



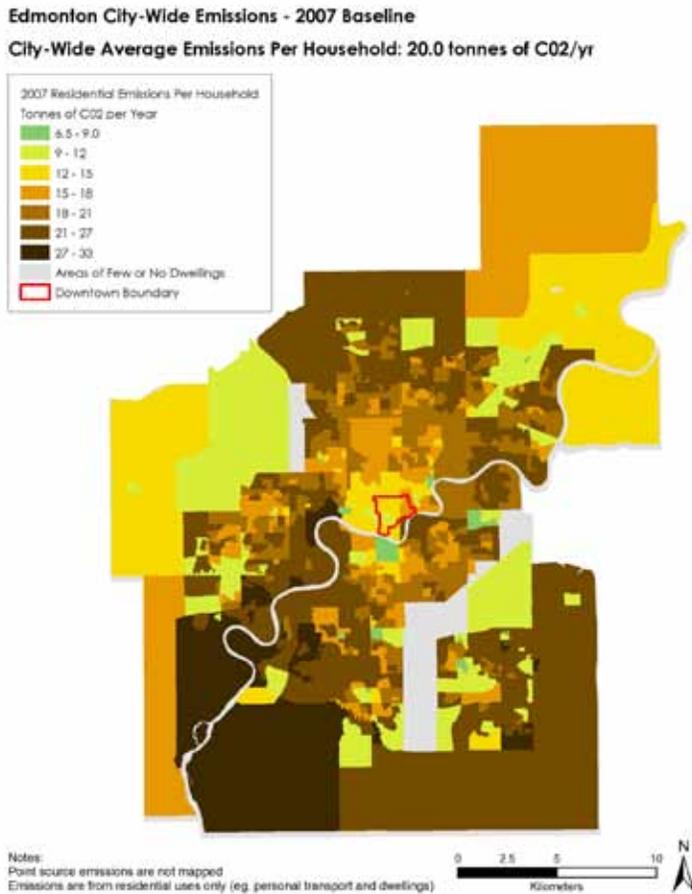
Building energy mapping methodology

Within each Dissemination Area (DA) unit of analysis, the total building energy consumption is estimated by multiplying the total floor area of each building type by average energy intensity for that type; the average energy intensity is then calculated by dividing energy by floor area for that DA. Energy intensities for each building type are based on NRCan data and modified by the average building age for that area.

4.1.3 Overall Energy Performance

Due to the number of factors in play, including building age, climate, and many others, it is challenging to evaluate building energy performance in Edmonton against other jurisdictions. However, we do know that energy

Figure 6: Residential GHG Emissions



4.2 HOUSEHOLD WATER USE

The benchmarking for water consumption compares the level of water efficiency in Edmonton’s buildings to other Canadian and international cities (See: Figure 7).

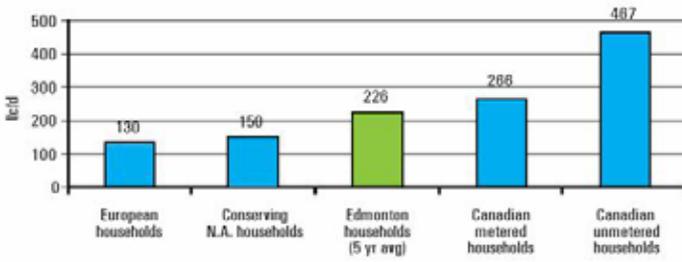
Edmonton uses water metering, which contributes to an overall pattern of relatively conservative household water usage, especially by Canadian standards. However, additional conservation measures could bring these rates down even further, as highlighted by the much lower usage rates seen in North American households that practice water conservation.

Our conclusion is that Edmonton’s water use is relatively low and therefore we anticipate that the Green Building Plan should aim to support existing water efficiency strategies that have proven to be successful.

4.3 GREEN BUILDING CERTIFICATION

There are several third-party green building rating systems

Figure 7: Residential Water Usage Rates



available on the market. These voluntary rating systems help developers gain recognition and ideally, financial benefit for taking steps to provide high environmental performance buildings. There are rating systems that are used predominantly to certify new commercial buildings (LEED-NC), new homes (BuiltGreen and EnerGuide), and commercial buildings operations (BOMA BEST). A comparison of the adoption and performance of buildings that are registered in these different rating systems, as presented below, provides an indication of the overall green performance of Edmonton’s buildings compared to other cities and best practices.

Benchmarking for green building certification is useful as these systems provide an indication of the degree in which other important aspects of green building are being taken up by the market. Water and energy efficiency, the use of regional and recycled content in building materials, indoor environmental quality, solid waste reduction and diversion, and site selection are some of the important aspects of green building that are addressed by these systems.

4.3.1 LEED

The Canada Green Building Council (CaGBC) was created in 2003 to further the expansion of green building in Canada. The Canada Green Building Council’s mandate is to “Lead and accelerate the transformation to high-performing, healthy green buildings, homes and communities throughout Canada.” The Canada Green Building Council is best known for the management of the Leadership in Energy and Environmental Design (LEED) green building rating system in Canada. Developed by the U.S. Green Building Council (USGBC), LEED is intended

to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. LEED is a third-party certification program and an internationally accepted benchmark for the design, construction and operation of high performance green buildings.

LEED Canada for New Construction (LEED NC) is the most popular rating system for non-residential building construction with 382 projects registered in Alberta and 82 projects registered in Edmonton. Since the CaGBC was only started eight years ago, the number of certified projects is much smaller with only two projects certified in Edmonton and 27 certified in Alberta. In addition to these CaGBC certified buildings, there are 12 USGBC LEED NC certified projects in Alberta (five are located in Edmonton).

Alberta has had significant uptake of the LEED for Homes program, with 150 of the 784 Canadian registrations being in Alberta. Two of the registrations have been in Edmonton. This differs significantly from Calgary, which has 87 LEED for Homes registrations.

The LEED for Neighborhood Development (LEED ND) program was launched as a pilot program through the USGBC in 2007. Twenty-three projects are registered in this pilot program in Canada including two projects in Edmonton.

4.3.2 BuiltGreen

The Canadian Home Builders Association (CHBA) is an industry driven group started in 1943 that now represents the voice of more than 8,000 builder firms nationally. In 2003, the CHBA launched Built Green Canada as an industry driven voluntary program to promote sustainable building practices and reduce the impact of home construction on the environment. In 2004, the CHBA formed the Built Green Society of Canada to own and manage the Built Green program.

Over 16,000 homes have been registered in Canada, and over 12,000 homes have been certified under the Built Green program. The program is most popular in Alberta, where it originated, where 13 per cent¹⁰ of the provincial

¹⁰ Built Green certifications as a percentage of annual Alberta new residential construction was calculated by dividing the 2009 Built Green enrolments by the new residential construction starts. http://builtgreencanada.ca/uploads/files/2010_AGM_REPORT.pdf

construction seeks Built Green certification representing over 80 per cent of the national Built Green registrations and certifications.¹¹ The take up of BuiltGreen in Edmonton has been relatively good. As of 2010, there were more than 2000 BuiltGreen homes in Edmonton.

4.3.3 EnerGuide for Houses

EnerGuide is a system that rates the energy performance of a wide range of products including both new and existing houses. Initiatives including Built Green and government rebate programs use EnerGuide as a basis for their programs as well.

Records show that uptake of EnerGuide rating for new homes in Edmonton is lower than seen in Calgary, possibly due to the relative amount of Built Green houses in each city.

4.3.4 BOMA BEST

The Building Owners and Managers Association was started in Vancouver in 1902. BOMA Canada was formed in 1944 and now represents over 2,500 industry professionals representing over 1.9 billion square feet (177 million square metres) of office space in Canada. BOMA Canada launched the BOMA BEST (Building Environmental Standards) in 2005 to address an industry need for realistic standards for energy and environmental performance of existing buildings based on accurate, independently verified information.

Since 2005, over 1200 office buildings representing 225 million square feet (21 million square metres) have achieved BOMA BEST certification. Alberta Infrastructure has alone certified 82 of their buildings with BOMA BEST.¹²

4.4 OTHER BENCHMARKING INITIATIVES

There are many other benchmarking initiatives impacting the building industry. For example, bird friendly guidelines and mandatory design requirements are becoming more common. These initiatives encourage buildings to turn out lights at night to reduce the quantity of birds striking windows at night. They also promote architectural design

¹¹ http://builtgreencanada.ca/uploads/files/2010_AGM_REPORT.pdf

¹² BOMA BEST Energy and Environmental Report, p. 20. http://www.bomacanada.ca/docs/BBER_2010_ENG_TEXT_LRes2.pdf

features that reduce the likelihood of building-related bird fatalities such as the use of thick mullions, frits, shades, awnings and other strategies to help building glazing appear “solid” to birds. There is a long list of other initiatives include policies promoting green roofs, mixed-use development, and various other building-related initiatives.

4.5 LEADING EXAMPLES AND CASE STUDIES

4.5.1 The Village at Griesbach

The Village at Griesbach is a Canada Lands LEED-ND Gold Certified Neighbourhood. This Canada Lands Company project is converting a former military base into a vibrant community for 13,000 people to work, live and play. The homes will be designed to be more energy-efficient, use less water and natural resources, create less waste and offer less exposure to mold and mildew. Significant efforts have been made to preserve 95 per cent of heritage trees to create tree lined sidewalks that support the greater efforts to promote neighborhood walkability.

4.5.2 PCL Centennial Learning Centre

The Centennial Learning Centre was built in celebration of PCL's corporate centennial and focuses on staff training and education. The project included many leading-edge design features including a high performance building envelope, green roofs and ENERGY STAR-qualified roof products, a solar chimney, and an earth tube ground heat exchanger for the fresh air intake. It is 38 per cent more efficient than Model National Energy Code for Buildings requirements and includes plumbing fixtures that reduce water use by 58 per cent. Best practice construction management resulted in an impressive 97 per cent construction waste diversion rate. The Centennial Learning Centre was the first LEED Gold certified commercial building in Alberta.¹³

4.5.3 The Riverdale NetZero Project

Riverdale NetZero is a new semi-detached duplex on a prime inner-city site in Edmonton. Each two-storey home is approximately 234 m² (2,519 sq. ft.), including the basement. These homes have been designed and



Photo: Village at Griesbach, The Canada Lands Company



Photo: Village at Griesbach, The Canada Lands Company



Photo: Centennial Learning Centre, PCL, Ray Steinke



Photo: Centennial Learning Centre, PCL, Tom Arban

¹³ <http://www.pcl.com/NR/rdonlyres/82871038-509F-40FC-A1F6-841A4B0B7361/19947/PCLCLCSustainableFeatures.pdf>

constructed with the intent that they are healthy to live in, produce as much energy as they require in a year, reduce energy use to a minimum, conserve resources, have low environmental impact, and be marketable to people interested in investing in sustainable homes.

4.5.4 Triffo Hall, University of Alberta

Triffo Hall, constructed in 1915, is one of the oldest buildings at the University of Alberta. It provides conference facilities and a laboratory in the historic South Lab. The two-storey heritage structure is composed of two bays with a saw-tooth roof configuration including clerestory windows. Sustainable design strategies include the reuse of an existing historic structure (98 per cent of the existing building fabric was retained), maximal use of daylighting, minimal application of additional materials, capture and re-use of rainwater, and high performance heating & cooling systems. Triffo Hall is both the first project and first major renovation at the University to be registered with LEED and achieved LEED Gold certification in 2009.

4.5.5 Edmonton Police Service - Southeast Division Station

In 2007, the Edmonton Police Services' South East Division Station became the city's first LEED Gold-compliant project and the first police station in North America to achieve the standard. The police station has many environmentally responsible features such as the use of recycled building materials, certified wood, use of greywater from the showers for flushing toilets, storage of two months of site rainwater, operable windows to increase natural ventilation and a thermal chimney. It achieved a 43 per cent energy savings compared to a code compliant design.



Photo: Riverdale NetZero Project, CMHC



Photo: Triffo Hall, University of Alberta Sustainability Office



Photo: Edmonton Police Service Southeast Division, IBI Group

4.5.6 Edmonton City Hall

City Hall received a BOMA BEST - Level 1 certification from the Building Owners and Managers Association (BOMA) of Canada. The green practices established at City Hall include converting to low-energy use lighting, replacing old carpet with more environmentally friendly carpet, using green products in the heating, ventilation and air conditioning systems and having custodial staff use green cleaning products. Employees are continually encouraged to reduce their environmental footprint by turning off lights, recycling paper, metals, glass, cardboard, plastic, and toner cartridges from printers.

4.5.7 Habitat for Humanity

In 2010 construction started on 47 homes built as part of the Habitat for Humanity Edmonton project in the Anderson Gardens community. These homes will be certified to the BuiltGreen Standard.

4.5.8 Epcor Tower

The 28 storey Epcor tower was completed in 2011, meeting a LEED Silver level certification. A few of the notable energy efficiency features include motion sensors, heat recovery, and radiant heating and cooling to improve energy efficiency. The building also promotes water efficiency with efficient fixtures and a green roof that will be irrigated from a rainwater harvesting system. The EPCOR Tower at Station Lands is adjacent to stops for 33 Edmonton Transit bus routes, and across the street from indoor access to the Churchill LRT Station via City Hall.

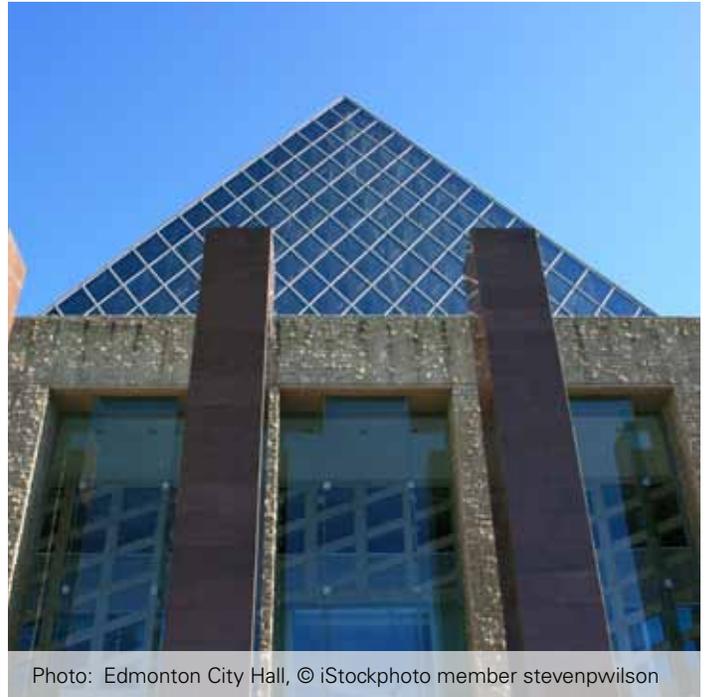


Photo: Edmonton City Hall, © iStockphoto member stevenpwilson



Photo: Epcor Tower in Edmonton, Alberta as viewed from Churchill Square. CC Attribution-Share Alike 3.0 license from Thankyoubaby



Photo: Habitat for Humanity

5.0 CHALLENGES

Green building in Edmonton faces a number of barriers and constraints. While these challenges do present real and in some cases, significant obstacles for the short term greening of Edmonton's buildings, this Plan strives to provide steps that can be taken now and over the next five years that will help overcome these challenges.

As shown in the following discussion, there are challenges associated primarily with government, as well as market barriers and constraints.

5.1 GOVERNMENT BARRIERS AND CONSTRAINTS

5.1.1 City of Edmonton

Solar access not prioritized in development planning.

Solar access is crucial to buildings' passive solar heating. Passive solar can provide substantial portions of the annual heating load in our climate, significantly reducing energy use. City development planning processes such as Area Structure Plans, Area Redevelopment Plans, and Neighbourhood Structure Plans, in addition to Mature Neighbourhood Overlays, Urban Design Plans, and Neighborhood Design Guidelines can provide opportunities to ensure that blocks are laid out so that buildings have adequate orientation and solar exposure for passive design. Ideally, streets will be oriented lengthwise along an east west axis, maximizing southern exposure for buildings along these streets. During the City's long range planning efforts, solar orientation could be better prioritized. Currently, it may be too readily sacrificed in favour of other considerations, such as road access, servicing conduits, and views.

Approvals reports for subdivision, rezoning, or development permit do not explicitly consider green building performance. Generally green building features are not required for these applications, so green building considerations are not necessarily made explicit in staff reports or elsewhere in the approvals process.

Staff review of innovative technology. In the development world, time is money; therefore, extra time spent during approvals of green buildings can reduce their



Photo: © iStockphoto member benedek

uptake. Development applications for energy and water efficient construction tend to be complete and well-developed, speeding approvals for most green residential developments. However, some innovative green technologies fall outside the Building Code or other regulations. Consequently, applications can sometimes take longer to process due to the need for staff to review and investigate these technologies.

5.1.2 Senior Government

Alberta Building Code. The Alberta code has some energy efficiency requirements for small buildings, and none for large buildings. New homes typically achieve an EnerGuide rating of 70. The new National Building Code is expected to raise the energy efficiency level equivalent to EnerGuide 80 for houses. It is anticipated that the Alberta code will adopt this requirement in the future.

5.2 MARKET BARRIERS & CONSTRAINTS

Cost premiums. Opinions on cost premiums for green buildings range from 0 to 10 per cent premium over conventional building costs. The consensus of opinion is that cost premiums are decreasing as builders and developers gain more experience with building green.

Split incentives. Green buildings can create lower operating costs and lower life cycle costs for commercial, institutional and residential buildings. However, the developer of a green building will not necessarily be the beneficiary of these lower life cycle costs. This barrier is known as a “split incentive”, whereby the developer pays for added capital costs, while residents/occupants reap the benefits of lower utility bills, and additional benefits (health, etc).

Limited market demand. Surveys indicate that high proportions of corporate users will pay more rent to secure green space. Amongst health motivated buyers of residential units, well over 50 per cent will pay more for green space. Green buildings can also support higher rents and selling prices for residential properties. However, research has indicated that the current Edmonton market is somewhat limited and this creates uncertainty for many investors and developers. It should be noted that in the eyes of many investors, the benefits of green commercial buildings is stronger over longer rather than shorter investment horizons.

Market acceptance of co-benefits and externalities.

Adding non-financial benefits such as increased productivity and health value to financial benefits can support total benefits of green being 10 times the initial capital cost. Further, adding externalities that accrue to society rather than developers, investors and building users further increase the benefits of green buildings and greatly enhance the case for green buildings. The challenge is gaining market acceptance of the co-benefits of green building.

The business case is stronger for commercial than new residential buildings. The case for green buildings from commercial and institutional property owners and developers is strong. Through life cycle analyses, owners can see that investing in green pays off through better returns on investment. The case for green buildings from residential households is more difficult. It is hard for residential households to justify paying more now for financial advantages that will not be realized for some years to come.

Industry capacity. A key factor in the greening of Edmonton buildings will be the availability of the human and technical resources needed to undertake the transformative changes. Fortunately, local post-secondary institutions offer multiple programs that emphasize green building and management practices. For example, the University of Alberta has a School of Energy and the Environment that offers relevant courses including clean energy and electrical systems, renewable energy engineering and sustainability, life cycle assessment, energy auditing, and energy simulation. The Northern Alberta Institute of Technology (NAIT) has both a building environmental systems technology program and an architectural technology program that offer an emphasis on sustainable building practices.

