Energy Efficiency & Buildings

A Resource for BC's Local Governments

REVISED

Community Action on **Energy and Emissions**

This *Energy Efficiency & Buildings* manual provides an overview of local government policy tools and leading civic building operations that advance energy efficiency.

Fraser Basin Council

In partnership with the

Community Energy Association

caee.ca

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The Community Action on Energy and Emissions (CAEE) initiative, delivered by the Fraser Basin Council and supported by the Province of BC, and other partner organizations, is designed to provide financial and research support to BC local governments and First Nations to advance energy efficiency, greenhouse gas and air quality emission reductions through government policy tools.

This *Energy Efficiency & Buildings* manual is a product of the CAEE initiative developed by the Fraser Basin Council in partnership with the Community Energy Association.

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Contents

1 • Introduction & Background

This manual is for BC local government officials who want to improve energy efficiency, and reduce greenhouse gas emissions in their communities. It provides practical examples of tools in the following areas of energy planning:

- Energy codes
- Building and equipment energy rating and labelling
- Energy management for civic buildings and operations
- Policy tools to advance energy efficiency in private-sector development

This manual provides case studies to show how various BC local governments have made progress towards energy efficiency and greenhouse gas reductions.

Section 3, on energy codes, covers examples of energy standards established in federal, provincial and municipal regulations. Section 4, on building and equipment energy rating and labelling, discusses third-party rating systems for commercial and residential buildings as well as energy-using equipment (e.g. computers, furnaces). A discussion of and examples of civic building retrofits, green building policies and equipment purchasing policies follows in section 5. Lastly, section 6 discusses policy tools available to local governments to advance energy efficiency in private-sector development.

Although the Province has overall responsibility for the BC Building Code, local governments have many policy-based tools available to help them advance energy efficiency in private-sector buildings. In British Columbia, local government statutory authority is derived from the *Local Government Act* and *Community Charter*. Within this framework, local governments are empowered to use a range of policies and regulatory tools to promote energy efficiency and greenhouse gas reductions in communities. In 2008, the *Local Government (Green Communities) Statutes Amendment Act*, also known as Bill 27, required local governments to include greenhouse gas emission targets in their Official Community Plans (OCPs) by May 31, 2010 and Regional Growth Strategies (RGSs) by May 31, 2011, along with policies and actions proposed for achieving those targets. Existing powers were enhanced and new powers were introduced to help local governments achieve greater greenhouse gas emission reductions in their communities.

Local governments have a vested interest in optimizing the energy performance of civic-owned buildings and operations. In most cases, the local government retains ownership of buildings and energy-using equipment over the assets' lifetime, and therefore can justify higher incremental capital costs with an attractive return on investment (i.e. short payback periods).

The measures presented in this manual predominately focus on the energy efficiency of buildings. Many communities are complementing them by instituting smart growth practices to increase urban density and make better use of transportation infrastructure. Land use and transportation planning are equally as important as building performance in reducing greenhouse gas emissions.

The motivation for this manual evolved out of the Community Action on Energy and Emissions (CAEE) initiative.[1] CAEE, delivered by the Fraser Basin Council and supported by the Province of BC, and other partner organizations, is designed to provide financial and research support to BC local governments and First Nations to advance energy efficiency, and greenhouse gas and air quality emission reductions through government policy tools. The CAEE program is continually expanding and has met and exceeded its original goal of 50 participants by 2010. As of 2008, 62 communities have participated in the program through the following six phases:

[1] Previously referred to as Community Action on Energy Efficiency, the initiative was renamed Community Action on Energy and Emissions to include renewable energy and transportation-related emissions.

1 PHASE 1 - 2004/05

City of Kelowna
City of Quesnel
Town of Atlin

2 PHASE 2 - 2006/07

City of Burnaby
City of Dawson Creek
City of Fort St. John
City of Merritt
City of North Vancouver
City of Vancouver
City of Victoria
District of Central Saanich
District of Houston
District of Saanich
Islands Trust Salt Spring Island
Municipality of Bowen Island
Town of Oliver
Town of Smithers
Village of Kaslo

3 PHASE 3 - 2006/07

Capital Regional District
City of Abbotsford
City of Campbell River
City of Kamloops
City of Kelowna
City of New Westminster
City of Port Moody
City of Surrey
District of Squamish
District of Vanderhoof
Regional District of Central Kootenay
Regional District of Nanaimo

4 PHASE 4 - 2007/08 GOLD PROGRAM

City of Dawson Creek
City of North Vancouver
City of Port Moody
City of Vancouver
District of Central Saanich
District of North Vancouver
District of Saanich
District of Squamish
Islands Trust Salt Spring Island
Regional District of Nanaimo

5 PHASE 5 - 2007/08

City of Colwood
City of Fernie
City of Nelson
City of Prince George
City of Prince Rupert
Coldwater Indian Band
Corporation of Delta
District of 100 Mile House
District of Ucluelet
Ktunaxa First Nation
Resort Municipality of Whistler
Town of Ladysmith
Village of Burns Lake
Village of Queen Charlotte

6 PHASE 6 - 2008/09

Adams Lake Indian Band
City of Kimberley
District of Elkford
Fraser Valley Regional District
Musgamagw Tsawataineuk Tribal Council
Seabird Island Band
Town of Gibsons
West Moberly First Nation

Visit the CAEE website, **www.caee.ca**, for up-to-date details on participating local governments, policies undertaken by CAEE participants, and project partners. Energy efficiency practices will evolve as additional BC communities participate in CAEE.

CAEE was awarded the Finalist Premier's Award in 2006/07.

PREMIER'S AWARDS

2 • **Rationale** for Taking Action

There are a number of reasons for local governments to take action on energy efficiency and community energy management, including the following:

L

Leadership on climate change – Local governments have direct control over greenhouse gas emissions through their own buildings and vehicle fleets and can influence up to half of Canada's greenhouse gas emissions.[2] In British Columbia, residential and commercial buildings — those building types local governments have the most influence over — account for 23 percent of all energy consumed [3] and 12 percent of BC's greenhouse gas emission.[4] Local governments can make a major contribution to emissions abatement.

E

Ensuring housing affordability – Energy efficient buildings can use 25 to 50 percent less energy than conventional buildings, reductions that translate to significant savings for all residents and in particular those living on low incomes.

A

Achieving livability through energy management – Community energy management is in many ways consistent with other mainstream sustainability planning schools of thought, including Smart Growth and New Urbanism. Dense, transit-oriented, mixed-use neighbourhoods are fertile grounds for alternative energy technologies, energy efficient buildings, and location efficient development that reduces automobile dependency.

D

Development process influence – Local governments are a key point of contact in the development process, interacting with builders and developers from the concept stage through to occupancy.

E

Economic development and competitiveness – Green buildings make a community a more attractive place in which to live and do business. At the same time, they reduce the capital burden imposed on local governments to service buildings.

R

Recognition and civic pride – Local government officials who take early action on energy management and emissions abatement are admired by their colleagues, and their actions are a point of pride for local citizens. Leadership begets respect, praise, and emulation.

[2] Source: The Federation of Canadian Municipalities Partners for Climate Protection program, www.sustainablecommunities.fcm.ca/partners-for-climate-protection/

[3] Source: BC's Energy Efficient Buildings Strategy: More Action, Less Energy, www.energyplan.gov.bc.ca/efficiency/

[4] Source: BC's Climate Action Plan, www.livesmartbc.ca/government/plan.html

3 • Energy Codes

Few codes regulate the energy efficiency of buildings in British Columbia. There are, however, four significant pieces of legislation to be aware of, as follows:

BC BUILDING CODE

An amended 'green' BC Building Code, which now specifies requirements for energy and water efficiency for all buildings, came into effect on September 5, 2008. Insulation standards have been increased for houses, multi-family residential buildings under five stories, and commercial buildings. Builders may choose to meet these new standards or achieve an EnerGuide rating of 77 by other means. Larger buildings must meet the American Society of Heating, Refrigeration and Air Conditioning Engineers 90.1 (2004) standard (ASHRAE 90.1).

VANCOUVER ENERGY UTILIZATION BYLAW

Because Vancouver has its own charter, it is the only BC municipality with the power to directly implement an energy code for buildings. The Vancouver Energy Utilization Bylaw, introduced in 1991, regulates energy efficiency in all commercial and high-rise residential buildings. It is a comprehensive energy code based on ASHRAE 90.1 (see Section 4, on standards).

The City of Vancouver introduced a Green Homes Program in 2008. This program requires that all new building permit applications for one- and two-family homes meet energy and indoor air quality requirements. The program will enable home owners to easily install roof-mounted solar energy systems and electric vehicle charging systems.