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PART II:
HOW WE
MAKE IT
HAPPEN

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6.0 ACTION FRAMEWORK

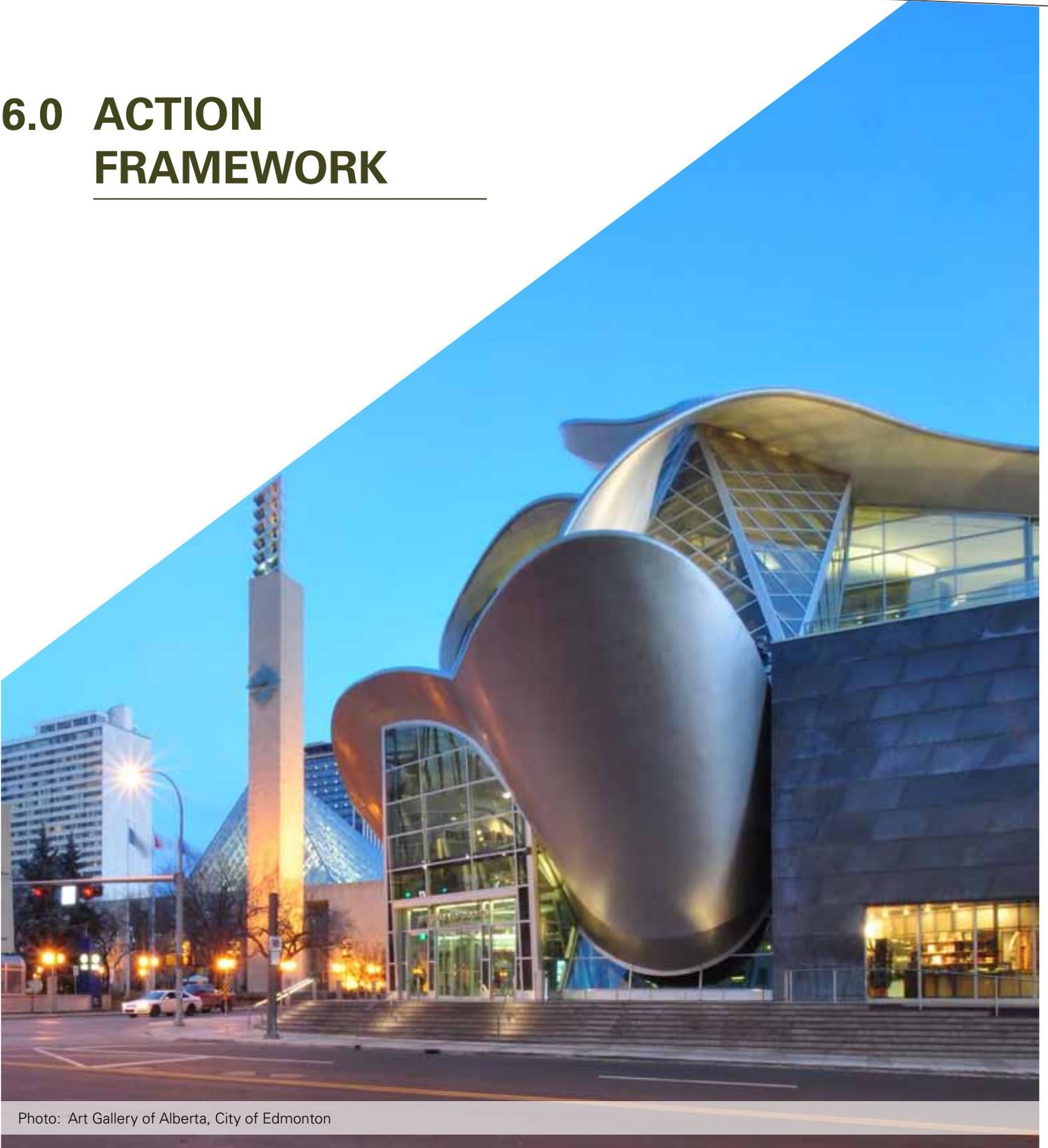


Photo: Art Gallery of Alberta, City of Edmonton

6.1 GREEN BUILDING PLAN: THE “BUILDING” DIMENSION

The Plan’s proposed programs have been organized into a framework that distinguishes buildings by building type. The four basic building types used by the Plan are:

- › New Homes
- › New Large and Commercial Buildings
- › Existing Homes
- › Existing Large and Commercial Buildings

This framework has been devised in order to facilitate the development of programs and policies tailored to the unique opportunities and challenges of each building type.

As specific initiatives are further developed and rolled out, these may need to delineate the applicability of policies and programs to more specific building types.

New Homes. Within the process for permitting and building new single-family houses, duplexes and townhouses, the City has the opportunity to target big improvements in energy use, water use and other elements of green building.

New Large and Commercial Buildings. With future development planned or underway for the downtown, city centre neighbourhoods and the City Centre Airport lands, new multi-family and mixed-use buildings are an increasingly important product in Edmonton’s housing and building market.

Existing Homes. Green home renovation has great potential for improving the greenness of Edmonton’s buildings and is an important component of its Green Building Plan.

Existing Large and Commercial Buildings. Existing multi-family and mixed use buildings are pivotal pieces of Edmonton’s green building stock. Encouraging the owners of these buildings to undertake major green retrofits offers great potential for improving the sustainability of Edmonton’s multi-unit residential buildings. With respect to Industrial, Commercial, and Institutional (ICI) buildings, the energy and water consumption patterns in these buildings are often much higher than with residential buildings. While recognizing that many industrial processes will, by their nature, require the use of large amounts of energy and water, this Plan will seek means for ICI building operators to green their operations where possible.



Photo: City of Edmonton

Definitions

“Homes”: Single-family detached houses, duplexes, townhouses, and apartment buildings less than four storeys.

“Large and commercial buildings”: Multi-family and mixed use buildings taller than four storeys, “Part 3” buildings, and industrial, commercial, and institutional (ICI) buildings.



Photo: © iStockphoto member sundown001

6.2 GREEN BUILDING PLAN: THE “GREEN” DIMENSION

The “green” dimension addresses the key sustainability objectives. As introduced earlier, these are driven by *The Way We Green*. In the table below, the first six issues are from *The Way We Green*; economics and health have been also included, to reflect the additional City goals for the Green Building Plan. This table illustrates the level of influence that the Green Building Plan could have on these sustainability issues, and also indicates some of the green building elements or components that would likely be part of a Green Building Plan.

Table 3: Green Building Plan: The Green Dimension

Sustainability Issue	Relative Plan Influence (at large scale)	Select Green Building Elements and Components
Energy and climate change	H	Building energy efficiency, building form & location, low carbon materials
Water	M-H	Building water efficiency, landscaping design, including green roofs (Drainage)
Food	M	Potential for edible landscaping, gardens, small plot intensive urban farms
Air	L	Low VOC materials
Solid waste	L-M	Recycling facilities, construction waste management, recycled materials content
Biodiversity	L-M	Landscaping, green roofs, building form, bird-friendly design
Economics	M-H	Capital and operating costs, improved productivity
Health	M	Healthy indoor/outdoor environment

6.2.1 Green Standards

Green standards, establishing a benchmark for green building/energy performance, are an important part of green building program and policy design. For example, incentives such as development permit fee rebates may be granted if the development application meets a certain “green” standard.

Green building standards may cover a wide range of green building and sustainability issues (e.g., LEED green building rating system), or may address one specific area (e.g., Energuide). Standards may also be custom-developed to suit the situation (e.g., a sustainability checklist).

Table 4 summarizes a range of third-party green standards that could be applied to each of the four main building dimensions. Based on staff and stakeholder consultation, the standards have been prioritized from most to least preferred, within each of the four streams. Note however that all the standards shown received some level of support; a well-designed green building policy may be flexible enough to include many or all of these.

All these third-party standards or rating systems have multiple levels of performance that are achieved based on verified project design – for example LEED NC Certified, Silver, Gold and Platinum performance levels.

Projects could qualify for incentive programs for being certified under a rating system to a particular level, or potentially achieving “equivalency.” The latter can reduce project soft costs as well as increase uncertainty in verification processes. Primary values of third-party rating system certification include industry, and public recognition and defensibility due to verification procedures.

Table 4: Third-Party Building Design and Rating Systems

Stream	System	Comments
New Homes	Energuide	Energy performance only
	LEED for Homes	
	BuiltGreen	Includes Energuide
	Passive House	Aimed at very high energy performance only; less established in Canada
	Living Building Challenge	Leading edge, very high performance green building rating system
New Large & Commercial Buildings	LEED NC	Multi-storey residential towers, ICI sector, mixed use
	LEED CS	Core & Shell (similar to NC, but for buildings less than 50% fit-up)
	BuiltGreen MS&RT	Multi-Storey & Residential Tower (stacked units)
	ASHRAE 90.1/MNECB	Energy performance only
Existing Homes	Energuide	Energy performance only
	LEED for Homes	Only if undergoing full renovation that exposes insulation
	LEED CI	For tenant improvements
Existing Large & Commercial Buildings	LEED NC	Major renovations
	LEED EB: O&M	Operations & maintenance
	BOMA BESt	Operations & maintenance
	LEED CI	For tenant improvement renovations

Third-party standards such as LEED can also be referenced within local government policy for specific issues, such as energy. For example, policy could require a project to achieve equivalency of a minimum of four points under LEED NC “Optimize Energy Performance” credit.

In addition to third-party green standards, some programs and policies may utilize customized green standards, that such as sustainability checklists, that potentially offer increased flexibility, lower soft costs for industry, and provide the opportunity to create made-in-Edmonton solutions based on local priority issues. For example The Quarters Downtown Overlay created a customized checklist of green features linked to density and height incentives that does not include direct reference to 3rd party green building rating systems such as LEED – though many of the checklist items parallel those in LEED.

City staff and stakeholders have also identified the importance of food systems/urban agriculture, and biodiversity/habitat including bird-friendly design, in the Edmonton context; these aspects also support objectives of *The Way We Green*. These green elements would be important to consider within customized Edmonton green standards such as a sustainability checklist.

Customized green standards can also pose challenges in terms of effort needed to develop them, as well as verification and defensibility, relative to third-party systems. Programs that rely on customized standards need to take these issues into account, and balance them against the benefits. Some sustainability checklists developed in other jurisdictions include both third-party standards such as LEED and customized green elements – for example allowing standards to be achieved through multiple pathways.

6.3 GREEN BUILDING PLAN: THE “PLAN” DIMENSION

The strategic framework for action will be based on the Market Transformation Curve which suggests that different types of actions are associated with specific types of changes in the green building market.

For the various elements of green buildings, as identified in the previous section, the current state of market transformation needs to be assessed. Based on this assessment, the strategy for further market advancement can be developed.

For example, if an incentive program has been undertaken and the uptake shows a high level of consumer acceptance for the product or service, regulations or permanent / long-term price-signals may be the next step required in this area. Conversely, if a product or service is new, a demonstration project may be the next step required.

Once the current state of market transformation has been assessed, a series of steps for further market transformation should be determined to allow the overall strategy to create an impact over the next five to 10 years until a review and update of the Green Building Plan is completed.

It is important to note that self-sustaining market transformation occurs once regulations or permanent price-signals are in place. These stages are therefore the primary goal of a market transformation strategy.

6.4 BEST PRACTICES: THE MUNICIPAL TOOLBOX

A comprehensive review of best practices in North American approaches to green building strategies was conducted. Based on a market/community transformation theory, these best practices were grouped and analysed according to these broad categories:

- › Education and Capacity Building
- › Incentives
- › Financing Tools and other Services
- › Regulatory Tools

The full list of these best practices was explored in a workshop with the project Working Committee on March 16th, 2011, and this complete list can be found in the Appendix D of this Plan. The preferred best practices from this list have been incorporated into the Recommended Programs and Actions detailed in the following section in this Plan.

7.0 RECOMMENDED PROGRAMS AND ACTIONS

The Green Building Plan consists of one core program and four focused, sector-specific programs. The core program would be overarching and consist of elements that would be common to each of the four sector-specific programs.

These five programs would be:

1. Core Green Building Program
2. New Homes Program
3. New Large & Commercial Buildings Program (Multi-unit residential buildings (MURBs) and Industrial, Commercial, and Institutional (ICI) buildings)
4. Existing Homes Program
5. Existing Large & Commercial Buildings Program

The following tables outline the recommended components of these programs, as developed in collaboration with the City of Edmonton, the project Working Committee, industry stakeholders, as well as considering public input.



Photo: City of Edmonton

CORE GREEN BUILDING PROGRAM

	Primary Area of Impact	Type
Promotion of tools and programs	Cross-cutting	Education / Capacity Building
Staff & Industry Education, Training & Capacity Building	Cross-cutting	Education / Capacity Building
Demonstration Projects	Cross-cutting	Education / Capacity Building
Green Building Recognition Program	Cross-cutting	Education / Capacity Building
Bylaw, Policy and Process Review	Cross-cutting	Regulatory Tools
Green Lease Program	Cross-cutting	Regulatory Tools
Financing Strategies	Cross-cutting	Financing

NEW HOMES PROGRAM

	Primary Area of Impact	Type
Building Energy Labelling	Energy/GHG	Education / Capacity Building
Green Building Checklist and Guidelines	Cross-cutting	Capacity Building or Regulatory
Green Home Buyer's Guide	Cross-cutting	Capacity Building

NEW LARGE & COMMERCIAL BUILDINGS PROGRAM

	Primary Area of Impact	Type
Green Building Checklist and Guidelines	Cross-cutting	Capacity Building or Regulatory

EXISTING HOMES PROGRAM

	Primary Area of Impact	Type
Building Energy Labelling	Energy/GHG	Education / Capacity Building
Green Renovation Program	Energy/GHG or Cross Cutting	Education / Capacity Building

EXISTING LARGE & COMMERCIAL BUILDINGS PROGRAM

	Primary Area of Impact	Type
Green Renovation Program	Energy/GHG	Regulatory Tools
Operations and Recommissioning	Energy/GHG	Financing Tools

PROGRAM 1: CORE GREEN BUILDING PROGRAM

The Core program cuts across multiple building sectors and supports many of the sector-specific elements within each of the four specific green building programs.

PROGRAM 1.1 PROMOTION OF TOOLS AND PROGRAMS

Summary and Rationale

In order for programs and tools to be effective, consumers need to be aware of them. Therefore, each program and initiative needs to have an outreach and promotion strategy. These outreach activities should be designed to make good use of opportunities generated by other parts of the Plan. There is also benefit to promoting the full suite of activities that the City is undertaking in a broad promotional and outreach campaign. This will help to tie all of the programs and initiatives together and provide a higher profile for all.

How the Program Works

The first step should be the development of an overarching promotion strategy for the Plan. This strategy will establish the short, medium, and longer term actions required to effectively promote and support the Plan, including the need for internal and external partnerships, and estimated levels of staff and funding resources for the various Plan programs. A second step would be the development of individual promotional activities for each program and tool, tailored to the appropriate target markets.

Implementation Phasing

To be determined by the phasing of the programs and tools the outreach is associated with.

Implementation – Funding & Staffing Resources

Funding and staff resources for outreach and promotion should be a part of the resourcing for each program or initiative.

Monitoring and Performance Metrics

- › Success of other programs
- › Citizen and stakeholder awareness of programs

Examples/Case Studies

This is an approach that is widely used in all municipalities. The City of Edmonton's CO₂RE program is a good example of a local initiative that has had extensive outreach and promotion associated with it.

PROGRAM 1.2 STAFF AND INDUSTRY EDUCATION, TRAINING & CAPACITY BUILDING

Summary and Rationale

In order for programs and tools to be effective, City staff and companies within the marketplace need to be aware of them and have the ability and capacity to implement them. Outreach and capacity building activities specifically designed for each audience and their role within the Green Building Plan need to be undertaken.

It is also valuable to build some general awareness around the benefits of green building and the Green Building Plan in order to build buy-in within the City and industry for specific programs and tools.

How the Program Works

Training and capacity building programs would be undertaken as needed for both City staff and industry.

For City staff, the training would likely be integrated into the regular training programs undertaken by the City.

For industry, it has been suggested that there are already various organizations and associations that offer training programs and that it would be good to partner with these groups on any industry training programs.

Implementation Considerations - Phasing

To be determined by the phasing of the programs and tools the training is associated with.

Implementation – Funding and Staff Resources

Funding and staff resources for training should be a part of the resourcing for each program or initiative.

Monitoring and Performance Metrics

- › Success of other programs
- › Staff and industry knowledge of and comfort with new programs
- › Number of requests for information or complaints received

Examples/Case Studies

This is an activity that is widely used in all municipalities, including the City of Edmonton, for any new initiative being undertaken by municipalities that impact the industry.

PROGRAM 1.3 DEMONSTRATION PROJECTS: SUPPORT, FACILITATE AND DEVELOP

Summary and Rationale

The demonstration of new products, services or behaviours are a component of market transformation. Without being successfully demonstrated, new ideas have a difficult time achieving suitable early market penetration. The City has a role to play in supporting, facilitating and developing demonstration projects in order to help advance new green building ideas as a way to prepare the marketplace for continued advancement into the future.

How the Program Works

City staff would have the responsibility of identifying, evaluating and supporting select demonstration project opportunities for the City to support within Edmonton. These types of opportunities are often brought forward by project proponents, but City staff may also bring forward ideas.

Each idea would then be evaluated against a set of criteria to determine if the City should work to support it and the appropriate role for the Corporation. A set of draft criteria is presented below:

- › Ability to enhance the environmental performance of buildings in Edmonton
- › Likelihood of successful demonstration
- › Level of City resources required
- › Leverage of other resources
- › Degree of innovation
- › Replicability
- › Visibility
- › Other economic and social benefits and impacts

Various potential City roles include: project funder, regulatory support, enhanced visibility and credibility through association, technical or staff resources, or assistance with integrating or connecting with other City services and infrastructure.

Implementation – - Phasing

Phase 1: Development of a structure for identifying, evaluating and supporting select projects should first be undertaken. This structure can then be tested and adjusted as necessary.

Phase 2: Once the structure has been developed and tested, it can then be used on an ongoing basis to support demonstration projects in the city.

Implementation – Funding and Staff Resources

Existing staff would likely be used to manage the City's involvement in demonstration projects. Specific funding amounts or mechanisms would need to be identified to enable financial

support for demonstration projects. It should be noted that there are a number of existing and completed such City-led initiatives within the City that are already involved in demonstration projects. Projects within the Smart Choices program, and the City's Sustainable Building Policy are good examples. Any future initiatives should build upon and collaborate with these existing programs.

Examples/Case Studies

A number of high-profile demonstration projects have already been undertaken in Edmonton including the Riverdale Net Zero Energy House.

PROGRAM 1.4 GREEN BUILDING RECOGNITION PROGRAM

Summary and Rationale

Recognition programs can be used to promote green building practices in both new and existing buildings. These programs serve to raise the profile of innovative practices and hopefully motivate others to undertake similar or even more innovative projects.

How the Program Works

The program would invite applications to provide good examples of green buildings and would select winners in four proposed categories: new houses, existing houses, new large buildings and existing large buildings. These winners, and possibly other entries, would be promoted within industry and with the public to encourage other developers, building owners and consumers to adopt similar efforts.

Recognition could also be linked with achievement of high performance levels established through sustainability checklists, assuming there is some level of verification.

Implementation – Phasing

The green building recognition program can be started immediately.

Implementation – Funding & Staffing Resources

Both funding and staff resources are required to administer a recognition program and to promote the winners. The level of funding and resources depends on the level of sophistication the City wishes to have.

A basic program could advertise the program through industry associations, have a fairly simple application, review and decision making process, and could advertise the results through a media release and in partnership with the winning organizations.

The program would look to leverage City and industry partnerships and build on existing recognition programs - for example, the BOMA BEST rating system.

A more involved program could undertake advertising and host a large event to announce the winners.

Monitoring and Performance Metrics

- › Number of award submissions
- › Level of media interest

PROGRAM 1.5 REGULATION: BYLAW, POLICY AND PROCESS REVIEW

Summary and Rationale

The City's bylaws and policies, as well as its approvals and permitting processes, have a significant influence on the uptake of green building by the development industry. Stakeholders including Edmonton industry representatives, Working Committee members, and City staff have suggested a wide variety of potential additions and improvements to the City's bylaws, policies, and processes towards enhancing the City's ability to help improve the sustainability of Edmonton's buildings. Some of these suggestions include:

- › Approvals coordination
- › Solar-ready considerations
- › Development and building permit fee rebates
- › Development cost charge reductions
- › Smart grid-ready considerations
- › Subdivision/redesignation standards or covenants or DP requirements
- › Minimum efficiency standards for existing buildings
- › Property tax rebates
- › Integration of design for biodiversity and habitat
- › Sustainable food system considerations
- › Bird strikes considerations

While each of these ideas has merit and a degree of support, it is recommended that as a first foundational step, all the City's bylaws, policies, and processes be reviewed through the lens of implementing and supporting the recommendations of this Plan.