For more information, visit:
www.vancouver.ca/commsvcs/CBOFFICIAL/greenbuildings/greenhomes/index.htm

FEDERAL ENERGY EFFICIENCY ACT

The Federal *Energy Efficiency Act*, first passed by Parliament in 1992, regulates the efficiency of many different appliances and equipment, including fluorescent lighting, transformers, air-conditioning equipment and household appliances. The act covers any equipment that is imported into Canada or shipped across provincial borders. It does not include equipment that is sold in the same province where it was manufactured. For the most part the act sets standards similar to US regulations, which most equipment already meets.

BC ENERGY EFFICIENCY ACT

The *BC Energy Efficiency Act* is similar to the federal act but applies to all equipment sold within British Columbia (whereas the federal act does not apply to equipment manufactured and sold within BC). Most of the equipment and appliances covered by the act, and the efficiency levels required, are the same as those covered by the federal act. The *BC Energy Efficiency Act* was updated in 2006 and 2008 to raise efficiency standards for a variety of products and appliances (e.g. furnaces, windows, fluorescent ballasts) and further updates are expected.

For more information, visit:
www.empr.gov.bc.ca/EAED/EnergyEfficiency/Pages/EEAct.aspx

FURTHER INFORMATION

Canada's Energy Efficiency Regulations
www.oee.nrcan.gc.ca/regulations/home_page.cfm?PrintView=N&Text=N%20BC%20Energy%20Efficiency%20Act

BC Energy Efficiency Act
www.qp.gov.bc.ca/statreg/stat/E/96114_01.htm

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ENERGY CHAMPION

WHY ENERGY EFFICIENCY? WHY BOTHER?

Energy management is critical to becoming a more sustainable community. It permeates all aspects of a growing community from land use decisions to transportation to building design. Having an energy plan in place, one that includes energy efficiency objectives, will enable a community to better manage the impacts of urban development related to energy, greenhouse gases and air quality, while achieving broader community objectives related to housing, transportation management, job creation and local economic development.

Guiding, facilitating and ultimately leading the community towards a more energy efficient built form is of paramount importance in the face of rising fuel costs and the long term prospects for maintaining the livability of our communities. The City's goals and objectives in the Official Community Plan and the implementation of our Local Action Plan (Partners for Climate Protection Program) provide the direction and framework for this to occur.

WHAT ARE YOUR MOST SIGNIFICANT ENERGY-RELATED POLICY ACHIEVEMENTS?

- *Development of the 2002 Official Community Plan* – This plan is based on the integrating theme of becoming a more sustainable community. Further, the Plan includes specific energy management objectives which provide the direction and impetus for energy management in the City.
- *Creation of the Lonsdale Energy Corporation and its community energy system* – The Lower Lonsdale neighbourhood, facing significant redevelopment, was selected and designated as an area that would be serviced by the City's newly created Community Energy System, run by the City owned Lonsdale Energy Corporation in partnership with Terasen Gas. This district energy heating utility would serve the growing community through a street distribution system served by a series of mini-plants. Six buildings have been connected to date with plans for another 14 by 2010.

the city of north vancouver

- *Adoption of the Local Action Plan* – This plan focuses on cost-effective actions to reduce energy consumption and resulting greenhouse gas emissions. The Plan includes both a corporate plan and a community plan featuring the need for green building policies for both plans in addition to the expansion of the existing community energy system. In February of 2007, the City adopted a LEED standard for new civic buildings.

WHAT IS YOUR RECIPE FOR POLICY SUCCESS?

- Energy management objectives in the Official Community Plan. The importance of having political support cannot be overstated.
- Making progress in bridging the information gap, for energy management is not a traditional area addressed by municipalities. The local level, however, is the best scale at which to address these issues, particularly energy efficiency.
- Setting targets and measuring progress along the way will keep you on track. For the City this occurs through both our Local Action Plan and our Official Community Plan Targets and Indicators Monitoring Strategy.

A sustainable community will effectively address the issues of energy management and greenhouse gas emissions by implementing Smart Growth principles in land use and transportation planning, and by considering long-term social, economic and environmental considerations when implementing new policies or programs. Our energy management plan provides the framework for achieving these goals in the City of North Vancouver. Energy efficiency objectives, such as building greener buildings, both on a corporate and a community level, are a key component of that plan.

WHAT ARE SOME EASY WINS FOR MUNICIPAL POLICY-MAKERS WANTING TO DEVELOP GOOD ENERGY MANAGEMENT POLICIES?

- Sign up for the Partners for Climate Protection Program and kick-start your efforts today. In moving through the five milestones, a municipality is forced to reconcile many aspects of energy management which ultimately results in a more sustainable, energy efficient community. Further, it requires that you build in targets and report out down the road.
- Start thinking about how your next Official Community Plan can build in energy management objectives and take steps to introduce the subject to your Council and community. In the short term, two key areas to target would include: establishing a green building policy for new civic buildings to lead by example and providing information on energy efficiency at the local level. This could mean having information available for local developers and builders about more energy efficient building programs and models for new buildings and renovations. This may include dispelling myths about higher costs by providing information on lifecycle costs of different choices.

At the end of the day, it is all about making it easier to 'do the right thing'. Everyone wants to – it's just a matter of knowing where to start.

INTERESTING / RELEVANT WEBSITES

City of North Vancouver: www.cnv.org
Lonsdale Energy Corporation: www.cnv.org/lec
Local Action Plan (Partners for Climate Protection): www.cnv.org//server.aspx?c=3&i=440
Official Community Plan (2002) Environment Chapter, Section 8.5 Energy Objectives):
www.cnv.org/c//DATA/2/107/~CHAPTER%2008%20ENVIRONMENT.PDF
Sustainable Development Guidelines:
www.cnv.org/c//DATA/2/171/SUSTAINABILITY%20GUIDELINES%20.DOC
Smart Growth: www.smartgrowth.bc.ca
BC Hydro: www.bchydro.com
Terasen Gas: www.terasengas.com
Canada Green Building Council: www.cagbc.org

4 • Building Standards & Rating Systems

The Vancouver Island Technology Park in the District of Saanich is the first LEED® Gold–certified building in Canada.

Many different voluntary standards and rating systems exist for buildings and energy-using equipment. An awareness of the available systems and where they apply is important, as these often form the basis of local government policies. It is much simpler, from both the local government's and the developer's perspective, to reference a well-known standard than to try to develop one from scratch.

A multitude of different standards and labelling programs are available for buildings. Standards generally set a single target level of efficiency, whereas rating systems provide different levels of achievement. However, standards and rating systems often overlap, and in some cases one standard or rating system will be used within another, broader system. This section identifies the more common standards and systems used in BC and highlights their key characteristics and the differences among them.

4.1 Commercial/ Institutional

ASHRAE 90.1

The ASHRAE 90.1 standard is the world's best-known energy standard for buildings. Produced by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), it was developed in the 1970s and is updated regularly. ASHRAE 90.1 is a comprehensive, whole building standard, with sections for lighting, heating, ventilating and air-conditioning (HVAC), and architecture. It is a flexible standard, with both minimum requirements and the ability for trade-offs (e.g. better lighting in exchange for more glass area). ASHRAE 90.1 is written in code-style language, for easy adoption by governments and regulating authorities. The 2008 updates to the BC Building Code require larger buildings to meet the ASHRAE 90.1(2004) standard.

The most recent version of ASHRAE 90.1 is 90.1-2007 (released in 2008). ASHRAE 90.1 has been adopted in some form by a majority of US states and is also used by other rating systems. The City of Vancouver has adopted the 2004 version, and LEED® (see below) references an older version, 90.1-1999.

MODEL NATIONAL ENERGY CODE FOR BUILDINGS (MNECB)

The Model National Energy Code for Buildings (MNECB) was released by the National Research Council Canada (NRC) in 1997. It is a comprehensive, whole building code, similar to ASHRAE 90.1. In fact, many of the efficiency standards in the MNECB were taken directly from ASHRAE 90.1-1989. A new edition of the code, scheduled to be released in 2011, will use an objective-based format, which will offer new information to support the evaluation of innovative products and systems.

Although no province has ever adopted the MNECB and no jurisdiction is using it, the commonly used target of 25 percent improvement over MNECB, first used in the now-cancelled Commercial Building Incentive Program (CBIP), has become a de facto standard, used in many energy rating systems for buildings, such as LEED®.

LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN (LEED®)

Leadership in Energy and Environmental Design (LEED®) is a rating system developed by the US Green Building Council (USGBC), adapted and managed in Canada by the Canada Green Building Council (CaGBC). It is a broad, comprehensive environmental standard for green buildings that includes not just energy, but also site selection, building materials, water conservation, and indoor air quality.