The goal of this review would be a solid and subtle understanding of how individual bylaws, policies and processes interact and operate within the larger City systems. A set of strategic and coordinated recommendations would effectively support and help implement the Green Building Plan, while avoiding any potential unforeseen consequences.

How the Program Works

The bylaw, policy and process review would involve establishing a team to undertake the review and perhaps contracting a consultant to support the team. This team would then be charged with identifying bylaws, policies and processes that have an impact on the environmental performance of buildings in Edmonton. They would also review and perhaps expand upon the list of suggestions for new bylaws, policies and processes presented above.

Existing structures would then be reviewed for whether they present a barrier or support for green buildings and how they could be modified to further advance green buildings. New ideas would be reviewed for the support they could provide to green buildings in the city. These new ideas or modifications to existing structures would also be reviewed concerning both their positive and negative impacts.

Given the progress made on other programs in the Green Building Plan, decisions would need to be made concerning which new ideas or modifications could be implemented. Consideration of resources and timing of implementation would also need to take place.

Implementation - Phasing

This project should be initiated within one year of adoption of this Plan.

Implementation – Funding and Staff Resources

This project would require the support of the Sustainable Development department and specific allocations of staff time and possibly budget to hire a consultant.

PROGRAM 1.6 GREEN LEASE PROGRAM

Summary and Rationale

This program would require the City to utilize Green Leases for all new leased space. Green leases include clauses to create a cooperative environment for both the landlord and tenant to work towards improvements in building energy efficiency in addition to other green building considerations such as recycling program requirements.

Green leases were created in response to the typical lease situation where the landlord is responsible for capital improvement costs that could improve energy efficiency while the tenant pays for utility costs based on the portion of the building that they lease as opposed to the efforts that they take to conserve energy. Under this traditional lease, there is a disconnect – the landlord pays for the energy saving upgrades, but the energy savings flow to the tenant.

A green lease overcomes this barrier with an explicit agreement between the landlord and the tenant regarding the energy and environmental features of the space. Both parties can make adjustments to their financial decision making now that they have more certainty, and are more aware of the energy and environmental services that are associated with the lease.

How the Program Works

The City of Edmonton would work to determine what requirements it would like to see within new leases it signs. These may include mandatory third-party certification. Information from other green lease arrangements will be

invaluable to this step. A National Standard Green Office Lease is available to guide tenants looking to adopt green leases.

The City would also want to engage with existing and potential landlords on the form of the green lease, and to provide them with adequate lead time to be able to meet future green lease requirements. This could be done, in part, with the help of the Building Owners and Managers Association (BOMA) and the Real Property Association of Canada (REALPac). It should be noted that green leases have the support of industry associations such as BOMA and REALPac.

Ultimately, mandating green leases would require the creation of a new City policy or the amendment of an existing policy.

Once a green lease program is established, outreach to other tenant groups would be important to increase uptake of green leases outside of City leases.

Implementation - Phasing

Phase 1: Assess the costs and benefits of different forms of green leases and decide on a green lease format for the City.

Phase 2: Review the successes and challenges of the City's experiences with green leases and revise the lease accordingly.

Promote successful green lease approaches to other organizations.

Implementation – Funding & Staffing Resources

Additional work is required by the City's Corporate Properties branch to institute green leases, but it is expected that this can be addressed within current practices to actively manage the City's leases.

Monitoring and Performance Metrics

- › Floor area of space under green lease
- › Estimated environmental benefit of green leases
- › Number of other organizations in Edmonton using green leases

Examples/Case Studies

REALpac publishes the National Standard Green Office Lease which is a modified version of their National Standard Office Lease. BOMA has published a guide to sustainable and energy efficient leasing.

PROGRAM 1.7 FINANCING STRATEGIES

Summary and Rationale

Many green building opportunities are economically viable in theory, but are impeded by one or more real-life financial barriers. By lending support to green building financing programs, the City can help overcome market barriers to green building and home retrofits.

Green financing strategies would support several of the programs of this Green Building Plan. The key Plan programs that would benefit from financial strategies are the Green Lease Program, Building Energy Labeling programs, the Green Renovation Programs, and the Operations and Recommissioning program.

How the Program Works

Financing can be done in a number of different ways, but the basic premise for green financing program is that it offers easy or more attractive financing for green building or upgrades.

Examples of green financing include:

- › Reduced lending rates or insurance premiums
- › Repayments made via utility bills
- › Financing integrated with energy assessments and retrofit providers

Implementation — Phasing

Phase 1: Establish a strategically-selected pilot project to test the program structures before a broad roll out. For example, financing as part of an existing homes retrofit program may be a priority. In considering this, the City may want to focus on upgrades that are more likely to be successful such as commercial lighting (very attractive return on investment, relatively simple and relatively sophisticated clients).

Phase 2: Expand the program to a larger number of clients and all types of upgrades.

Implementation – Funding and Staff Resources

The City will identify the first priority pilot projects for Phase 1 development. The specific program requiring the financial strategy will require differing approaches and levels of funding and staff resources. Whether financing strategies for home retrofits, green leases, or building energy labeling, the City should also consider strategic partnerships that may help develop and support the specific program.

Monitoring and Performance Metrics

The monitoring and performance metrics will depend on the financing strategies being pursued.

Examples/Case Studies

The Toronto Atmospheric Fund was started in 1991 with an endowment of \$23 million from the City of Toronto. Since then, the fund has distributed \$51 million in grants and loans to projects such as energy efficiency retrofits, upgrading of appliances in community housing, pilot projects, feasibility studies, support for social enterprises, and grants for community projects.

- › Original endowment provided in 1991: \$23 million
- › Grants and loans provided by TAF since 1991: \$51 million
- › City energy budget savings supported by TAF: \$55 million
- › TAF average annual budget: \$1.9 million
- › Average administrative costs: 19 per cent
- › External funds raised (2007-2010): \$1.3 million
- › Annual cost of TAF to City operating budget: \$0

TAF has funded all of its operating, financing and granting activity since 1991 while retaining its original endowment capital.

Clean Energy Works Portland is a program that has provided loans and retrofits to over 400 houses at a value of nearly \$6 million. The program features include:

- › Online application
- › Energy assessments at no cost
- › Impartial source of information for consumers
- › Pre-qualified contractors and quality control mechanisms
- › 20-year amortized loan, transferable at time of sale
- › On-bill repayment of loans
- › Advertising and marketing

The program is now looking to expand using additional funding from various levels of government and is also looking to attract private capital in future stages.



Photo: City of Edmonton

PROGRAM 2: NEW HOMES

PROGRAM 2.1 BUILDING ENERGY LABELLING

Summary and Rationale

This program would encourage, and eventually require, all new homes (single detached, attached, row and town houses, low rise apartments) to be labelled with an EnerGuide rating prior to sale, or prior to granting of occupancy permit. The EnerGuide label indicates to home buyers the level of energy performance of the home, and by extension the relative energy costs. In principle, a home with a higher EnerGuide rating would have a higher market value. EnerGuide labelling is used on many products such as major appliances, and is now being utilized for housing. EnerGuide ratings and supporting information may be linked into the Canadian Real Estate Association's Multiple Listing Service (MLS) system.

How the Program Works

Initially, the energy labelling program would be voluntary. The home owner or builder would engage a certified Energy Auditor to conduct a home energy assessment. The energy assessment includes modeling of the home's design, and a blower door test following construction. This would result in a determination of the EnerGuide rating, from 0 to 100, and issuing of an EnerGuide label. The EnerGuide rating, and optional link to the energy efficiency report, would then be included in the MLS system.

For a mandatory program, all new homes would be required to obtain an EnerGuide rating and label, with linkage to the MLS system if appropriate, prior to occupancy.

Implementation and Phasing

Phase 1:

- › Develop a public education and promotion strategy for the home energy labelling pilot program. Goals of this strategy would include:
 - » Build market awareness of the benefits of energy efficiency and green homes
 - » Target the net economic benefits and paybacks as much as possible, and express these on a monthly and annual basis. The savings (along with any grants) must be significant enough to make energy retrofits attractive
 - » Highlight co-benefits. For example, renovations for other reasons (e.g. aesthetics or maintenance) may result in energy savings as well
 - » Include EnerGuide information in a Green Home Buyers Guide

- › Work with the auditing industry to explore opportunities to reduce the cost of labelling. Work with home builders to build capacity within the industry for EnerGuide assessments
- › Work with the Edmonton Real Estate Board (EREB) to create linkages to MLS, help disseminate program information and build adoption while engaging the industry (e.g. real estate agents)
- › Track program adoption and evaluate the pilot program, including feedback from participants and other stakeholders
- › Further explore the development or updating of a policy or bylaw requiring mandatory EnerGuide labelling – for example, a building bylaw linking energy labelling to occupancy permits

Phase 2:

- › Pending results of the pilot program, develop and launch a mandatory energy labelling program (without a minimum performance requirement) by the end of 2013
- › Evaluate the impact of the labelling program and track building performance
- › Note that it is expected that at some point in the future, the Alberta Building Code will include a minimum mandatory EnerGuide rating

Implementation – Funding and Staffing Resources

Obtaining an EnerGuide rating does entail cost to the owner/builder and/or buyer. It is expected that once auditing firms are set up to offer this service on a full-time basis, the economies of scale should allow the EnerGuide labelling service, including energy model, home inspection and report, to be offered for about \$500 or less. The City may want to consider providing an incentive to offset some of the energy labelling costs to facilitate uptake.

Costs to the City will primarily be staff costs to develop and administer the program, including monitoring.

Market Transformation

Home energy labelling will contribute to the transformation of the market by enhancing pricing signals to home buyers of energy costs associated with the normal operation of the home. The long-term impact of this program will be a more sophisticated consumer and a better developed market for energy efficient homes. Financing for the initial outlay required for modeling and testing can be addressed by proposed Green Building Plan Program 1.7 Financing Strategies.

Monitoring and Performance Metrics

- › Number of new homes labelled vs. number of new homes sold
- › Program feedback from participants and stakeholders, including influence of labelling on buyer decisions

Examples/Case Studies

- › City of Prince George; City of Vancouver
- › Boulder, Colorado
- › Time of Sale Home Energy Labelling Pilot, LiveSmart BC/ Victoria Real Estate Board

PROGRAM 2.2 GREEN BUILDING CHECKLIST

Summary and Rationale

A Green Building or Sustainable Development Checklist would be incorporated as part of permit applications. This would help build capacity within the development and building industries to create green, high performance buildings, and act as a tool to facilitate green building market transformation.

How the Program Works

When submitting applications (e.g. subdivision, development, and/or building permit approvals) applicants would complete and submit a checklist. The checklist would create awareness of green building practices and optionally link applicants with green design resources, and can also serve as a framework for discussion of green building commitments with City approving staff.

Completion of the check list would be voluntary but strongly encouraged through marketing and other support mechanisms. To be effective, it is recommended that completion of the checklist, or achievement of some minimum requirement, is linked with incentives (e.g., permit fee rebates, recognition) or green financing.

The checklist would need to cover the desired “green dimensions” of the project. This content may be developed specifically for Edmonton, building on existing City of Edmonton sustainability checklists (e.g. Quarters Sustainable Development Standard Checklist). It may also include recognition of 3rd party green building ratings or standards, such as EnerGuide, LEED for Homes, Built Green, and PassiveHouse design standards.

It is also recommended that the checklist be linked to, and supported by, green design resources. These green design resources or guides may be high level and link primarily to existing guides, or may include creation of new design guides for Edmonton.

Finally, the checklist process may or may not include a validation step.

Implementation and Phasing

Phase 1:

- › Develop and implement a voluntary checklist supported by incentives (recommended)
- › Utilize the existing checklist developed for the Quarters as much as possible within this process

- › Develop checklist content (and possibly complementary guidance resources), and integrate checklist with development approvals processes. Design decisions will need to include:
 - » The number of variants of the checklist that will be developed, and the specific building and project types to which these will be applicable. This proposal assumes that two checklist variants will be developed – e.g., one for homes and one for large buildings.
 - » The scope of the “green dimension” that will be covered. e.g., it may be specific to building design and systems, or more holistic in terms of site elements such as habitat
 - » Determine the incentive amounts, sources of funding, and levels of performance required for incentives, if incentives are to be included. Note: ideally any City incentives would be “stacked” on other third-party or senior government incentives.
 - » Determine if a web-based delivery mechanism may be utilized to contribute to outreach, streamline submissions, link users to design guidance, and track results.

Phase 2:

- › Evaluate results and consider how to optimize the program. This may include:
 - » Update and/or expand the set of criteria and levels of performance required, including those required for incentives
 - » Transition to minimum checklist requirements.
- › Voluntary checklists with incentives, supported by resources and outreach, may be more effective at engaging a relatively small, “early adopter” segment of the market, particularly in the shorter term.

Implementation – Funding and Staffing Resources

In addition to staff resources needed to develop and administer green building checklists within the development approvals process, financial resources would be needed if the program was to be supported by incentives. Capacity building for staff will also be required.

Incentive funding options could include:

- › Create a green incentives fund
- › Create a variable permit fee structure that is cost neutral from the City’s perspective that funds green incentives
- › Create a funding cap, with supporting policy indicating that should funds be exhausted; the rebate program may be suspended until the following budget cycle

However, to create certainty in the market, it is recommended that incentives funding be as sustainable as possible (i.e., available for more than one or two years).

Market Transformation

This program will aim to assist the market in providing cost-effective green building solutions. Market transformation will be fostered by providing information to developers and builders on how greener buildings can be achieved using a selection of building components and methods, as well as a feedback loop by which the City and industry can gain a better understanding of market barriers to green building.

Monitoring and Performance Metrics

- › Number of checklists completed (voluntary program) for each type of application, vs. total number of applications
- › “Scoring” data and incentives utilized
- › Feedback from participants, and applicants not using the checklists

Examples/Case Studies

The City of Edmonton has developed a Sustainable Development Standard Checklist as part of the Quarters Downtown Overlay. This Checklist could be a useful model for the Green Building Plan. While it was developed for one City neighbourhood, it provides an example of something that could, after further technical review, and industry consultation, be adapted for use City wide. See Appendix 8 for this the Quarters Sustainable Development Standard Checklist.

The Regional District of Nanaimo released a new set of comprehensive sustainable development checklists that are voluntary, make applicants eligible for financial incentives, and are supported by green design guides. These checklists were created after having limited success with mandatory checklists that did not have any minimum requirements or attachment to incentives.

The City of Vancouver has also developed a Passive Design Guideline.

PROGRAM 2.3 GREEN HOME BUYER'S GUIDE

Summary and Rationale

A buyer's guide would help potential home buyers assess and understand the value of green features of a home as part of the buying process, thereby helping to build market demand for these features.

How the Program Works

The buyer's guide would be disseminated to potential home buyers through various methods to assist them in making buying decisions. It would clearly communicate the benefits of green homes, with emphasis on economic benefits, in language appropriate to the buying audience.

Implementation and Phasing

Phase 1:

- › Research existing examples and develop an Edmonton guide.
- › Work with Edmonton Real Estate Board on the guide development and testing with potential buyers. Ensuring buy-in from the real estate industry is important for success; this process can be simple and not necessarily exhaustive.
- › Work with EREB and potentially other partners to establish an effective dissemination campaign for the guide.

Phase 2:

- › Consider updating and wider distribution.
- › Implementation – Funding and Staffing Resources
- › The primary resources required for this program are for development of the guide and working with partners to disseminate it.

Market Transformation

Educational, training and capacity building programs have been identified as a key City-led approach to help increase the market awareness of the benefits of green building and speed the market transition to a higher level of green building in Edmonton.

Monitoring and Performance Metrics

- › Qualitative assessment of awareness and market penetration with home buyers

Examples/Case Studies

City of Seattle



PROGRAM 3: NEW LARGE & COMMERCIAL BUILDINGS

PROGRAM 3.1 GREEN BUILDING CHECKLIST

Summary and Rationale

A Green Building or Sustainable Development Checklist would be incorporated into the permit application process. The Checklist would help build capacity within the development and building industries to create green, high performance buildings, and would facilitate green building market transformation.

How the Program Works

When submitting applications, for example for subdivision, development, and/or building permit approvals, applicants would complete and submit a checklist. The checklist would create awareness of green building practices and optionally link applicants with green design resources. It can also serve as a framework for discussion of green building commitments with City approving staff.

The checklist would be introduced as a voluntary tool. To be effective, it is recommended that completion of the checklist, or achievement of some minimum requirement, is linked with incentives (e.g., permit fee rebates, recognition) or green financing.

The checklist would need to cover the desired “green dimensions” of the project. This content may be developed specifically for Edmonton, building on existing City of Edmonton sustainability checklists (e.g. Quarters Sustainable Development Standard Checklist). It may also include recognition of 3rd party green building ratings or standards, such as EnerGuide, LEED for Homes, Built Green, and passive house design standards.

It is also recommended that the checklist be linked to, and supported by, green design resources. These green design resources or guides may be high level and link primarily to existing guides, or may include creation of new design guides for Edmonton.

Finally, the checklist process may or may not include a validation step.

Implementation and Phasing

The checklist program for new large buildings should be developed and implemented in concert with that for new homes. Refer to the New Homes section for more detail.

This program is complemented by the Eco-Industrial Toolkit Initiative (EIC) which addresses many green building aspects. It is recommended that the EIC act as the primary program targeted at the industrial buildings sector.

Market Transformation

This program will aim to assist the market to provide more cost-effective green buildings. Market transformation will be fostered by providing information to developers and builders on how greener buildings can be achieved using a selection of building components and methods, as well as a feedback loop by which the City and industry can gain a better understanding of market barriers to green building.

Monitoring and Performance Metrics

- › Number of checklists completed (voluntary program) for each type of application, vs. total number of applications
- › “Scoring” data and incentives utilized
- › Feedback from participants and applicants not using the checklists

Examples/Case Studies

The Regional District of Nanaimo just released a new set of comprehensive sustainable development checklists that are voluntary, make applicants eligible for financial incentives, and are supported by green design guides. These checklists were created after having limited success with mandatory checklists that did not have any minimum requirements or attachment to incentives.

The City of Surrey will also be launching a new set of development checklists shortly.

The City of Vancouver has also developed a Passive Design Guideline.



Photo: City of Edmonton

PROGRAM 4: EXISTING HOMES

PROGRAM 4.1 BUILDING ENERGY LABELLING

Summary and Rationale

The energy labelling program for existing homes would be similar to that for new homes. This program would encourage existing homes (single detached, attached, row and townhouses, low rise apartments) to be labelled with an EnerGuide rating. This rating, and supporting documentation, would be available to potential buyers through the Multiple Listing Service (MLS) system when the home is offered for resale. If carried through to a mandatory program, the intent would be for all homes to obtain a rating and list it for potential buyers prior to resale.

How the Program Works

Initially, the energy labelling program would be voluntary. The home owner would engage a certified Energy Auditor to conduct a home energy assessment. The energy assessment includes modeling of the home's design and a blower door test. The test results determine the EnerGuide rating, from 0 to 100, and an EnerGuide label is issued. The EnerGuide rating, and optional link to the energy efficiency report, would then be included in the MLS system at the owner's discretion. Refer to the figure below for an example of an existing pilot program.¹⁴

For a mandatory program, all homes would be required to obtain an EnerGuide rating and label with linkage to the MLS system for resale. This requirement could be triggered in different ways, which have to be evaluated further.

Linking program users to incentives, such as those from third parties or senior government to assist with audit costs or retrofit costs, would undoubtedly prove vital to the success of the program.

Implementation and Phasing

Phase 1

- › Refer to the Energy Labelling program under New Homes for implementation and phasing recommendations. Note MLS information should include the date of the EnerGuide rating.
- › For existing homes, showing how owners could achieve results with minimal out-of-pocket expense, for example via financing programs, would be compelling; lending and mortgage institutions could be potential partners here.

¹⁴ Time of Sale Energy Labelling Pilot, Frequently Asked Questions for Home Sellers & Buyers, LiveSmart BC. http://www.citygreen.ca/cgFiles/TimeOfSale_LSBC.pdf

Phase 2

- › When considering a mandatory labelling program, careful thought is needed to address the issue of potentially poor energy performance of older homes and the potential valuation impacts of low EnerGuide ratings on sellers. Also, there is a question around determination of the appropriate regulatory mechanism to require labelling, e.g., municipal bylaws, as title transfer of properties is provincially regulated.
- › Consider moving toward an “expiry date” for EnerGuide ratings over the long term to ensure they are reasonably up-to-date.

Implementation – Funding and Staffing Resources

Funding and resources for the existing home labelling program should be integrated with the program for new homes.

Market Transformation

As in the case of new home energy labelling, labelling of existing homes at resale will contribute to the transformation of the market by enhancing pricing signals to home buyers of the energy costs associated with the normal operation of the home. The long-term impact of this program will be a more sophisticated consumer and a better developed market for energy-efficient homes. Financing for the initial outlay required for testing and energy retrofits can be addressed by proposed Program 1.7 Financing Strategies, and Program 4.2 Green Renovation Program.

Monitoring and Performance Metrics

- › Number of existing homes labelled vs. number of existing homes sold
- › Program feedback from participants and stakeholders, including influence of labelling on buyer decisions

Examples/Case Studies

- › City of Prince George; City of Vancouver
- › Boulder, Colorado
- › Time of Sale Home Energy Labelling Pilot, LiveSmart BC/Victoria Real Estate Board
- › England and Wales (Energy Performance Certificates)
- › Denmark, the Netherlands, Austria, and Greece (Energy Performance Assessment of Existing Dwellings)

PROGRAM 4.2 GREEN RENOVATION PROGRAM

Summary and Rationale

A Green Renovation Program would integrate a number of elements, making it easier for homeowners to undertake efficiency upgrades to their homes.

The Program could be supported by a Green Retrofit guide, which would serve as an education tool to help educate consumers of the various opportunities offered by the Green Renovation Program.

How the Program Works

A green renovation program would be voluntary. A key feature is that the various resources are brought together into an integrated program, which is simple and easy to understand and access for home owners. Elements to integrate could include:

- › Information on green buildings, energy efficiency, and associated benefits (costs and other benefits), as well as EnerGuide ratings and labelling (see Energy Labelling program)
- › Assistance with project management, energy auditing, linking homeowners to approved contractors and helping to obtain rebates
- › Financing strategies

Jurisdictions that have been the most successful in stimulating green home retrofits have put all of these elements together into a ‘full service’ package that makes it very easy and attractive for building owners to undertake upgrades. Green financing is critical. This can be structured so that annual energy savings are actually greater than the annual loan repayment, creating a positive cash flow for home owners right away. It is important to have the loan run with the house and not the owner, so that home owners do not worry about being saddled with loan repayments even if they sell their home.

While the Program could be operated by a third-party on a for-profit or not-for-profit basis, the City could assist in establishing the program and providing assistance where necessary.

Implementation and Phasing

Phase 1

- › Create a City of Edmonton Green Retrofit Guide, update/integrate existing City materials, and/or integrate and promote existing guides (e.g., from CMHC). City guides or program information should link users with other 3rd party resources where possible.
- › Integrate, and update where necessary, existing City program information and initiatives with creation and outreach of the Guide; in particular, CO₂RE materials and initiatives such as “Taking Action on Climate Change,”

“Eco-landscaping,” “Apartments & Condominiums,” “Home\$avers,” and the newsletter.

- › There are many retrofit guides and information sources currently available, including the ATCO EnergySense program and the EPCOR Energy Efficiency Guides. These could serve as models or opportunities for linkages with these programs and guides could be explored.
- › Effective outreach is critical to success. A communications strategy should be developed that could include outreach via:
 - » Web site
 - » Mobile applications
 - » Community newspapers
 - » Professional organizations
 - » Retail stores (e.g. home improvement)
- › Information should highlight co-benefits
- › Initiate discussions with potential partners to shape the integrated program. Linkages and support from local community organizations, non-profits, utilities, financial institutions, and related academic institutions would be beneficial to the creation and maintenance of the program. Identify needs at a neighbourhood level; pooling the needs identified will create economies of scale.

Phase 2

- › Launch an integrated Green Renovation Program in concert with partners and update the guides and outreach.

Implementation – Funding and Staffing Resources

Resourcing for this program should be modest as it is primarily linking together existing initiatives and resources. Communication efforts should be integrated with other green building program elements.

Market Transformation

Research by the Pembina Institute, and reported by GP Rollo, indicates that energy efficiency upgrades to existing homes can result in significant annual savings on home energy use — up to \$3,000 in some cases. Depending on the specific options used, the payback period on initial investment can be less than six years. This period can be shortened further in the presence of financial incentives from senior government and utilities.

Monitoring and Performance Metrics

- › Evaluate outreach program effectiveness; survey target market for awareness (formally or informally)
- › For Phase 2, track uptake of program elements such as financing uptake (this may be done via partners)

Examples/Case Studies

Program:

- › Clean Energy Works Portland
- › Sustainable Works pilot – Greater Edmonton Alliance Guide
- › ATCO EnergySense program and the EPCOR Energy Efficiency Guides
- › City of Vancouver Green Renovation Guide.

PROGRAM 5: EXISTING LARGE & COMMERCIAL BUILDINGS

PROGRAM 5.1 GREEN RENOVATION PROGRAM

Summary and Rationale

A green renovation program aims to incorporate green building features into renovation or upgrades to existing buildings. Improved energy efficiency may be the most practical objective in this program due to its potential for reducing operating costs and providing co-benefits such as improved occupant comfort. Construction waste management could be another important component.

How the Program Works

There are two potential levels of implementation. The first, aimed at capacity building, is based on encouraging uptake through outreach to specific ICI sub-sectors that would benefit the most. This outreach would include demonstrating to building owners the “why” (benefits) and “how” to achieve green renovations, e.g. through providing links to further information and resources.

The second, for future consideration, is a green renovation bylaw that would require major renovations or upgrades, e.g. for fire safety, to also incorporate energy efficiency strategies and/or possibly other green building best practices, such as waste recycling. It would typically be triggered by a building permit application.

Implementation and Phasing

Phase 1

- › Determine which sectors may benefit the most. Feedback from stakeholders suggested small businesses, commercial/light industrial warehousing, and possibly large-format/big box retail stores often use crude construction methods resulting in poor energy performance. This understanding could be refined through some further basic research.
- › Develop and deliver outreach materials described above utilizing available materials from third parties. Consultants and professionals doing retrofits and renovations should be part of the target audience for this program.
- › The building permit process may be utilized to trigger or reinforce this program, however it is important to reach audiences early in their planning and design cycles.

Photo: Edmonton City Streets, City of Edmonton



- › Retrofitting of large buildings can be complex and varies widely across building types and uses. Therefore a green renovation program for this sector needs to be flexible. Also, it is assumed that there is a higher degree of awareness and responsiveness to energy efficiency cost savings in some markets, such as commercial office buildings. Multi-family residential buildings pose different challenges due to ownership and operations responsibility.
- › The Eco-Industrial Toolkit, currently under development, will support the objectives of this program for the industrial sector.

Phase 2

- › Monitor and review the performance of this part of the program and consider the development of a green renovation bylaw that would mandate energy efficiency requirements, and possibly other green requirements, as part of major renovations.

Market Transformation

A Green Renovation Program for existing large buildings will help the market better understand the benefits of green buildings, including both financial (e.g., lower operating costs) as well as the non-financial (e.g., health, productivity). From the perspective of the City, a market transition towards greener ICIs presents several important benefits, including lowered impact of public infrastructure, economic development in the way of job creation for green building materials and technologies, and reduced environmental impacts.

Monitoring and Performance Metrics

- › Evaluate outreach program effectiveness; survey target market for awareness (formally or informally)

Examples/Case Studies

The City of Vancouver has developed a green renovations program with a guide for homes, and is developing a green renovation bylaw, first for homes, to be followed by larger buildings.

The City of Prince George recently conducted a pilot study of energy retrofits for small and medium-sized enterprises (SMEs).

PROGRAM 5.2 OPERATIONS AND RECOMMISSIONING

Summary & Rationale

Recommissioning (or retro-commissioning) is a systematic process applied to existing buildings to identify and implement operational and maintenance improvements, and to ensure continued performance over time. It optimizes how equipment operates as well as how systems function together. It often results in significant operational cost savings, and can improve indoor air quality and occupant comfort. Although recommissioning may include recommendations for capital improvements, its primary focus is on building operation. The City can facilitate recommissioning in the market by taking leadership

and first implementing it for City facilities, then transitioning to a market recommissioning program.

How the Program Works

ICI sector buildings frequently undergo operational and occupancy changes. Over time, these changes, and the natural drift in building controls challenge the ability of a building to operate at optimal energy performance levels. Studies have demonstrated conclusively that these changes contribute to a decrease in a building's performance and can lead to indoor air quality problems and higher energy costs. These studies have also shown that, with minimal expense (no capital investment), it is possible to bring a building to its optimal operational level. This can result in improved indoor conditions and energy savings in the order of five to 15 per cent with a payback period of less than two years.

For applicable City-owned buildings and facilities (e.g., those with significant energy/HVAC systems), the City would require recommissioning of all existing buildings, newly purchased existing buildings, and every five years subsequently.

For ICI sector buildings, the City would require building recommissioning at the time of sale and every five years subsequently.

Implementation and Phasing

Phase 1

- › Create or amend an existing City policy to require recommissioning for applicable City-owned buildings as described above. Building recommissioning should be considered in concert with energy audits that assess the opportunities for energy retrofits and operational cost savings.
- › Develop simple educational/promotional materials, to integrate with the Green Renovation program materials and outreach, promoting recommissioning in ICI sector buildings.
- › Document and track results of recommissioning (and energy retrofits where possible), incorporating into later information provided to the market.

Phase 2

- › Create or amend a building bylaw to mandate building recommissioning at the time of sale for ICI sector buildings; a set of criteria may be developed for applicability of priority building types.
- › Support from BOMA would be beneficial to raise awareness and education.

Market Transformation

This program would help support the local market for building recommissioning, as well as helping the City in reducing its long-term building operation and maintenance costs.

Examples/Case Studies

US Federal Government buildings are required to be assessed for commissioning measures.

8.0 IMPLEMENTING THE PLAN

8.1 FIVE-YEAR PLAN

Based on the market and financial analyses and stakeholder input, it is clear that there is significant interest and recognition of benefits of green building in Edmonton, and in some sectors green building is becoming established. At the same time, current economic conditions make the market very cost sensitive, and the green building market as a whole requires time to mature. Consequently, the emphasis in this Plan is on helping the market to develop through education and outreach, beginning to address cost premiums through building industry capacity, and developing financing programs, and establishing foundational program elements that will evolve along with the market and economic conditions.

In previous sections, phasing of program elements is described, outlining how program elements can evolve to support market transformation. Table 5 provides a graphical overview of possible timing of this phasing. This initial timing will need to be adjusted and updated as funding is allocated to the program and program elements are rolled out.

The effectiveness and cost minimization of the program roll-out will be benefited greatly by developing and building upon partnerships with other organizations, whether industry associations, financial institutions, utilities, non-profits, community organizations, or others. Table 6 identifies some of these types of organizations.

8.2 PROGRAM INTEGRATION

The Green Building Plan has been structured into discrete program elements to assist the City in designing policy and developing materials that are targeted to specific sectors and audiences. However, for efficient implementation, these program elements need to be integrated into a cohesive Green Building program. In addition, it is recommended that existing programs that overlap with the scope of the Plan are also integrated into an overall program.

This integration could include City staff roles and responsibilities, financing, and most importantly, outreach to clients: successful programs require an effective outreach and communications program that reaches target audiences, and that integrates program elements as seamlessly as possible so that options are simple and convenient for clients and users to access.



Photo: © iStockphoto member corvix

Table 5: Internal City Partners and Primary External Partners

	2012	2013	2014	2015	2016	2017	>2017
Program 1 Core Programs							
Program 1.1 Promotion of Tools and Programs		Build on initial outreach for GBP	Integrated promotion strategy for GBP as a whole, and programs by phase	Ongoing			
Program 1.2 Staff and Industry Education, Training & Capacity Building		Continue to engage staff on GBP implementation	Initial staff training on GBP	Ongoing			
Program 1.3 Demonstration Projects: Support, Facilitate and Develop			Establish criteria for developing and evaluating potential projects	Promotion of program	First demonstration project selected	Ongoing	
Program 1.4 Green Building Recognition Program				Establish process, eligibility, etc	Promotion of program	First annual recognition awards	Ongoing
Program 1.5 Regulation, Bylaw, Policy, and Process Review			Review period	Implement changes	Monitor		
Program 1.6 Green Lease Program			Create a terms of reference for this project	Assess costs and benefits	Launch	Review and revise	
Program 1.7 Financing Strategies			Identify & contact potential partners	Launch	Expand program sectors	Ongoing	
Program 2 New Homes Program							
Program 2.1 Building Energy Labeling			Develop voluntary labeling pilot	Launch	Expand labeling program	Launch	
Program 2.2 Green Building Checklist	Complete and approve Green Building Plan, and launch program	Develop voluntary checklist with incentives	Launch	Monitor and work with industry to refine	Expand checklist criteria	Launch	Continue monitoring, review progress against objectives, and update program periodically
Program 2.3 Green Home Buyer's Guide			Develop and pilot	Launch			
Program 3 New Large Buildings Program							
Program 3.1 Green Building Checklist		Develop voluntary checklist with incentives	Launch	Monitor and work with industry to refine	Expand checklist criteria	Launch	
Program 4 Existing Homes Program							
Program 4.1 Building Energy Labeling			Develop voluntary labeling pilot	Launch	Expand labeling program	Launch	
Program 4.2 Green Renovation Program		Develop Green Renovation Guide	Launch	Integrated program	Launch		
Program 5 Existing Large Buildings Program							
Program 5.1 Green Renovation Program				Develop for priority sectors	Launch	Launch	
Program 5.2 Operations and Recommissioning				Voluntary commercial program & City building program	Launch	Expand commercial program	Launch

Table 6: Five-Year Plan

Program	Primary Partners
Program 1: Core Programs	
1.1 Promotion of Tools and Programs	CHBA, ERB, BOMA, C>Returns
1.2 Staff and Industry Education, Training & Capacity Building	Natural Resources Canada, C>Returns
1.3 Demonstration Projects: Support, Facilitate and Develop	
1.4 Green Building Recognition Program	BOMA
1.5 Regulation, Bylaw, Policy, and Process Review	City of Calgary
1.6 Green Lease Program	BOMA
1.7 Financing Strategies	Financial Institutions
Program 2: New Homes	
2.1 Building Energy Labelling	EREB; CHBA
2.2 Green Building Checklist	UDI
2.3 Green Home Buyer's Guide	EREB; CHBA
Program 3: New Large Buildings	
3.1 Green Building Checklist	UDI
Program 4: Existing Homes	
4.1 Building Energy Labelling	EREB
4.2 Green Renovation Program	Financial Institutions; Utilities
Program 5: Existing Large Buildings	
5.1 Green Renovation Program	BOMA; Financial Institutions; Utilities
5.2 Operations and Recommissioning	BOMA

Legend

BOMA	Building Operations and Management Association
EREB	Edmonton Real Estate Board
CHBA	Canadian Home Builders Association
UDI	Urban Development Institute
C>Returns	A not-for-profit organization that provides turn-key retrofit services for single-family homes

Existing programs with the strongest overlap are:

- › Eco-industrial Toolkit: this initiative ideally addresses Green Building objectives for the Industrial buildings sector.
- › CO₂RE: Energy efficiency and other materials related to green building, as well as incentive programs, have already been developed under this program and should be integrated (and updated where needed) with the Green Building programs.
- › Renewable Energy Task Force: program objectives and many of the recommendations being developed overlap or complement the Green Building Plan. Implementation planning for this program is ideally as integrated as possible with that of the Green Building Plan elements to avoid any duplication.

Green Building Plan implementation therefore is not “starting from scratch,” but can build on and integrate with these existing initiatives toward a streamlined, effective and efficient program.

8.2.1 Complementary City-led Initiatives

While the scope of the Green Building Plan is focused on buildings themselves, achieving sustainable development objectives including GHG reductions in Edmonton will involve action in many other areas as well, some of which overlap green buildings. It is suggested that in concert with advancing green buildings, the City continue to explore complementary areas recognizing that:

- › While GHG emission reductions can be achieved by green building design and construction, other factors such as building size and land use patterns are also important. Transitioning to compact, complete community design may be necessary to adequately address community emissions in the long term.
- › Integrated community planning and green building initiatives could support sustainable development objectives. For example, the Ecodistricts initiative in Portland ties together target-specific neighborhoods, and intersects buildings, infrastructure and people in a holistic process that brings together multiple stakeholder groups.
- › City staff have internally developed some valuable research resources on specific issues such as Ecodistricts and other governance/policy approaches, biodiversity/bird habitat, and urban agriculture.

8.3 LONG-TERM VISION AND PROGRESSION

Implementation and phasing of policies and actions within the Green Building Plan needs to address several objectives:

1. Stimulate green building interest and activity in the short term, and generate “quick wins” wherever possible.
2. Progress at a pace that will allow interim goals, as well as visionary long-term goals to be reached.
3. Proceed stepwise in a practical fashion that will ensure interim steps are achievable.

Among other goals, *The Way We Green* puts forward a visionary goal of a carbon-neutral Edmonton – though the timeline is not specified. BC and Ontario governments, following the lead of the Intergovernmental Panel on Climate Change, have adopted climate protection policies that call for reductions in GHG emissions of 80% by 2050, with interim goals of 20% to 30% by 2020 (Ontario and BC respectively). Though it is not the place of this Plan to set long term GHG reduction goals, it is clear that major changes and steady progress will need to occur over time to reach these visionary targets. Within the 2020 timeframe, energy and GHG emissions will be dominated by the existing buildings in Edmonton, rather than buildings constructed after today. Other TWWG goals, such as zero waste, imply substantial change as well.

The ability to meet short and long-term objectives will depend in part on the intensity of policies and programs, how quickly they are rolled out, and the adoption from industry. Lower intensity and slower rollout will generally be easier to implement, and will be less likely to result in achievement of objectives. It is important to note that given the state of the green building market in Edmonton, and the Plan’s emphasis on capacity building and incentives in the short term, even implementation of all the Plan elements may not enable short to medium-term targets to be reached; however it represents an achievable and foundational step towards longer term targets.

As per the market transformation process described earlier, substantial long-term change will require transitioning to regulatory mechanisms. In this regard, senior government policy plays an important role – for example, the Alberta Building Code is a primary driver of building design and construction practices, and future codes are expected to drive building energy performance. Other factors such as energy prices can also be strong drivers. In that respect, the Green Building Plan will need to evolve along with senior government policy and market factors. However, as described earlier, the City has both the opportunity and the levers to influence the rate of progress, can address many other green building aspects that fall outside the scope of the building code, and can facilitate the greening of the existing building stock.

Though the scope of this Plan pertains to buildings, there are strong linkages with other aspects of sustainable development, including factors that influence community GHG reduction. It is suggested that green buildings are viewed as an important component within this broader context that considers sustainable neighbourhood design, land use, and other site considerations — all of which influence and interact with overall sustainability performance of buildings.

8.4 ADVOCACY AND COLLABORATION ACTIVITIES

For the most part, the Green Building Plan is built around programs that can be implemented by the municipality within the context of the current Municipal Government Act and provincial regulatory regime. However, addressing some of the barriers to Green Building that were identified by the Working Committee and mentioned in Green Building Plan will require the joint commitment of the City of Edmonton and the Government of Alberta. The Federal Government is also involved in the setting of National Codes and the development of specific energy efficiency programs. Federal involvement, through the Federation of Canadian Municipalities Green Municipal Fund, may also be of benefit to assist with funding and capacity building. Collaborating with non governmental organizations, academic institutions and industry associations may also be required to realize positive outcomes. Ongoing industry consultation is expected to be required as the programs are implemented.