LEED® has been extremely successful since its release in 1998, becoming the best-known and most widely referenced building rating system. LEED-NC® (New Construction), the original and most popular LEED® standard, applies to new commercial and high-rise residential construction.

A new operational performance rating system - LEED® for Existing Buildings - is being developed. It provides standards and prerequisites for construction and site protection for building upgrades. This program is expected to launch in Canada in 2009.

The US Green Building Council (USGBC) is developing a LEED® for Neighbourhood Development (LEED ND®) rating system to guide and assess sustainable community development. The Canada Green Building Council has been approached by industry leaders and local governments across the country to introduce LEED ND® in Canada. Several Canadian projects are taking part in the USGBC LEED ND® pilot and their experience will inform the adaptation of the rating system in Canada.

All LEED® standards use a point system, with certification levels of Certified, Silver, Gold, and Platinum, with minimum requirements in each area. For the Canadian version of LEED-NC®, the energy requirements are based on either MNECB or ASHRAE 90.1-1999, with a minimum efficiency of 25 percent higher than MNECB for LEED® certification.

Some complaints have been levelled against LEED®, including the cost of certification and the complexity of verifying compliance. In spite of this, the number of LEED®-registered projects continues to grow exponentially.

OTHER COMMERCIAL RATING SYSTEMS

There are several other commercial rating systems in addition to ASHRAE 90.1, MNECB and LEED®, although none have the same profile or relevance to local governments as these three.

Green Globes is an online environmental rating system for existing buildings, developed by the UK-based RICS Foundation. It generates a score from 1 to 100 as well as a comparative score against other buildings. It is a self-assessment system, although third-party verification can be arranged, which entitles the building to display a Green Globes rating.

The Building Operators and Managers Association (BOMA) runs a voluntary program for existing commercial buildings called BOMA Go Green. It covers energy efficiency as well as issues such as recycling, water conservation, and material selection. The basic program emphasizes audits and the establishment of environmental policies. A Go Green Plus program addresses more specific building components and uses the Green Globes rating system.

4.2 Residential

ENERGUIDE FOR HOUSES / ECOENERGY

EnerGuide is a rating system for houses developed by Natural Resources Canada (NRCan). It can be used to rate either new or existing houses, and can also be used for low-rise multi-family residential buildings. An incentive program for existing homes, also called EnerGuide, was cancelled in 2006 and replaced with a new program called ecoENERGY (its full name is ecoENERGY Efficiency Initiative), while EnerGuide, the rating system for new houses, continued. This has led to some confusion over the names.

The EnerGuide rating system still exists and is the same for both new and existing houses. EnerGuide ratings range from 1 to 100 on a non-linear scale. An average existing home will have an EnerGuide rating of 58 to 68, while new homes range from 71 to 76. No standards or certification levels are associated with EnerGuide; it is simply a rating of the home's energy use.

R-2000

R-2000 is another NRCan program to certify energy efficient homes in Canada. Adoption of the program has never been overwhelming, but it has played an instrumental role in developing energy efficient construction techniques. Although focused on energy, R-2000 also takes into account water use, indoor air quality and building materials. The energy rating for an R-2000 home is equivalent to EnerGuide 80 or higher.

BUILT GREEN™

Developed by the Canadian Home Builders Association (CHBA), Built Green™ is an industry-driven program that certifies environmental performance for new houses and low-rise residential buildings. The Built Green™ Society of Canada is in the process of developing Built Green™ standards for multi-story and residential towers, communities, and renovations. Pilot projects for the multi-story and residential towers standards began in 2006.

Built Green™ addresses energy through the use of EnerGuide ratings, while using a points scoring system for other environmental features, such as water, waste, materials, indoor air quality, and developer business practices. The strengths of Built Green™ are its low cost, simplicity and use of a recognized energy standard (EnerGuide). Recent updates to the BC Building Code and other standards have made the Bronze level of this program, which requires a building to reach a relatively low EnerGuide rating of 72, less relevant. In 2008, a Platinum designation was added to the program; to achieve this level, buildings must reach an EnerGuide rating of 82.

OTHER RESIDENTIAL PROGRAMS

LEED® for Homes, which is similar to the LEED®-NC standard, but designed for houses and low-rise multi-family residential buildings, was initiated in the United States in 2008. The Canada Green Building Council (CaGBC) is developing a Canadian version of this rating system for launch in early 2009. Findings from the Canada Green Building Council case study program, which closed in May 2008, will be integrated into the final LEED Canada for Homes program.