As the implementation of the Green Building Plan advances, the following areas of advocacy and participation with other partners and stakeholders could be pursued:

1. Other Municipalities and Municipal Organizations

- 1.1 Advocacy priorities identified in this plan should be shared with other municipal stakeholders such as the Alberta Urban Municipalities Association and the City of Calgary to establish – where possible – common positions and priorities
- 1.2 Establish/participate on the Alberta Urban Municipalities Association's energy efficiency committee

2. Provincial Government

- 2.1 Collaborate with the Government of Alberta to design and implement an initiative to make Alberta the national leader in energy efficiency and sustainability. The mandate was put forward in 2011 to the Ministries of Energy, Environment and Sustainable Resource Development
- 2.2 Advocate to the Government of Alberta to improve environmental and energy standards in the Provincial Building Code
- 2.3 Work with the Government of Alberta to establish new grants or funding programs specifically targeting energy efficiency retrofits in both the residential (including multi-unit residential buildings) and industrial, commercial and institutional sectors
- 2.4 Collaborate with the Government of Alberta to develop education, awareness and marketing materials and approaches designed to build capacity in industry and create demand for green buildings

3. Federal Government & Federal Organizations

- 3.1 Participate in discussions and reviews of federal building codes being developed by the Government of Canada.
- 3.2 Look for collaboration opportunities to work with the Federation of Canadian Municipalities and opportunities to obtain funding through the Green Municipal Fund to advance Green Building related initiatives in Edmonton

4. Non Governmental Organizations & Industry Associations

- 4.1 Participate, partner and collaborate with non-governmental building organizations and industry associations such as the Green Building Council, Canadian Home Builders, Urban Development Institute, BOMA, etc. Whenever possible, engage external partners to assist in the development and delivery of the programs outlined in the Green Building Plan. Engagement of external partners can leverage limited resources, build industry capacity and create ownership over the initiatives.
- 4.2 Through the Alberta Energy Efficiency Alliance (AEEA), advance energy efficiency in Alberta. The AEEA is a group of industry, municipal and non-profit organizations and associations working to maximize energy efficiency in the province.
- 4.3 Promote renewable energy solutions and carbon reduction technologies by collaborating with renewable energy suppliers and organizations such as the Solar Energy Society of Alberta on demonstration projects.

5. Academic Institutions

- 5.1 Establish/continue relationships with the University of Alberta, NAIT and other academic institutions in an effort to advance programs designed to enhance industry capacity to build green

6. Utilities

- 6.1 Work with Utilities to coordinate incentives and the delivery of financial strategies such as on-bill repayment of energy efficiency loans.

Advancing discussions with other orders of government, municipalities, academic institutions and other organizations on any of the above issues is a long-term process requiring persistence. The advocacy and collaboration activities would be conducted in parallel with the Green Building Plan programs. Given the complexity of the barriers identified, on-going effort is expected to be required to achieve desirable outcomes.

8.5 FINANCIAL IMPACTS: IMPROVING THE BUSINESS CASE FOR GREEN BUILDINGS IN EDMONTON

The financial impact of any green building programs and policies adopted by the City is of great interest to development, building and other stakeholders in Edmonton. To assess the market readiness and financial implications of green building in Edmonton, a discussion paper “The Business Case for Green Buildings in Edmonton, Alberta” (see Appendix C) was developed by land economist GP Rollo and Associates.

At a very general level, GPRA’s assessment concluded that the green building market in Edmonton is limited, and the current business case for green buildings in Edmonton is mixed. This does not take away from the value of the City implementing green building policies; in fact it points to the need for a Plan that takes market realities into account.

In this regard, while the Green Building Plan does aim to advance more sustainable, high performance buildings, it also suggests the adoption of a range of strategies designed to mitigate challenges in transitioning from the current reality to a more sustainable future.

Market Opportunities and Challenges: How the Plan Responds

In the following sections, and further elaborated in the GPRA Business Case paper, key issues are highlighted and the response suggested by the Plan detailed. Four specific issues are addressed in the Plan in order to respond to current challenges. These include:

- › Addressing green building construction cost premiums
- › Developing business case solutions
- › Improving market conditions
- › Providing appropriate implementation phasing

Through a coordinated effort of responses, the Plan suggests an approach to allow the development of more sustainable buildings while respecting current market realities.

Addressing Green Building Construction Cost Premiums

A very common question from stakeholders is “what is the cost premium for a green building?” Within a given building sector, green construction cost premiums are affected by many factors including:

- › The level of green building expertise and experience of project design teams and the local industry in general
- › The priorities of the project stakeholders – e.g., requirements or preferences for particular green project features
- › The nature of the baseline project – e.g., low-budget vs. premium
- › Other project-specific factors

Therefore there is no universal answer to this question, either in Edmonton or any other jurisdiction. However a substantial body of information indicates the range of cost premiums as well as typical premiums in different jurisdictions.

Opportunity: new construction green building cost premiums¹⁶ (e.g., LEED certification) can be as low as zero per cent, particularly for larger commercial projects where there are opportunities for cost reduction due to efficiencies gained, and where an effective Integrated Design Process (IDP) is followed.

Challenge: capital cost premiums for most projects in most markets are typically 10 per cent or less and generally decreasing. However premiums for specific projects can be considerably higher – while not representative of the general case, “outliers” are reported to be as high as 30 per cent.¹⁷

Also, depending on the sector, local industry lacks green building experience, and is wary of extrapolating green project examples from markets other than Edmonton.

Incentives are an important tool to assist in adoption, however it is not practical to expect that incentives will be able to fully compensate for all cost premiums.

Plan Strategy: recognizing that cost premiums are often higher in less mature green building markets, the Plan aims to help reduce cost premiums and their impacts through:

- › Capacity building including education and a voluntary green building checklist and design guide
- › Examining opportunities to streamline development applications (bylaw and process review)
- › Developing financing strategies to help overcome the burden of initial cost premiums for buyers, owners, developers or builders
- › Providing incentives where possible (eg. within a Green Building Checklist program)

¹⁶ These apply to new construction. For green retrofit costs, please refer to the notes on Retrofit Costs near the end of this section.

¹⁷ As per information reported by a stakeholder at a Working Committee meeting, July 28, 2011.

Table 7: Costs to Industry

Program	Costs to Industry	
	Phase 1/ Shorter term	Phase 2/ Longer term
Program 1: Core Programs		
1.1 Promotion of Tools and Programs	None	None
1.2 Staff and Industry Education, Training & Capacity Building	None	None
1.3 Demonstration Projects: Support, Facilitate and Develop	None	None
1.4 Green Building Recognition Program	None. Optional project costs to create a green project (voluntary), depending on scope	None. Optional project costs to create a green project (voluntary), depending on scope
1.5 Regulation, Bylaw, Policy, and Process Review	None (potential savings)	None (potential savings)
1.6 Green Lease Program	None (except for municipal buildings)	None (except for municipal buildings)
1.7 Financing Strategies	None (potential savings)	None (potential savings)
Program 2: New Homes		
2.1 Building Energy Labelling	No mandatory costs; ≤ \$500 per home labelling cost (voluntary); Optional costs to upgrade energy performance, dependent on level of performance	≤ \$500 per home labelling cost (mandatory); Optional costs to upgrade energy performance, dependent on level of performance
2.2 Green Building Checklist	Minor soft cost to complete a checklist; Optional project costs to create a green project (voluntary), depending on scope; May be partially offset with incentives	Minor soft cost to complete checklist; Potential project costs to create a green project, based on a minimum threshold to be achieved; May be partially offset with incentives
2.3 Green Home Buyer's Guide	None	None
Program 3: New Large Buildings		
3.1 Green Building Checklist	Minor soft cost to complete a checklist; Optional project costs to create a green project (voluntary), depending on scope; May be partially offset with incentives	Minor soft cost to complete checklist; Potential project costs to create a green project, based on a minimum threshold to be achieved; May be partially offset with incentives
Program 4: Existing Homes		
4.1 Building Energy Labelling	No mandatory costs; ≤ \$500 per home labelling cost (voluntary); Optional costs to upgrade energy performance, dependent on level of performance; Possibilities for incentives	≤ \$500 per home labelling cost (mandatory); Optional costs to upgrade energy performance, dependent on level of performance; Possibilities for incentives
4.2 Green Renovation Program	No mandatory costs; Optional project costs to create a green project (voluntary), depending on scope	No mandatory costs; Optional project costs to create a green project (voluntary), depending on scope
Program 5: Existing Large Buildings		
5.1 Green Renovation Program*	No mandatory costs; Optional project costs to create a green project (voluntary), depending on scope	No mandatory costs; Optional project costs to create a green project (voluntary), depending on scope
5.2 Operations and Recommissioning**	No mandatory costs (except for municipal buildings); Optional costs (voluntary)	Costs to applicable building types for undertaking mandatory periodic recommissioning, dependent on building type, size and other factors

* Green renovation & retrofit costs: Cost premiums for green retrofits relative to business-as-usual retrofits have not been studied as part of the GPRA paper. A Deloitte survey¹ of 16 organizations that had undergone a LEED retrofit project found that 75% of respondents reported premiums from 1 to 10%, and 25% report premiums of over 10%. Other experts have suggested that "research has increasingly shown these up-front costs to be minor and rapidly recovered through lower operating costs."² As with new construction however, we recognize that cost premiums are real, so the primary focus of the plan is to accelerate market transformation through education and capacity building, building market awareness, cost reduction, incentives, and financing options.

** Recommissioning costs: Further study is recommended on establishing financial impacts of this proposed program, as part of the initial program development and implementation. However, it is expected that the goal of each recommissioning project undertaken (initially City projects in the first phase) would be to create life cycle financial benefits accruing from energy cost savings.

1 The dollars and sense of green retrofits, Deloitte and Charles Lockwood, 2008.

2 Green Buildings and the Finance Sector: An Overview of Financial Institution Involvement in Green Buildings in North America, UNEP, 2010.

Developing Financial Solutions

Initial cost premiums are one component of project cost accounting and business case evaluation. However overall business case performance indicators such as return on investment (ROI) are also dependent on the accounting methodology and which costs and savings are included – in other words embedded in the business model of the stakeholder firm or individual.

Opportunity: green buildings can result in substantially lower operating and life cycle costs. The most readily quantifiable component is savings due to improved energy efficiency and/or the use of alternative energy, to reduce the need for purchased energy on an ongoing basis.

On a life cycle basis, the rate of return from building LEED certified buildings is potentially high (with the possible exception of LEED Platinum buildings), and there is a compelling case for the City to green its own buildings, since it has a long-term interest in operating these buildings.

In addition, other financial and non-financial benefits such as increased employee productivity and health can also potentially accrue as a result of green building, though these are more difficult to clearly quantify.

Challenge: Most residential developers are selling dwelling units to buyers prior to occupancy and therefore do not take into account operational cost savings (e.g. due to higher energy efficiency) in their business models (the “split incentive” issue). Construction cost premiums impact profit, and developers generally will not lower profit margins for green features. For developers or building owners who do consider operational costs, many of these do not utilize a life cycle basis for financial performance. Also, despite the potential benefits, less quantifiable benefits such as health are also not typically part of most business models.

Plan Strategy:

- › Developing alternative financing strategies can help bridge the “split incentive” issue for energy efficiency, and bridge the financing gap between developers/builders and owners
- › Educational tools help stakeholders understand the financial benefits and alternative project accounting or financing options

Improving Market Conditions

Opportunity: Many corporate clients will pay higher rent for “green” space; many health-conscious home buyers will pay more for greener homes.

Challenge: currently there is a limited market for green buildings, and this increases risk for developers. This limited market is contributed to by “soft” economic and real estate market conditions at present: low commercial/retail rents, and price sensitivity on housing purchases.

Plan strategy:

- › The Plan aims to increase market awareness of green building benefits and value through education, building energy labelling, and a green home buyers guide
- › Development of alternative financing options will help to provide a more attractive investment environment
- › Capacity building will help prepare the market for improved economic conditions

Providing Appropriate Implementation Phasing

Opportunity: Launching green building programs and evolving these progressively will help to implement green building solutions across different building sectors, and prepare for improved market conditions.

Challenge: It will take time for market conditions to improve and green building demand to increase. Under the current conditions, the market is not in most cases conducive to additional cost premiums.

Plan Strategy:

The Plan calls for a phased approach with a transitional period to allow for industry and government to build capacity, and for market changes to occur. This strategy has corresponding benefits in terms of minimizing potential financial impacts:

- › There are no Plan components that will *require* construction cost premiums (i.e. mandatory requirements) during the first phase of implementation (3-5 years)
- › In future phases, some programs may result in mandatory requirements that have cost premiums attached; however’ the intent is that these premiums would be modest with concurrent benefits, and any mandatory programs will be preceded by pilot phases to test and refine the program.

Through this approach, the market is given clear signals and will have the opportunity to transition.

Appropriate implementation of the Plan has been carefully considered in terms of costs by program throughout each phase. Cost impacts as the Plan phases in are outlined in the table below. Note however that as per the preceding discussions, initial costs are only one element of a business case – and the intent is that over time these costs become supportable as part of net positive business cases.

Adjacent Jurisdictions

One concern raised by some stakeholders is the potential to drive development to adjacent jurisdictions through more onerous regulations or policies. This situation is always a possibility, and applies to many types of regulations and policies, not just those related to sustainability.

Through adoption of *The Way We Green*, Edmonton has indicated it is taking sustainability seriously. This means change and new directions, and will inevitably result in some differences with neighbouring jurisdictions. Large urban centres like Edmonton and Calgary generally have more resources and larger markets, and thus are often on the forefront of sustainability policy. However, smaller centres such as Canmore and Medicine Hat also have progressive sustainability programs.

The phasing and transition time of this Plan will allow the City and other jurisdictions to share learnings, and to discuss regional collaboration opportunities.

Conclusion

Edmonton's Green Building Plan aims to advancing green buildings across all sectors, existing and new, in Alberta's capital. At the same time, the Plan recognizes current market realities and incorporates a range of strategies designed to ease transitional challenges.

A phased approach that will help improve both market capacity and market demand is recommended. When the financial conditions of the market improve it is important that the City of Edmonton experience development that will help drive future demand and increased market value of green buildings. Accordingly, the focus of the Green Building Plan is on market transformation, including improving the business case over time, and preparing the market for coming changes through transitional phasing.



PART III: APPENDICES

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APPENDIX A: GLOSSARY OF TERMS

Biodiversity: the variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; including diversity within species, between species and of ecosystems

Brownfields: abandoned, idle or underutilized commercial or industrial properties where past actions have caused or may have caused environmental contamination, but where there is a potential for development

Built environment: artificially created fixed elements such as buildings, structures, devices and surfaces that together a physical character of the area

Carbon neutrality: refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset, or buying enough carbon credits to make up the difference. It is used in the context of carbon dioxide releasing processes, associated with transportation, energy production and industrial processes. The concept may be extended to include other greenhouse gases (GHG) measured in terms of their carbon dioxide equivalence—the impact a GHG has on the atmosphere expressed in the equivalent amount of CO₂.

city: refers to Edmonton in its entirety including land, building, infrastructure, natural areas and population within its established boundaries

City: refers to Edmonton's municipal government including City Council, the administration it directs and all related operations

Corporate strategic action or initiative: a specific statement of how the corporation intends to pursue a strategic objective

Climate Change: a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole Earth. In recent usage, especially in the context of environmental policy, climate change usually refers to changes in modern climate. It may be qualified as anthropogenic climate change, more generally known as global warming or anthropogenic global warming.

Corporate strategic goal: a general statement describing a desired end state, ideal, condition, or quality to be sought in Edmonton's physical, social, or economic development that will help achieve Council's vision (i.e., without specifying how)

Corporate strategic objective: a specific statement of what the corporation needs to accomplish in order to achieve a strategic goal. Objectives should be achievable within the time frame of the plan (i.e., affiliated with the corporate strategic goals, but indicating a desired direction of change)

Disturbance: a temporary change in average environmental conditions that causes a pronounced change in an ecosystem. Ecological disturbances include fires, flooding, windstorms, insect outbreaks, as well as anthropogenic disturbances such as forest clearing and the introduction of exotic species. Disturbances can have profound immediate effects on ecosystems and can, accordingly, greatly alter the natural community. These effects can continue for an extended period of time.

Durability: the durability of an item indicates how well it stands up after a period of sustained use. Infrastructure that is durable generally contributes to goals of sustainability and resilience

Ecosystem: a biological environment consisting of all the organisms living in a particular area, as well as all the nonliving, physical components of the environment with which the organisms interact, such as air, soil, water, and sunlight. (A healthy ecosystem is one that can maintain a state of equilibrium between its members over time in the face of external stress).

Ecological design: any form of design that minimizes environmentally destructive impacts by integrating itself with living processes (e.g., low impact development (LID))

Ecological footprint: a measure of human demand on the Earth's ecosystems. An ecological footprint compares human demand with planet Earth's ecological capacity to regenerate itself. It represents the amount of biologically productive land and sea area needed to regenerate the resources a human population consumes and to absorb and render harmless the corresponding waste. Using this assessment, it is possible to estimate how much of the Earth (or how many planet Earths) it would take to support humanity if everybody lived a specified lifestyle.

Ecosystem services: benefits people receive from ecosystems

Edmonton Sustainability Papers: a set of 21 discussion papers developed by subject area experts that explore Edmonton's sustainability and resiliency challenges. These

papers served as input for community discussion and to generally informed the development of The Way We Green.

Energy: one of the basic human needs, existing in the form of heat, light, sound, electrical, chemical, nuclear and mechanical

Energy density mapping: a computer modeling tool used to evaluate existing energy use in a community and plan to improve energy efficiency through different land use and built form patterns, better building standards, transportation options and the integration of local alternative and renewable energy sources. The approach builds on accepted practices for reducing energy use in efficient ways, such as through reduced demand for transportation and space heating/cooling in buildings. The process incorporates the idea that maximizing energy efficiency of urban form requires integrating transportation issues, addressing improvements to and orientation of the built environments, and ensuring that energy needs of a community are met in the most efficient way possible, such as obtaining the highest and best use from a given primary source of energy.

Energy Transition Strategy: a strategy that responds to the continual decline in net energy supporting humanity. The strategy strives for a future scenario in which humanity has successfully adapted to the declining net fossil fuel energy availability and has become more localized and self-reliant.

Environmental aspect: elements of an organization's activities, products or services that can interact with the environment

Environmental impact: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

Environmental management system: part of an organization's management system used to develop and implement its environmental policy

Environmental policy: the overall intentions and direction of an organization related to its environmental performance as formally expressed by top management

Externality: a cost or benefit, not transmitted through prices, incurred by a party who did not agree to the action causing the cost or benefit. For example, the costs associated with climate change are generally borne by all of society in a variety of ways, and are not reflected in the price of a litre of gasoline.

Feed-in tariff: a policy mechanism designed to encourage the adoption of renewable energy sources and to help accelerate the move toward grid parity. Under a feed-in tariff, eligible renewable electricity generators (which can include

homeowners and businesses) are paid a premium price for any renewable electricity they produce. Typically regional or national electric grid utilities are obligated to take the electricity and pay the tariff.

Food resilience: the ability at all times to acquire safe, nutritionally adequate, and personally and culturally acceptable foods, produced in ways that are environmentally sound and socially just

Food system: consists of production, processing, storage, transportation, buying and selling, eating and waste management

Green building: the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle. From siting to design, construction, operation, maintenance, renovation, and demolition, this practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

ICI: Industrial, Commercial, Institutional

ISO 14001: a standard developed by the International Organization for Standardization (ISO) that outlines 18 key requirements for inclusion in an organization's environmental management system

Low-impact development: a land planning and engineering design approach for managing stormwater runoff. LID emphasizes conservation and use of on-site natural features to protect water quality. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source.

Management system: a framework of processes and procedures used to ensure that an organization can fulfill all tasks required to achieve its objectives

MURB: Multi-unit residential building

Net Zero: buildings produce the same amount (or more) of energy than they consume, and based on an account of its greenhouse gas emissions, are responsible for "zero" emissions over the life of the building.

Peak Oil: the point in time when the maximum rate of global petroleum extraction is reached, after which the production rate enters terminal decline.

Pest: include insects, plant pathogens, weeds, mollusks, birds, mammals, fish, nematodes and microbes that destroy property, spread disease or are a vector for disease or cause a nuisance.

Pesticide: any substance or mixture of substances for preventing, destroying, repelling or mitigating any pest. A pesticide may be a chemical substance, biological agent (such as a virus or bacterium), antimicrobial, disinfectant or device used against any pest.

Policy statement: a statement describing a preferred course of action regarding a particular issue or situation.

Pollution: the creation, emission or discharge of any type of pollutant or waste that adversely impacts the environment.

Progress: measure a meaningful, quantitative indicator of how well the strategic goal is being achieved.

Resilience: the capacity of a system (in this case a functioning city) to withstand and bounce back intact from environmental disturbances.

Significant environmental aspect: an interaction with the environment that has or can have a significant environmental impact.

Sustainability: the ability of human society to endure over a prolonged period as an integral part of Earth's natural systems. It is achieved through the practice of sustainable living.

Sustainable living: a conscious way of life whereby a human system, on whatever institutional scale, in order to meet its current needs, uses the physical, natural and social resources available to it in such a manner that these resources are available, or replaceable, to enable the living systems in which these humans are situated to thrive, essentially in perpetuity. (Office of Sustainability, University of Alberta).

Zero waste: a philosophy that encourages the redesign of resources life cycles so that all products are reused. Any trash sent to landfills is minimal. This process is similar to the way resources are reused in nature.

APPENDIX B: CITY OF EDMONTON PROGRAMS & INITIATIVES AND REGULATIONS

Built Green Initiatives

In April 2007, the City of Edmonton announced home building permit rebate for homes built to bronze, silver and gold Built Green™ standards.¹ These rebates are no longer available. Builders that were able to achieve Gold warranted a \$450 rebate, Silver, \$200 and Bronze, \$100.² Rebates were also awarded for homes achieving the R2000 standard.³

Furnace Rebates

The City of Edmonton ran a program starting in April 2007 and ending in September 2009, which offered a furnace rebate of \$500 for homeowners installing a high efficiency gas furnace.⁴ This program was modified to apply to low income homeowners only under the Residential Rehabilitation Assistance Program (RRAP). The rebate offered is \$2000 for these homeowners when they install an Energy Star qualified high efficiency gas furnace (92% efficiency or better with a DC variable-speed motor).⁵

Appliance Rebates

The City of Edmonton no longer offers a \$75 rebate for ENERGY STAR clothes washers to all residents who upgraded their washing machines. Through the program, 2,282 rebates were offered, reducing GHG emissions by an estimated 467 tonnes.⁶

Home Insulation Rebates

The City of Edmonton, through its CO₂RE program, is offering an incentive for insulation upgrades with a rebate of up to \$250. This rebate, available to Edmonton residents, piggybacks on the federal and provincial insulation rebates that offers up to \$8,000.⁷

Solar-Electric Pilot Program

In 2010, the City of Edmonton offered a limited number of rebates for home and business owners interested in installing solar electricity generation capacity for their home or business. This pilot project had a total budget of \$200,000 and its residential and commercial components each received \$100,000.⁸

The residential program offered a rebate of \$3 per watt of rated solar array capacity. The maximum rebate per residential system was \$9,000. Residential refers to “non-commercial buildings with a footprint of less than 600 m² or less than three storeys”. Eligible systems had to be fully operational and meter-ready. Eligible costs included design, equipment and hardware, third-party installation, shipping, and permitting.⁹

The commercial program offered a rebate of \$3 per watt of rated solar array capacity. The maximum allowable rebate per commercial system was \$18,000. Commercial refers to “non-residential buildings with a footprint greater than 600 m² or greater than three storeys.” However, schools and other public institutions were not eligible. As with the residential systems, commercial systems had to be fully operational and meter-ready and eligible costs included design, equipment and hardware, third-party installation, shipping, and permitting.¹⁰

- 1 BuiltGreen, “Builders save on City of Edmonton Permits for Built Green™ Homes”, Media Release, April 18, 2007. http://www.builtgreencanada.ca/uploads/files/Media_-_Press_Release_07-April-18_City_of_Edmonton_rebate.pdf (accessed April 7, 2011).
- 2 Laura Severs, “Incentives give Edmonton builders reason to go green”, Business Edge, Vol. 7, No. 9, 2007. <http://www.businessedge.ca/archives/article.cfm/incentives-give-edmonton-builders-reason-to-go-green-15281> (accessed April 7, 2011).
- 3 Carbon Dioxide Reduction Edmonton CO₂RE News, Fall/Winter 2007. http://www.edmonton.ca/environmental/documents/FallWinter_2007.pdf (accessed April 7, 2011).
- 4 Carbon Dioxide Reduction Edmonton CO₂RE News, Fall/Winter 2007. http://www.edmonton.ca/environmental/documents/FallWinter_2007.pdf (accessed April 7, 2011).
- 5 Environment Canada, Alberta, 2011. <http://www.ec.gc.ca/financement-funding/default.asp?lang=En&n=EF8AE9FC-1&offset=1&toc=show> (accessed April 7, 2011).
- 6 City of Edmonton, Carbon Dioxide Reduction Edmonton (CO₂RE), 2011. <http://www.edmonton.ca/environmental/programs/carbon-dioxide-reduction-edmonton.aspx> (accessed April 6, 2011).
- 7 City of Edmonton, Home Insulation Rebate, 2011. <http://edmonton.ca/environmental/programs/insulation-rebate.aspx> (accessed August 23, 2011).
- 8 City of Edmonton, Edmonton Solar-Electric Pilot Program, 2011. <http://www.edmonton.ca/environmental/programs/solar-electric-pilot-program.aspx> (accessed April 6, 2011).
- 9 City of Edmonton, Residential Solar-Electric Program, 2011. <http://www.edmonton.ca/environmental/programs/residential-solar-electric-program.aspx> (accessed April 6, 2011).
- 10 City of Edmonton, Commercial Solar-Electric Program, 2011. <http://www.edmonton.ca/environmental/programs/commercial-solar-electric-program.aspx> (accessed April 6, 2011).

Secondary Suites, Garage Suites and Garden Suites - Grant Program

Although not directly targeting increases to urban density, this program which subsidizes the cost of adding secondary, garage or garden suites to homes will result in higher density living in the areas where homeowners embrace the program. A homeowner of a single detached house interested in providing an affordable suite in addition to their primary residence can apply for a Cornerstones grant to assist with construction costs of the suite. The program is designed to encourage the upgrading and addition of suites as an affordable housing option for lower income households in Edmonton.¹¹

Renovation and Energy Efficiency Resource Brochures and Publications

The City of Edmonton has produced three brochures to inform homeowners and renters about things they can do to reduce their GHG emissions. The brochure, "Take Action on Climate Change," provides a list of resources, information about lighting, weatherstripping, thermostat use, Energy Star products, and the City's CO₂RE program. The "Eco-landscaping" brochure presents environmentally friendly ways to reduce yard maintenance, costs and greenhouse gas emissions. The "Apartments & Condominiums" brochure provides tips for renters and condo owners to reduce their energy use and save money.¹²

As part of the CO₂RE program, the City has published several booklets in its "HomeSavers" series, which are available online, at two libraries and all Sears locations. The series covers attic insulation, basement insulation, caulking and weatherstripping, condensation concerns, conserving electricity, heating systems, ventilating your home, water conservation and windows.¹³

The CO₂RE program has also published a newsletter twice a year since 2007. The newsletters cover tips for reducing GHG emissions, energy, and water usage, and actions happening in Edmonton related to these, as well as information about rebate programs.¹⁴

Free CFL Lightbulbs Program (ended)

In 2007, CO₂RE distributed 10,000 free compact fluorescent light bulbs to City of Edmonton residents.¹⁵ In fall 2008, Project Porchlight volunteers, in partnership with the City of Edmonton, distributed 132,000 free compact fluorescent light bulbs door-to-door in Edmonton.¹⁶

Water Efficient Fixtures Bylaw

On January 1, 2008, the City of Edmonton's Water Efficient Fixtures bylaw took effect. It requires water efficient fixtures be installed in all new developments and major renovations that require plumbing permits. The bylaw limits installation of toilets to low flush toilets (no greater than 6 litres) and identifies maximum flow rates for other fixtures such as urinals, faucets and showerheads.¹⁷

Community League Energy Upgrades Challenge

In 2008, three community leagues challenged other Edmonton Community Leagues to a list of energy upgrades on their facilities. Twenty leagues took up the challenge and the winner was awarded \$5,000 by CO₂RE. In 2009, 44 leagues took up the challenge. The participating leagues had a number of challenges that they needed to meet, and those who are participating again must complete additional challenges to qualify. CO₂RE again presented the winning community league with a cheque for \$5,000¹⁸. In 2010, the prize was split into a top award of \$4000.00 and a runner-up award of \$1000. The City has again committed to sponsoring a Green Challenge award in 2011.

Sustainable Building Policy for City of Edmonton Buildings – Leadership in Energy and Environmental Design (LEED) Silver

According to the sustainable building policy statement, the City of Edmonton "is committed to environmental, economic, and social stewardship of City-owned buildings and facilities and continues to demonstrate environmental leadership in the community." Since the beginning of 2008, all new City-owned buildings and major renovations have been designed and constructed to meet LEED Silver Standard as a minimum, and are LEED certified.¹⁹

- 11 City of Edmonton, Cornerstones, 2011. http://www.edmonton.ca/for_residents/programs/cornerstones.aspx (accessed April 6, 2011).
- 12 City of Edmonton, CO₂RE Publications & Resources, 2011. <http://www.edmonton.ca/environmental/programs/co2re-publications-resources.aspx> (accessed April 7, 2011).
- 13 City of Edmonton, CO₂RE Publications & Resources, 2011. <http://www.edmonton.ca/environmental/programs/co2re-publications-resources.aspx> (accessed April 7, 2011).
- 14 City of Edmonton, CO₂RE Publications & Resources, 2011. <http://www.edmonton.ca/environmental/programs/co2re-publications-resources.aspx> (accessed April 7, 2011).
- 15 Carbon Dioxide Reduction Edmonton CO₂RE News, Fall/Winter 2007. http://www.edmonton.ca/environmental/documents/FallWinter_2007.pdf (accessed April 6, 2011).
- 16 Carbon Dioxide Reduction Edmonton CO₂RE News, Spring/Summer 2009. http://www.edmonton.ca/environmental/documents/CO2RE_spring09_e.pdf (accessed April 6, 2011).
- 17 Carbon Dioxide Reduction Edmonton CO₂RE News, Fall/Winter 2007. http://www.edmonton.ca/environmental/documents/FallWinter_2007.pdf (accessed April 6, 2011).
- 18 Carbon Dioxide Reduction Edmonton CO₂RE News, Spring/Summer 2010. http://www.edmonton.ca/environmental/documents/CO2RE_News_2010-SprSum.pdf (accessed April 6, 2011).
- 19 City of Edmonton, Sustainable Building Policy – Leadership in Energy and Environmental Design (LEED) Silver, City Policy C532, 2007. <http://www.edmonton.ca/environmental/documents/C532.pdf#xml=http://dmzasrch71/texis/search/pdfhi.txt?query=sustainable+building+policy&pr=www.edmonton.ca&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&rdepth=0&sufs=0&order=r&cq=&sr=-1&id=4d550ebb7> (accessed April 6, 2011).

The purpose of this policy is to “ensure that City-owned new facilities and major renovations are designed and constructed to an environmentally sustainable standard that benefits all Edmonton residents, now and in the future.” Through this plan, the City will achieve 30 per cent or greater energy efficiency than the Model National Energy Code for Buildings in regard to design and construction of new buildings.²⁰

Guidelines for Residential Infill in Edmonton’s Mature Neighbourhoods

In 2009, the City of Edmonton created guidelines applicable to infill development. Application of the guidelines varies according to the scale of the proposed development. One element discussed in the guidelines is that the planning and design of residential infill projects in mature neighbourhoods should contribute to a more environmentally sustainable city.²¹

The guidelines outline various ways that infill projects can contribute to improved environmental sustainability:²²

- › Enhancing opportunities for people to use transit
- › Enhancing opportunities for active transportation such as walking and cycling
- › Using building form and construction techniques that create buildings that are adaptable to reuse, such as above ground parking garages
- › Incorporating sustainable development/green building features that qualify for LEED-NC or LEED-ND certification equivalents in all residential infill projects, particularly Medium and Large-scale projects. Such features include:
 - » Utilizing building standards/materials and appliances that achieve high energy efficiency
 - » Incorporating alternative heat and electrical energy sources (solar, geothermal)
 - » Maximizing opportunities to cool interiors through natural ventilation
 - » Installing plumbing fixtures that conserve water
 - » Designing for the reuse of grey water and/or storm water on site
 - » Utilizing high efficiency irrigation, drought tolerant plants, and native species for landscaped areas (xeriscaping)
 - » Inclusion of green roofs
 - » Salvaging and recycling of building materials during construction
 - » Orienting buildings on large sites, where possible, to take advantage of passive solar heat gain

Transit-oriented Development Guidelines

Transit-oriented development is, as its name suggests, development that is designed to make it easy for people that live, work or use services in the community to use transit. Transit-oriented development usually has higher densities than traditional developments to make them highly walkable and to be able to afford high quality transit service to the area. These increased densities also enable TODs to attract many local services making for a very attractive place to live.

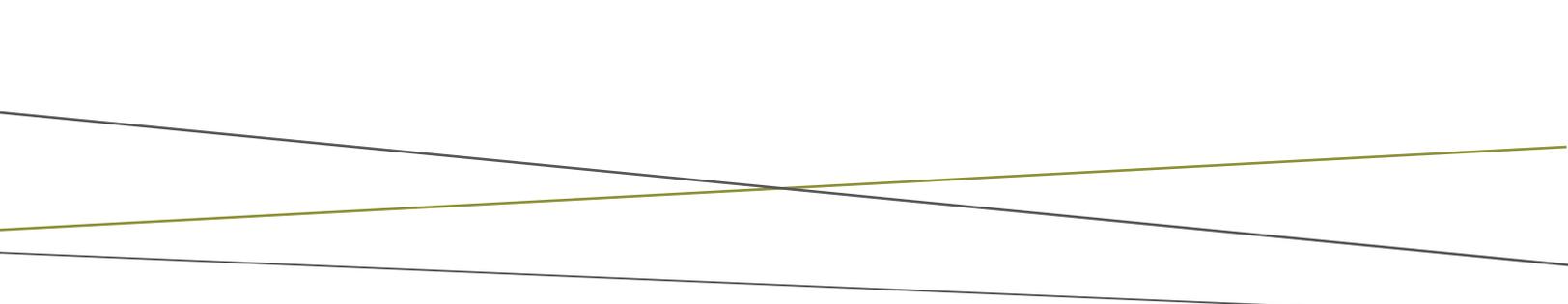
Low Impact Development Guidelines

Low impact development is a term often used to describe a development that is designed to manage storm water using local, natural systems as opposed to traditional storm water systems that focus on moving the storm water quickly out of the community. This reduces the amount and cost of storm water management systems that are needed, and it enhances the quality of water in the region as well.

²⁰ City of Edmonton, Sustainable Building Policy – Leadership in Energy and Environmental Design (LEED) Silver, City Policy C532, 2007. <http://www.edmonton.ca/environmental/documents/C532.pdf#xml=http://dmzasrch71/teaxis/search/pdfhi.txt?query=sustainable+building+policy&pr=www.edmonton.ca&prox=page&rorder=500&rprox=500&rdfreq=500&rwrfreq=500&rlead=500&rdepth=0&sufs=0&order=r&cq=&sr=-1&id=4d550ebb7> (accessed April 6, 2011).

²¹ The City of Edmonton, Planning and Development, Planning and Policy Services Branch, Smart Choices Program, Residential Infill Guidelines: A Manual of Planning and Design Guidelines for Residential Infill in Mature Neighbourhoods, (Edmonton, AB: Fletcher & Company, 2009). http://www.edmonton.ca/city_government/documents/Residential_Infill_Guidelines_Sept_2009.pdf (accessed April 6, 2011).

²² The City of Edmonton, Planning and Development, Planning and Policy Services Branch, Smart Choices Program, Residential Infill Guidelines: A Manual of Planning and Design Guidelines for Residential Infill in Mature Neighbourhoods, (Edmonton, AB: Fletcher & Company, 2009). http://www.edmonton.ca/city_government/documents/Residential_Infill_Guidelines_Sept_2009.pdf (accessed April 6, 2011).



APPENDIX C: DISCUSSION PAPER - THE BUSINESS CASE FOR GREEN BUILDINGS IN EDMONTON, ALBERTA

For the City of Edmonton

July, 2011

G. P. Rollo & Associates Ltd.

EXECUTIVE SUMMARY

G. P. Rollo & Associates, Land Economists have produced this Discussion Paper to introduce the economics of developing and owning green buildings to the development of the City of Edmonton's Green Building Plan.

The Paper has presented a considerable amount of evidence that there is a business case for green buildings in many North American jurisdictions. However, Edmonton stakeholders need home grown market based evidence of the viability of green building development, evidence that is not yet available, but is likely to emerge over the next decade.

There are many important facts about the economics of green buildings that have been identified in this Discussion Paper.

1. Opinions on cost premiums for green buildings ranges from 0% to 10% premium over conventional building costs. The consensus of opinion is that cost premiums are decreasing as builders and developers gain more experience with building green.
2. Green buildings can create lower operating costs and lower life cycle costs for commercial, institutional and residential buildings.
3. Surveys indicate that high proportions of corporate users will pay more rent to secure green space. Amongst health motivated buyers of residential units, well over 50% will pay more for green space.
4. Green buildings can support higher rents and residential selling prices. But market can be limited and this creates uncertainty for many investors and developers. The benefits of green commercial buildings is stronger over longer rather than shorter investment horizons.
5. Adding non-financial benefits such as increased productivity and health value to financial benefits can support total benefits of green being ten times the initial capital cost. Further adding externalities that accrue to society rather developer, investors and building users further increases the benefits of green buildings and greatly enhances the case for green buildings.
6. The rate of return from building LEED certified buildings is potentially high (but lowest with LEED platinum buildings). However, there is a lack of empirical data to support the long term financial return or other benefits that stakeholders will accept as truth.
7. While the trend towards green buildings is accelerating in Canada, there are conflicting views as to the relative costs and benefits of going green. The case for green buildings is strongest with commercial buildings. Residential developers are more hesitant to pursue green projects due to concerns with cost premiums and market acceptance.

The business case for pursuing green buildings in Edmonton is mixed.

1. From a government perspective
 - » Experiences from other US and Canadian jurisdictions illustrates the economic and non-economic benefits of going green.
 - » These same benefits will apply to government buildings in the City of Edmonton – there is a compelling case for the City of Edmonton to pursue green building in developing its own facilities.
2. From a private sector perspective
 - » The business case for a market supported expansion of the green building industry in Edmonton is limited because:
 - There is not yet sufficient market demand for both commercial and residential green buildings to warrant significant expansion of green buildings in Edmonton. While the demand for green buildings will grow over time, it could take a decade or more before investors, developers and green building users have confidence to support a major shift towards green buildings.
 - Residential developers do not directly realize the benefits of operating cost reductions from green buildings – residential owners realize these benefits.

- The private sector typically does not view development from the long term basis required for the full benefits of green buildings to be realized.
- » Current soft economic and real estate market conditions are not conducive to major green development. Low office market rents limit interest in tenants paying higher rents for green space. The same exists in the retail market. Uncertainty in the housing market limits demand for more expensive green units – if similar and less costly non-green units are available, the market typically gravitates towards lower cost alternatives. The viability of green development will improve as the economy and housing market improve and expand.
- » Green building stakeholders are not willing to take the experiences of other markets and jurisdictions and assume the same successes will work in Edmonton. There is too little experience and too much uncertainty surrounding green development to justify significant growth of the industry.

There are a number of initiatives that the City can pursue to increase awareness of the benefits of going green and speed the transition to more green building construction in the City.