The REAP (Residential Environmental Assessment Program) was developed by the University of British Columbia, and it is mandatory for all residential construction on the UBC campus. It is applicable to both low-rise and high-rise multi-family buildings. Based on LEED®-NC, REAP is adapted for a residential focus, with simplified compliance and reporting. The assessment guide is available online and is freely available for anyone to use.

4.3 Energy-Using Equipment

Major equipment, such as furnaces in houses or chillers in commercial buildings, is accounted for within the various building rating systems. But other equipment, such as office computers or home appliances, is not usually considered. Rating systems are available for such equipment and they can be useful in developing policies relating to energy efficiency.

ENERGUIDE

EnerGuide, the rating system for houses, is also a program developed by NRCan for rating major appliances. All appliances in Canada are required to display an EnerGuide label showing their estimated energy consumption. Individual models can be compared online at the EnerGuide website.

ENERGY STAR®

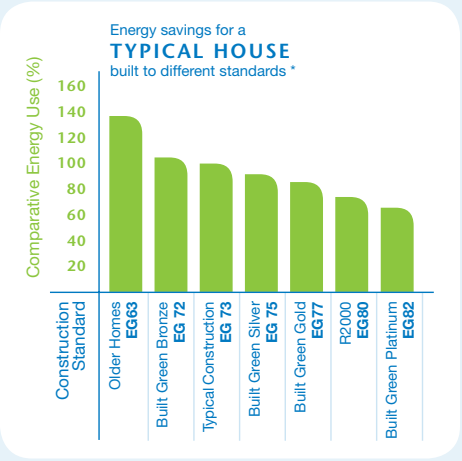
Energy Star® is an international rating system for all kinds of energy-consuming products. Almost all major equipment is rated under Energy Star®, which identifies products with the highest level of efficiency. Depending on the product, this may be between 10 percent and 66 percent more efficient than the average for the product class. Energy Star® endeavours to make sure that rated products are widely available, proven technologies, and cost-effective over the product life. In Canada, appliances that meet the Energy Star® criteria have an Energy Star® logo on the mandatory EnerGuide label.

How do different ratings compare?

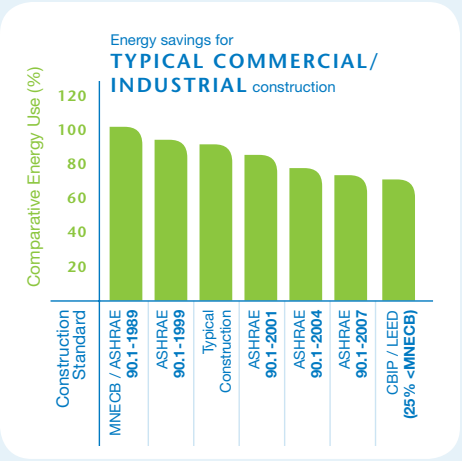
It can be quite difficult to compare rating systems with regard to energy saved, let alone with regard to other environmental parameters. This is because there are many different sizes and types of buildings, and different ways to meet a given standard. However, some attempts have been made to compare different standards to each other and to current BC construction practice.

Residential rating systems usually use EnerGuide as the energy rating, which provides consistency. However, the EnerGuide rating is not linear, which complicates things somewhat. Home retrofits under the EnerGuide program have shown that the typical existing BC home ranges from EnerGuide 58 to 68. New homes built to the BC Building Code before it was amended in 2008 rate between EnerGuide 71 and 76, depending on which provincial region they are located in. Analysis completed by the Province indicates that improving a house from EnerGuide 73 to 79 would result in a 29 percent reduction in energy consumption. The graph top right compares different residential standards, with an estimate of the relative energy savings.

Commercial ratings tend to use either MNECB or ASHRAE 90.1 as their energy standard. Several studies have compared these standards against each other and against current construction practice. Such comparisons are difficult, for the standards are very flexible in their requirements and individual building types can vary significantly. The results should not be considered exact for all buildings. The graph at right compares different standards for typical commercial/institutional construction, again with an estimate of the relative energy savings.



* This graph has been updated from the first edition of this guide. Minor changes in values are based on new information from EnerGuide.