- › Support educational programs that increase awareness of global warming and the need to be pro-active in green building programs to mitigate global warming.
- › Work with the financial industry to encourage their awareness of green buildings and development of green lending programs for energy retrofits and new construction.
- › Work to increase industry and public awareness of the benefits of green building development.
- › Encourage the green industry to be realistic about green and false green claims.
- › Increase public awareness of the benefits of green buildings on productivity and health benefits. Encourage developers, investors, institutions and government to incorporate these and other non-financial benefits into their decision making process for considering green building retrofits and new construction.
- › Encourage the expansion of green building technology and education at universities, trade schools and the public education system.
- › Encourage all green building stakeholders to integrate life cycle costing in their analysis of the benefits of green buildings.
- › City should take leadership; in areas where it makes good long-term business sense, i.e. their own buildings and facilities.

1.0 INTRODUCTION

The City of Edmonton's Green Building Plan aims to provide actions to improve the environmental, health and socio-economic performance of all types of buildings in the city.

This Discussion Paper is an introduction to the economics of green buildings and presents an overview of issues of interest to stakeholders developing and occupying green buildings, namely:

- › The financial viability and incentives to pursue green buildings
- › The role of life cycle costing in the economics of green buildings
- › The costs of owning and leasing green buildings
- › The role of non-financial issues and externalities in the decision to pursue green building
- › Stakeholder experiences and attitudes towards green building development
- › The economic environment and its impact on the development industry's interest in pursuing green development in order to state what the current Business Case is for developing green buildings in the City of Edmonton.

The economics of green buildings is discussed for diverse building types including institutional, commercial office and retail, multiple family, single-family (new and retrofit), and others.

The potential for green buildings is also considered from the perspective of "green building certification" as there are varying capital and operating costs associated with different certifications:

- › LEED-NC and BOMA BEST for new commercial buildings
- › BuiltGreen and enerGuide for new homes

The green building industry is in its infancy in Edmonton – it does not have the history of industry experience and market acceptance found in many US, European, and other Canadian (e.g. Montreal, Toronto and Vancouver) markets. Green building stakeholders resist applying the knowledge and experiences of other jurisdictions to the Edmonton market, requiring more proof of the viability of and demand for green buildings. It is hoped that the continuing growth of the industry in the City, combined with knowledge from this and other The Way We Green Discussion Papers will improve the understanding of the economic potential for pursuing green in Edmonton in the years ahead.

2.0 THE DECISION TO PURSUE GREEN BUILDING DEVELOPMENT

The decision to pursue green building development is largely an economic decision; the question is: does an investment in green technology or building provide a profit or rate of return on investment to justify pursuing it? In addition, especially for governments and some institutional developers and building owners, there are also non-financial issues and externalities that influence the decision to develop green buildings.

2.1 Economic Decision Making Criteria

Underlying the decision making process of institutional, investor, developer, businesses and households considering investment in green building space is the principle of life cycle costing.

- 1) Life cycle costing is a methodology for illustrating the economic benefits resulting from an investment in green building technology or building that is generated over the course of the life of the building.
- 2) Life cycle costing methodology forecasts capital and operating costs from the green investment and determines the present value of this cash flow.

3) Studies have shown that the present value of the life cycle cost savings associated with green buildings can greatly outweigh initial capital cost investment().

More specifically, green building stakeholders integrate life cycle costing considerations into specific financial criteria for deciding whether making a capital investment in green is worthwhile.

1) Commercial buildings

1. Investor and developer perspectives: aim to realize a market rate of return (internal rate of return on investment) and payback period commensurate with the risk of pursuing green development. Can incorporate life cycle costs, including operating and maintenance costs plus replacement costs over the economic life of the building.
2. Tenant perspectives: aim to minimize the present value cost of their lease and operating costs over an expected lease term. Over a long enough lease period, higher capital costs of green buildings can be made up by lower operating costs.

2) Institutional and government buildings

1. Institutions and governments aim to minimize the present value cost of green building ownership over the life of their buildings. As the economics of ownership and operation is considered for the full economic life of the building, there are opportunities to integrate a full life cycle costing into the analysis.
2. Alternate scenarios incorporating different green designations with varying technologies (e.g. LEED Silver, LEED Gold, LEED Platinum) may be considered and the economic decision is made by choosing that scenario that produces the lowest present value cost of development and ownership.

3. Residential buildings

- » Developer perspectives vary depending on whether the developer pursues condominium or rental units.
 - Condominium: developers aim to pursue a sufficiently large target market interested in green buildings to realize an acceptable profit on investment and minimal risk relative to pursuing non-green development. Green buildings are more expensive than non-green buildings, require a higher sales price than non-green buildings and hence can create risks for developers in price competitive markets.
 - Multiple family rental building: developers building to hold rental units aim to attract tenants willing to pay a premium for green units, achieve an acceptable absorption period and market rate of return (e.g. internal rate of return) on investment.
 - Single-family homes: developers aim to realize a profit on costs. Developers will be concerned about the number of households willing and able to pay for extra green building costs.
- » User perspectives
 - Condominium purchasers: are typically concerned with affordability, ability to secure financing plus minimizing equity investment, mortgage payments and operating costs. There are limitations on the size of the market for green residential units due to affordability or their higher cost. On the other hand there are "target markets" for green units, i.e. households who will pay a premium to own such a unit.
 - Multiple family renters: wish to minimize their monthly lease costs. Typically are not concerned with life cycle cost savings.
 - Single-family home owners: are focused on affordability, ability to secure financing and wish to minimize equity, mortgage and operating costs.

2.2 Non-Financial Benefits + Externalities

The decision to go green is also impacted by consideration of non-financial benefits and externalities.

1) *Benefits of green buildings*

1. Increased occupant comfort and health – green buildings incorporate superior air quality, abundant natural light, access to views and noise control. A North American study of office building tenant satisfaction determined that tenants highly value comfort in office buildings – respondents attributed the highest importance to comfortable air temperature (94%) and indoor air quality (94%). This can lead to increased productivity and salary cost gains.
2. Ecological considerations – green buildings strive to protect existing ecologies and enhance or improve ecologies that may have been damaged in the past by protecting natural spaces, enhancing existing ecology, reducing water use, reducing material use and the use of low-impact materials.
3. Reduced climate change impact through reduced greenhouse gas emissions. The largest building factor affecting global climate change effects is the use of energy for heating and cooling. In addition to using fewer materials and less energy, green buildings often incorporate clean energy, such as solar energy or wind power. Through these efforts, the contributions to global climate change by green buildings are significantly reduced.
4. Increased property values: green buildings can result in increased income and lower operating costs which when combined with lower capitalization rates than exist in non-green buildings equate to higher building value upon lease-up and sale.
5. Other indirect/intangible benefits of green buildings can be increased retail sales, improved image, and reduced development and management risk.

2) *External effects*

External effects are costs or benefits of a green building that accrue to society and which are not part of a private sector decision making process. Examples of external effects include:

1. Infrastructure cost benefits: green buildings incorporate measures to reduce water use. While direct cost savings are considered by the private sector, indirect costs associated with infrastructure and government subsidies have not been defined. On the assumption of a green building water use reduction of 30%, associated indirect cost savings can amount to 0.30 to 0.58 \$/sq.ft. per year.
2. Environmental effects or costs: external environmental costs include pollutants in the form of emissions to air, water and land and the general degradation of the ambient environment. A study by Lucuik and Meil in 2004 developed a full cost accounting approach by taking into account indirect costs for typical office buildings in Canada. The study concluded that indirect environmental costs were 17% of the total building cost or approximately \$19 per sq.ft.
3. Job creation: green building rating systems often promote the use of local or regional materials, which in turn encourages local or regional job creation.
4. International recognition and export opportunities: green buildings can also have economic effects on a broader level as a result of increased international recognition and related export sales.

3.0 EXPERIENCES WITH GREEN BUILDINGS

Stakeholders including developers, investors, governments, tenants, and residential households have important questions to consider regarding the following factors in pursuing their interest in green buildings:

1. Capital cost premiums
2. Rent premiums
3. Marketability (impact on absorption period)
4. Operating costs
5. Capitalization rates and green building value
6. Rate of return on green building investment
7. Risk analysis and how all these factors impact return on investment
8. For households purchasing green buildings: affordability (residential new and retrofit) and ability to secure financing.

With limited experience in the Edmonton market, one must draw upon the experiences reported in the literature plus experiences gained in other Canadian markets, notably eastern Canada and Vancouver.

3.1 As Reported in the Literature

While the trend towards green buildings is accelerating in Canada, there are conflicting views as to the relative costs and benefits of going green.

- › Opinions on cost premiums for green buildings range from 0% to 10% premiums. The consensus of opinion is that cost premiums are decreasing as builders and developers gain more experience with building green. While green buildings typically cost more than conventional buildings to design and build, these cost differences are greatly overshadowed by economic gains associated with life cycle operating costs, insurance rates, productivity gains and increased property values.
- › Green residential buildings (single or multiple family) can produce substantial cost savings and, from a life cycle cost perspective result in green buildings being a lower cost alternative to existing buildings. Similarly, lower operating costs plus increased productivity and health value can generate benefits of more than ten times the costs of building green commercial buildings.
- › The benefits of green commercial buildings are stronger over longer rather than shorter investment horizons.
- › Regarding demand, surveys indicate that high proportions of corporate users will pay more rent to secure green space. Amongst health motivated buyers of residential units, well over 50% will pay more for green space.
- › The rate of return (IRR on investment) from building LEED certified buildings is potentially high (but lowest with LEED platinum buildings). There is a lack of empirical data to support the long term financial return or other benefits that stakeholders will accept as truth.
- › The demand for green buildings is strongest with commercial buildings. Residential developers are more hesitant to pursue green projects due to concerns with cost premiums and market acceptance.

Benefits from green office buildings include:

- › Buildings with a green rating command rental rates that are roughly three per cent higher per sq.ft. than otherwise identical buildings – controlling for the quality and the specific location of office buildings. Selling prices of green buildings are higher by about 16 per cent.

- › Analyses establish that variations in the premium for green office buildings are systematically related to their energy-savings characteristics.
- › Beyond the direct effects of energy savings, further evidence suggests that the intangible effects of the green rating itself also play a role in determining the value of green buildings in the marketplace.
- › There is a compelling case for government to pursue green buildings. The Costs and Financial Benefits of Green Buildings, A Report to California's Building Task Force, 2003, a group of over 40 California state government agencies examined the economics of government going green and found:
- › Integrating sustainable or green building practices into the construction of state buildings is a solid financial investment. A minimal upfront investment of 2% of construction costs typically yields life cycle savings of over 10 times the initial investment. Energy savings alone exceed the average increased cost associated with building green.
- › The financial benefits of green buildings include lower energy, waste disposal and water costs, lower environmental and emissions costs, lower operations and maintenance costs and savings from increased productivity and health.

There is a strong case for new green single-family homes in Canada. The Pembina Institute reports savings to home owners as follows:

- › Energy efficiency for existing homes: numerous energy efficiency options are available for existing homes. These options can result in savings of up to \$3,000 per year, if all suggested energy efficiency options were applied. These options can pay back the initial investment in less than 6 years. When the impact of financial incentives available by provincial government and utilities, the payback periods for these options become even shorter.
- › Renewable energy for new homes and buildings: new homes and buildings are generally more efficient than the existing stock, and are expected to become more so as the Alberta Building Code evolves.
- › Energy efficiency for new homes and buildings: for energy efficiency in new homes, energy savings from improved envelopes (insulation and windows) were generally more cost-effective than mechanical (heat pumps and/or furnaces) or renewable energy upgrades. For commercial buildings there is a wider range of cost estimates for energy efficiency. In some markets, new buildings can achieve the savings with little or no incremental cost. This is particularly the case with higher quality Class A projects in high demand locations.
- › Energy savings: opportunities exist to reduce energy consumption by up to 30% relative to existing or new buildings based on current technologies. The challenge appears to be in reducing upfront costs for these technologies and encouraging wide spread uptake of design practices that lead to more efficient buildings.

The case for retrofitting existing homes for green is also strong :

- › Energy use in buildings accounts for a significant portion of greenhouse gas emissions in Canada. Energy-efficiency retrofits offer a fast and affordable way to cut greenhouse gas emissions, conserve energy and save consumers money on their utility bills. The bonus for individual homeowners, besides lower energy bills and increased comfort , is that their home increases in value with energy retrofitting.
- › A \$7,000 retrofit in Canada can reduce the average detached home's energy use by 23% to 26%, and cut the average household's greenhouse gas emissions by approximately 3.1 tonnes per year.
- › Homeowners can save \$700 per year on a \$2,000 annual heating bill by implementing home retrofit recommendations from the existing federal home energy audit program.

3.2 Canadian Perspectives

Canadian studies shed light on the benefits of going green.

1) Green Real Estate: A Powerful New Asset Class, University of Toronto, Rotman School of Management, 2008

- › Green buildings are more valuable.
- › Conventional buildings are at risk of accelerated obsolescence and devaluation.
- › Green buildings reduce operating costs, create a salable consumer amenity that enhances revenue streams, produces higher more predictable cash flows, and has superior investment potential, especially for long-term hold.
- › Corporate users: 77% would pay more rent, 23% would pay same or less.
- › RCLCO Survey: green residential demand is growing. The strongest market driver is wellness and health; buyers in this group are more affluent and educated (USA national survey, spring 2007). Among health motivated buyers, 91% would pay more for green features, 41% would pay more even if no payback.
- › Multi-family case study data: accelerated leasing and condo sales; top tier pricing, including price premiums.

2) Who Pays for Green, The Economics of Sustainable Buildings, CB Richard Ellis, 2009

- › Buildings with green credentials remain relatively scarce with the result that “track record” evidence of good practice is difficult to find and share across the market. This is partly because developing green is still perceived as more expensive, and because the evidence is limited on the commercial rewards of doing so.
- › There currently is no single agreed definition of a green building that encompasses all aspects of design, development and use.
- › Development of a greener commercial building – designed to achieve one of the higher standards of accreditation – is likely to add between 5% to 7.5% to construction costs.
- › US data indicates that green buildings do attract higher rents than conventional ones, and also enjoy higher rates of rental growth.
- › In percentage terms, the rent additionally is of the same order as the excess development cost for green buildings (2%-6%), suggesting that some additional premium may need to accrue from yields paid in the investment market.
- › Significant differences exist in energy usage and running cost profiles of green buildings vs. conventional buildings. This differential is driven mainly by fluctuations in oil prices and energy costs. Evidence suggests that for any given level of oil price, the energy usage savings on substantially improved buildings, relative to unimproved ones, are very significant. Depending on the level of improvement these savings at least exceed 10% and could well be over 50%.
- › The precise rental premium that a tenant might be prepared to pay for a building delivering this level of energy saving is complicated by various factors, including the use of fixed-term energy contracts that insulate tenants against market fluctuations in energy prices. Nevertheless, this suggests that the apparent savings accruing from reduced operating costs far exceed the scale of additional development cost, and hence create significant headroom in terms of potential rent premiums.

3) Financial Benefits of Green Buildings, Colliers International

- › Green buildings not only reduce the environmental impact of buildings, but also result in financial and economic benefits to building owners, developers and tenants.

- › On average, green certified buildings such as LEED use 25-50% less energy, use 40% less water, produce 70% less construction waste.
- › Typically energy costs are the greatest operating expense of buildings. In the future, carbon costing schemes, energy use reduction and lower greenhouse gas emissions will also result in further bottom line savings.
- › The focus in green building research has primarily been on energy efficiency measures and renewable energy systems because these are easier to quantify. However, the latest research focuses on the less tangible benefits of green buildings such as occupant health and productivity.
- › A recent RICS survey compared 893 green certified buildings to 10,000 non-green certified buildings and demonstrated green certified buildings rented for on average 6% higher and transacted for an average of 16% more than non green certified buildings.
- › Green certified buildings have higher occupancy rates and less tenants' turnover than non-green certified buildings.
- › Research continues to support the many benefits of sustainable buildings. Higher rents and sales prices already demonstrate this in many markets.

4) Green Value, Myth or Reality? RICS() Green Value Conference, Cushman Wakefield, 2006

Examines the linkages of green initiatives to project value. Findings include:

- › Sustainable site development: reduced development costs, improved marketability, reduced ongoing maintenance costs, improved natural appearance, higher sales/rents, absorption and re-tenanting, NOI/ROI benefits.
- › Water efficiency: lower tenant CAM charges. Direct NOI benefit for gross leases, potential for net leases requires communicating benefits to tenants.
- › Energy efficiency:
 - » Reduced operating costs, longer life cycle, lower development costs.
 - » Improved occupant productivity, lower churn, turnover, tenant inducements, etc.
 - » Higher net income for gross leased buildings, improved yield.
 - » Indoor environmental quality: risk reduction, greater marketability faster sales and leasing, higher ROI/NOI
 - » Reduced consumption of building materials: lower construction costs, probable lower operating/maintenance costs, higher ROI/NOI

5) Towards a Green Building and Infrastructure Investment Fund, Compass Resource Management, 2007

Examines the potential costs and returns of pursuing green buildings in a green building investment fund.

- › The average green premium for new construction ranges from 1% to 8%, depending upon the level of certification. Some individual developments have reported no premium and/or savings associated with LEED certification. Some developments have reported a premium in excess of 8% for LEED platinum. Incremental costs can be minimized through appropriate incorporation of green building practices throughout the design and construction process.
- › Although LEED provides credit for many types of performance improvements, energy and water savings provide the most direct financial benefits.
- › The rate of return for LEED certified buildings is high. In both Vancouver and Whistler, LEED certified buildings appear to be a profitable investment, with a 15 year rate of return above 35%. The rate of return for LEED silver, gold and platinum buildings is much lower. The 15 year rate of return on LEED silver buildings in Vancouver is 18%, while in Whistler it is 29%. For LEED gold buildings, the 15 year rate of return ranges from 11% in Vancouver to 19% in Whistler. For LEED platinum, the 15 year rate of return ranges from 2% in Vancouver to 8% in Whistler.

- › Although returns seem reasonable, these returns do not necessarily translate immediately into higher asset value. The market routinely passes up seemingly profitable investments in energy efficiency because of risk, capital constraints, agency and information problems. As a result, it is often difficult for green developers to justify and capture a green premium through the sales value for their buildings. Even when a developer has achieved a sales premium, it is often not clear whether the premium was due to green features or other factors such as location.
- › With ongoing ownership a long-term investor is more likely to recoup the premium through lower operating costs and/or higher rents from occupants. While green buildings may not attract a large sales premium initially, there is some evidence they can attract higher rents and higher occupancy.
- › There are also other innovative mechanisms to recover the premium for green construction. These include green performance contracting, green lending, green leases and lease purchase agreements for equipment, establishing utilities to own and operate equipment/services. All of these mechanisms involve isolating and transferring some of the costs from developers and/or ultimate owners and then recovering them through ongoing mortgage, lease or utility payments.

6) An Economic Feasibility Study of Green Buildings in Vancouver – Saxon, Goldenberg, Kawai, 2007

Paper examines the business case for green buildings in Canada and analyzes the opportunities and risks facing developers, purchasers and tenants. Findings:

- › The average green building costs approximately 2.1% more than a standard building.
- › The current business case for green buildings is untenable for most profit maximizing firms. A purchaser of a new property typically will not want to wait longer than 10 or 15 years to recoup upfront costs, and without full life-cycle costing, which takes into account the full life of a building (typically between 40 - 50 years), the benefits of green buildings are not realized.
- › Investors, developers, purchasers and tenants should work towards sharing the risks associated with the higher upfront costs required to build sustainable buildings. If the various players fail to do so, even the most certain benefits that would accrue over the lifetime of a building will undoubtedly be abandoned because of behavioral uncertainty. The business case exists for green buildings today under the condition that a longer time frame is considered for capital investments (between 20 and 40 years), and its benefits are unlikely to decrease; if anything it will become increasingly costly to avoid saving energy, conserving resources, limiting emissions and improving employee health.

3.3 Alberta Industry Perspectives

A survey prepared by the Alberta Chapter of the Canada Green Building Council to analyze the market transformation to green buildings provides Alberta perspectives on the potential for going green. The survey examines issues of the overall market, the arguments for green building, perception of the financial investment, the role of certifications and how the benefits of green buildings are being communicated among building design and construction professionals. Study findings are based on interviews with over 200 firms/professionals involved in the green industry. Study findings include:

1. While facility owners and managers as well as end-use customers are lagging in their embrace of sustainable building principles, the number of registered and certified projects across the range of prevalent rating systems is increasing.
2. The case for green buildings is most credibly accepted with regards to energy efficiency and this trend is on the rise. This is most prevalent in corporate office, healthcare and government sectors in Alberta.
3. Recognition that government has adopted green building practices as a priority is strong, with 75% of owners and real estate survey participants indicating a recognized likelihood that green building related regulatory/policy activities would affect their buildings and facilities over the next 5-10 years.

4. 60% to 70% of survey participants believe there is a cost premium for pursuing green building green practices, services and materials.
5. Nearly 50% of survey participants acknowledge the potential for significant return on investment for green building. However, there is a lack of empirical data to support the long term financial return or other benefits that stakeholders will accept as truth.
6. In Alberta, navigating the landscape of green building certifications and accreditations is seen as a challenge within the building industry.
7. The sustainable design community is struggling to express benefits effectively to buyers.

3.4 Edmonton Stakeholder Survey

G. P. Rollo & Associates surveyed 30 Edmonton green industry stakeholders. Only six responses were received. Findings from the survey include:

1) Rents and Leasing

- › Amongst developers, there is strong agreement that retail tenants are largely unwilling to pay any extra rent for locating in a green building. This could change over time with increased knowledge amongst retailers of the potential financial benefits of green buildings (e.g. lower operating/CAM costs).
- › Half of the survey respondents believed that green office buildings can command higher rents today than non-green buildings, all else being equal. The other half, while emphasizing a general lack of willingness amongst many tenants to pay 'green premiums' today, noted that within 5 years green office buildings would be the standard due to government legislation mandating government/quasi-government agencies being located in minimum LEED-Silver (or equivalent) structures.
- › Most respondents agreed that, if the market could deliver green building space with rental rates equivalent to non-green space, tenants would actively seek out green space.
- › Survey results indicated no significant relationship between speed of leasing or occupancy rates and green building.

2) Investment

- › General disagreement with the statement that "green retail buildings will have higher value upon resale than those without green benefits."
- › General agreement with the same statement pertaining to office buildings.
- › The development community expressed concern with the business case for green buildings due to the time it takes to recoup up-front costs through energy savings (15+ years in some cases). The up-front costs most often cited as being problematic are those relating to LEED certification and energy modeling.

3) Costs

- › Survey results indicated that energy costs are found to be somewhat lower in green buildings versus non-green buildings. However, it was noted that this is largely dependent on the retrofit and the proper integration of energy efficiency design into the early project planning stages. If an integrated design process is not undertaken, savings will be minimal.

- › Survey results indicated an equal split on operating cost feedback between “about the same” and “somewhat lower” than non-green buildings.
- › The premium in capital costs for green buildings over non-green buildings was identified as being between 3 and 4% by 5 respondents. One developer indicated a premium of over 10% for projects they were looking to become involved in. The most significant premiums they identified were those associated with LEED consulting fees (\$50,000 per building).
- › Other ‘significant’ cost premiums associated with green buildings are as follows:
 - › Lack of knowledge and experience amongst project teams (including the City) lead to wasted consulting fees;
 - › Many items that have a long term return on investment are often only considered capital costs. These include energy modeling, commissioning, and highly efficient materials technology.
 - › All respondents agreed that many green building related costs can be offset through increased scales of development.
 - › There was agreement amongst respondents that a better sharing of knowledge and creating certainty around process will bring down costs and open the door for more green construction opportunities. Too often a lack of understanding leads to ‘padded fees’ to cover unknowns.
 - › Amongst consultancy respondents, there was agreement that by mandating higher standards for construction, economies of scale will be created that will lead to decreasing costs for green building materials and techniques.

4) Obstacles

GPRA provided survey recipients with a list of possible obstacles to the mainstreaming of green buildings in order to assess where efforts to remove obstacles may be most warranted. Listed items were: construction costs; awareness of benefits; budget horizons; LEED documentation/costs; quantifying of benefits; payback period; construction complexity; and operating costs.

- › The two items that were deemed either “significant” or “very significant” obstacles to green building mainstreaming by all survey participants were:
 - › Payback period (i.e. time to recoup upfront costs)
 - › Awareness of benefits
- › Items that were deemed either “significant” or “very significant” by developers were:
 - › Payback period
 - › LEED documentation / costs
 - › Budget horizons
 - › Construction cost premiums
- › Items which developers identified as being “neutral” were:
 - › Quantifying benefits
 - › Construction complexity
 - › Operating costs

By and large, most developers believe that their involvement in green building projects will increase somewhat or increase substantially over the next 3 years. They believe that this involvement will primarily be related to office construction. Interestingly, all but one respondent felt quite strongly about having green building features in their own office space.

5) Incentives

- › On the commercial side, nearly all respondents noted that provincial and municipal requirements for LEED buildings for government offices has increased LEED and green-related construction across the industry. Some lamented the discontinuation of a Federal government program to offset costs associated with energy modeling, a program that was identified as useful in incentivizing clients to 'go green.' There was some suggestion that a municipal program that offers similar incentives (for modeling, commissioning etc.) could increase demand.
- › Some other municipal incentives that developers and consultants would like to see include:
 - » Rebates on residential and commercial space that meet certain standards (e.g. BuiltGreen, LEED Silver)
 - » Low interest rate loans to cover retrofits on existing buildings.
 - » Designated 'green building zones'
 - » Passive design toolkits for builders
 - » Passive solar zoning and solar mapping of the city, allowing developers to include solar hot water and photovoltaic panels.
 - » Requirements for energy performance rating reports on all buildings (with cost offsets for homeowners)
 - » Builders could receive rebates on permits for achieving BuiltGreen Status
 - » City could set up carbon neutral reserve fund to offset annual GHG emissions resulting from all municipal operations. This could be expanded to include developers of new buildings, with fees assess based on a building's incremental performance relative to a carbon neutral standard.

4.0 SUMMARY: THE BUSINESS CASE FOR GREEN BUILDINGS IN EDMONTON

This Discussion Paper has presented a considerable amount of evidence that there is a business case for green buildings in many North American jurisdictions. However, Edmonton stakeholders need home grown market based evidence of the viability of green building development, evidence that is not yet available, but is likely to emerge over the next decade.

There are many important facts about the economics of green buildings that have been identified in this Discussion Paper.

1. Opinions on cost premiums for green buildings ranges from 0% to 10% premium over conventional building costs. The consensus of opinion is that cost premiums are decreasing as builders and developers gain more experience with building green.
2. Green buildings can create lower operating costs and lower life cycle costs for commercial, institutional and residential buildings.
3. Surveys indicate that high proportions of corporate users will pay more rent to secure green space. Amongst health motivated buyers of residential units, well over 50% will pay more for green space.
4. Green buildings can support higher rents and residential selling prices. But market can be limited and this creates uncertainty for many investors and developers. The benefits of green commercial buildings is stronger over longer rather than shorter investment horizons.
5. Adding non-financial benefits such as increased productivity and health value to financial benefits can support total benefits of green being ten times the initial capital cost. Further adding externalities that accrue to society rather developer, investors and building users further increases the benefits of green buildings and greatly enhances the case for green buildings.
6. The rate of return from building LEED certified buildings is potentially high (but lowest with LEED platinum buildings). However, there is a lack of empirical data to support the long term financial return or other benefits that stakeholders will accept as truth.

7. While the trend towards green buildings is accelerating in Canada, there are conflicting views as to the relative costs and benefits of going green. The case for green buildings is strongest with commercial buildings. Residential developers are more hesitant to pursue green projects due to concerns with cost premiums and market acceptance.

The business case for pursuing green buildings in Edmonton is mixed.

1. From a government perspective
 - » Experiences from other US and Canadian jurisdictions illustrates the economic and non-economic benefits of going green.
 - » These same benefits will apply to government buildings in the City of Edmonton – there is a compelling case for the City of Edmonton to pursue green building in developing its own facilities.
2. From a private sector perspective
 - » The business case for a market supported expansion of the green building industry in Edmonton is limited because:
 - There is not yet sufficient market demand for both commercial and residential green buildings to warrant significant expansion of green buildings in Edmonton. While the demand for green buildings will grow over time, it could take a decade or more before investors, developers and green building users have confidence to support a major shift towards green buildings.
 - Residential developers do not directly realize the benefits of operating cost reductions from green buildings – residential owners realize these benefits.
 - The private sector typically does not view development from the long term basis required for the full benefits of green buildings to be realized.
 - » Current soft economic and real estate market conditions are not conducive to major green development. Low office market rents limit interest in tenants paying higher rents for green space. The same exists in the retail market. Uncertainty in the housing market limits demand for more expensive green units – if similar and less costly non-green units are available, the market typically gravitates towards lower cost alternatives. The viability of green development will improve as the economy and housing market improve and expand.
 - » Green building stakeholders are not willing to take the experiences of other markets and jurisdictions and assume the same successes will work in Edmonton. There is too little experience and too much uncertainty surrounding green development to justify significant growth of the industry.

There are a number of initiatives that the City can pursue to increase awareness of the benefits of going green and speed the transition to more green building construction in the City.

- › Support educational programs that increase awareness of global warming and the need to be pro-active in green building programs to mitigate global warming.
- › Work with the financial industry to encourage their awareness of green buildings and development of green lending programs for energy retrofits and new construction.
- › Work to increase industry and public awareness of the benefits of green building development.
- › Encourage the green industry to be realistic about green and false green claims.
- › Increase public awareness of the benefits of green buildings on productivity and health benefits. Encourage developers, investors, institutions and government to incorporate these and other non-financial benefits into their decision making process for considering green building retrofits and new construction.
- › Encourage the expansion of green building technology and education at universities, trade schools and the public education system.
- › Encourage all green building stakeholders to integrate life cycle costing in their analysis of the benefits of green buildings.
- › City should take leadership in areas where it makes good long-term business sense, i.e. their own buildings and facilities.

APPENDIX D: GREEN BUILDING BEST PRACTICES

Green Building Strategies - Best Practices

The following best practices were considered during the development of the Green Building Plan.

1. Education and Capacity Building Tools

Policy Tool	How Does it Work?	Ease of Implementation	Potential Impact	Sectors
Building Labelling	At point of sale or resale, buildings are labelled with an EnerGuide rating	Moderate Requires partnerships with local realtor board	Medium - High	Homes
Local Government Staff Capacity Development	Permitting staff (plan checkers, etc) can benefit from training in green building strategies & rating systems	Easy	Medium	All
Industry Education	Lack of Industry Capacity hinders uptake of green development	Moderate	Medium	All
Public Education	Promote existing programs. Flyers, workshops, subsidizing assessments, messaging within planning and permitting. Feedback system for utility customers.	Easy	Medium	All (probably stronger focus on homes)
Feasibility Studies	Undertake studies for larger projects to assess the feasibility of designing to higher standards	Moderate	Medium	Large buildings
Sustainability Checklist	Incorporate Checklist as part of permit applications <ul style="list-style-type: none"> • Educational value • Associate with incentives & regulatory requirements 	Easy to Moderate	Varies Checklists without incentives or supporting regulations are generally ineffective	All
Sustainability Block or Neighbourhood	City and developer collaboration.	Moderate - Hard	Medium	All
Demonstration Projects	Showcases emerging technology in Canada, such as net zero energy homes or building scale co-generation technologies.	Easy - Moderate	Medium - Low	All

2. Incentive Tools

Policy Tool	How Does it Work?	Ease of Implementation	Potential Impact	Sector
Acreage Assessment Fee Structure	<p>AA's levied on new developments to pay for infrastructure.</p> <p>Reduced fees provide an incentive to offset incremental costs for green building.</p>	<p>Moderate - Difficult</p> <p>Levies may accurately reflect municipal infrastructure cost savings due to low-impact development, OR additionally incentivize green building, over and above municipal savings. Additional incentives needed to make green building attractive.</p>	<p>Potentially High</p> <p>AA's can comprise a large % of development costs. Reductions provide a real incentive to developers.</p>	All
Property Tax Exemptions for green development	Reduce property taxes for green developments.	<p>Moderate - Difficult</p> <p>May require Provincial coordination; changes to Municipal Government Act.</p>	<p>Varies</p> <p>Target building users, not developers; indirect.</p>	All
Permit Fee Rebates	Return a portion of permit fees for applications meeting green criteria.	<p>Easy to Moderate</p> <p>Results in lost revenue, unless fees are increased for non-green applications.</p>	<p>Varies</p> <p>Depends on extent of rebate, ease of participation</p> <p>Typically, permit fee rebates are not lucrative enough to fully incent extensive green building</p>	All
Higher Fees for Standard Construction	Higher fees levied for projects that use Business-as-usual construction practices for energy efficiency or for projects that don't include a renewable energy component. Higher tipping fees at landfill. Higher price for water.	<p>Difficult</p> <p>Building/construction industry likely to oppose such measures</p>	Medium - High	
Property tax deductions for retrofits	Provide one-time tax rebates or reductions when energy efficiency retrofits are done	<p>Moderate - Difficult</p> <p>Requires funding.</p>	<p>Medium - High</p> <p>Cost of efficiency retrofits is a significant barrier.</p>	All

Permit Fast-Tracking	Reduce approvals time for applications meeting green criteria.	<p>Moderate - Difficult</p> <ul style="list-style-type: none"> • Various fast-tracking protocols exist. • Must have staff capacity and institutional structures to ensure projects can be fast-tracked. • May involve some risks; pressure to approve. 	<p>Medium-High</p> <p>Developers frequently rate fast-tracking as more desirable and effective than cash incentives, density bonusing.</p>	<p>All</p> <p>(Strongest for large buildings)</p>
Density Bonusing	<p>Increase density provisions for projects meeting green criteria.</p> <p>Effective in markets with significant pressure for greater density.</p>	<p>Moderate</p> <p>Set acceptable uplift levels. Develop clear guidelines for development planners to negotiate density bonus. Community opposition to individual projects could undermine incentive.</p>	<p>Medium-High</p> <p>Density should be allocated only in appropriate neighbourhoods</p>	<p>Large buildings</p>
Recognition and awards for green building or energy leadership	An award or recognition program is created to recognize local leaders and the buildings they build.	Easy	Low	All
Efficiency Incentives	Typically linked to prescriptive measures (eg. replacing a 13L toilet with a 6L toilet), or performance measures that are evaluated with an energy model	Moderate - requires both management and finances	<p>Medium - can act as a stimulus if the measure is relatively simple to implement. Excessive bureaucracy or technical complexity can depress take-up.</p>	All
Renewable Energy Incentives	Partner with other agencies such as utilities, non-profits, and offset sellers to offer direct financial incentives for renewable energy systems such as solar hot water.	<p>Moderate</p> <p>Requires securing of funding.</p>	<p>Medium</p> <p>Can significantly reduce water heating energy and costs. Limited penetration rate expected in shorter term</p>	<p>All</p> <p>(strongest for homes)</p>
Energy Efficiency Utility	An EEU works directly with business operators, homeowners, and renters to reduce their energy costs. Typically will provide financing, incentives and technical information and support.	Moderate	High	All

3. Financing Tools

Policy Tool	How Does it Work?	Ease of Implementation	Potential Impact	Sector
Revolving Fund Financing	A Revolving Fund finances energy efficiency improvements in either new or existing buildings. Loans are repaid from energy savings.	Difficult Requires inexpensive capital for fund Due diligence to ensure workmanship	High Financing a substantial barrier to green buildings	All
Support 3rd party Green Loan Programs	Local Governments can partner with lending institutions, to promote existing green building lending programs Energy utilities may also be able to develop a financing program	Easy Lending institutions have the capacity to manage programs. Unclear whether appropriate programs currently exist in Alberta Local utilities may be good candidates; green financing supports Demand Side Management, and could be integrated with utility billing processes	High Financing is a substantial barrier to green buildings	All
Local Improvement Charges Or Property Assessed Clean Energy (PACE) Financing	Local Government finances capital costs of energy efficiency (Private lending has been used in some PACE programs). Energy savings paid back to through LIC or property taxes (under the PACE model).	Moderate - Difficult Experience with LICs beneficial. Province of Alberta may not approve of this use of LICs. Consider implementing PACE programs as experience in Canada grows.	High Financing a substantial barrier to green buildings	All
Feed-in Tariff	The Feed-in Tariff provides a payment for electricity generation that is comparable to the cost of generating the power. Provides a financial incentive for building-scale renewable energy generation.	Difficult Requires a funding mechanism to cover the cost of the tariff	High	

4. Regulatory Tools

Policy Tool	How Does it Work?	Ease of Implementation	Potential Impact	Sector
Review & revise building related policies and procedures to eliminate barriers to green building	Many policies and procedures include provisions that present barriers to green building (ex. Height limits barring for solar arrays).	Easy - Moderate Requires review of existing bylaws	Varies with extent of barriers	All
Set Minimum Standards for Efficiency in Development Plans, Development Permits and/or Zoning	New construction must meet a minimum energy efficiency standard (i.e. Energuide) Upgrades are required at time of sale.	Difficult	High	All
Green Renovation Bylaw	Add requirements for energy efficiency or other green elements to other requirements in existing renovation bylaws, such as upgrades for fire safety	Moderate Can apply to residential and commercial sectors. Requires updating bylaws. Can be linked to cost savings/paybacks. May conflict with provincial building code	High Existing buildings dominate energy & emissions performance; renovations of existing buildings are common.	All
HVAC Bylaw	Regulate commissioning, maintenance, and possibly other aspects of heating, cooling and ventilation equipment in new construction.	Difficult Requires new or updated bylaws. May conflict with provincial building code	Medium Necessary to achieving high energy performance in buildings.	Large buildings
Solar Ready Bylaw	Mandate that all new single family dwellings within their communities be solar hot water ready.	Easy - Moderate BC government has prepared content as part of provincial building standards.	Medium - Difficult Potential authority issues for municipality with respect to provincial code	Homes
Durability Design and Field Reviews Mandatory for Building and Occupancy Permit	Require building science professional sign off on design and field reviews.	Moderate	Medium	Large Buildings
Tie Mandatory Energy and Water Upgrades to Other City Permits	For example, require low cost water fixture upgrades (toilets, sinks) as part of liquor permits	Moderate	Medium	Large Buildings

Design Guidelines	Specify building forms and character, encouraging passive solar design, water efficient landscaping, potentially other green building features.	Moderate Requires guidelines for different building types (retail, office, etc). Architectural testing study should be undertaken, to ensure that passive design strategies fit in a variety of contexts.	Medium Passive design strategies can significantly affect energy and water consumption. However, potential for guidelines to be inappropriate in a variety of contexts.	All
Redesignation / Subdivision Standards and Covenants	Adopt aspirational performance standards, to guide staff negotiations during redesignation and subdivision. Register covenants requiring follow through on green building standards.	Easy - Moderate Standards should evolve, to stay ahead of Provincial regulatory requirements (building code). Generally guaranteed through voluntary covenant. Local governments should 'strongly encourage' adherence to standards.	Medium to High With much new development expected, higher standards at redesignation or subdivision can have significant impact on building performance.	All
Compact Complete Communities - OCP Policies	Land use intensity can be increased using a variety of zoning tools & best practices. Less floor space per occupant typically means lower energy use per capita.	Depends on many local factors. Primarily a longer term strategy.	High Higher density development must be located appropriately.	All
Long Lead Times for Regulation Changes	Pass legislation that will not trigger regulatory changes for several years. Sends a clear signal to industry while allowing sufficient time for capacity building.	Moderate but will depend on the issue.	High	All
Require Green leases for all Leased City Spaces	Commercial leases generally don't encourage environmentally sustainable behaviours through legal and financial separation for capital upgrades and operating costs.	Low	Medium - will simplify upgrades to City leased spaces. Will set an example and help educate the industry.	Large Buildings