4.4 Local Government Integrated Design Process Policies for Energy Efficiency

Adopting an Integrated Design Process (IDP) policy for local government buildings is a flexible and adaptable way to apply green building approaches to the construction and maintenance of all civic buildings. An IDP is a comprehensive, team-based approach to building design that is becoming increasingly popular for constructing green buildings. During an IDP, the entire design team and key stakeholders – architects, landscape architects, engineers, energy modellers, cost consultants, construction managers, and owners work together from the beginning. This process can be further complemented by the broader set of experience and insight offered by operators, future tenants, and environmental consultants. Early input from a variety of experts and future building users results in cost savings and improved building design.

The Regional District of Nanaimo (RDN) has adopted an innovative green building policy (Green Building Policy for Regional District Facilities) that requires all new construction undertaken by the RDN to follow an IDP. Based on the urgent need to mitigate climate change, all new construction must optimize energy efficiency and minimize greenhouse gas emissions. Starting in 2010, efficiency measures will achieve a 50 percent reduction in tonnes of CO_2-equivalent, relative to the Model National Energy Code. This will increase incrementally until 2030, at which point the RDN is committed to building carbon neutral facilities. The RDN will use a life-cycle costing approach to calculate the long-term savings associated with up-front investments in efficiency.

Source: www.rdn.bc.ca/cms.asp?wpID=1046. **Contact:** Chris Midgley, Sustainability Coordinator, cmidgley@rdn.bc.ca, 250.390.6568

FURTHER INFORMATION

ASHRAE 90.1	www.ashrae.org
MNECB	www.nationalcodes.ca/mnecb/index_e.shtml
LEED®	www.cagbc.org
Green Globes	www.greenglobes.com/existing/homeca.asp
BOMA BESt	www.bomabest.com/about.html
EnerGuide	www.oee.nrcan.gc.ca//energuide
R-2000	www.oee.nrcan.gc.ca/residential/personal/new-homes/r-2000/About-r-2000.cfm?attr=4
Built Green™	www.chbabc.org/content.php?id=504
REAP	www.planning.ubc.ca/corebus/reap.html
Energy Star®	www.energystar.gc.ca

ENERGY CHAMPION

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WHY ENERGY EFFICIENCY? WHY BOTHER?

Energy efficiency improvements are the most cost-effective way to reduce greenhouse gas emissions and help mitigate changes to our climate. Many energy efficiency measures yield great returns on investment.

WHAT ARE YOUR MOST SIGNIFICANT ENERGY-RELATED POLICY ACHIEVEMENTS?

- Adoption of the City of Vancouver's Corporate and Community Climate Change Action Plans, with accompanying reduction targets and resource commitments for their implementation
- Early role in having the City establish the Neighbourhood Energy Utility for sustainable district heating systems

WHAT IS YOUR RECIPE FOR POLICY SUCCESS?

- Patience and understanding, Grasshopper!
- Understand stakeholder interests and demonstrate both the feasibility of satisfying the policy as well as the value in doing so.

WHAT ARE SOME EASY WINS FOR MUNICIPAL POLICY-MAKERS WANTING TO DEVELOP GOOD ENERGY MANAGEMENT POLICIES?

- Measure the targeted energy use and set short- and long-term targets for change.
- Demonstrate the business case and leadership through City operations – significant energy retrofits of municipal facilities still yield positive net present values!

INTERESTING / RELEVANT WEBSITES

www.vancouver.ca/sustainability
www.onedayvancouver.ca

CITY OF VANCOUVER

5 • Civic Buildings & Operations

A completed energy retrofit saves money at Saanich City Hall.

Port Moody retrofitted lighting in its arena to save on civic energy bills.

When it comes to energy conservation, local governments usually begin with their own buildings and operations. Most have already undertaken some level of energy efficiency retrofit, through BC Hydro's Power Smart program, the FortisBC PowerSense program, and the Terasen Gas energy efficiency programs, and/or as part of a local action plan to reduce greenhouse gas emissions. But there are many more opportunities for local governments to take action on energy within their own facilities. This is especially true for local governments who have signed onto the Climate Action Charter and who are committed to becoming carbon neutral by 2012.

Although cost savings associated with energy efficiency upgrades have usually been the primary driver for energy efficiency projects, they need not be the only one. Related benefits include occupant health and comfort, employee productivity, and reduced maintenance requirements. Perhaps most important is the opportunity to show leadership within the community. As local governments ask more of their citizens with respect to action on the environment, it only makes sense for them to set a good example.

Energy efficiency as an investment

Unlike most capital projects carried out by local governments, energy efficiency projects provide a monetary return through the energy savings they generate. This means they can be viewed as investments, rather than as simply expenditures.

As for any large investment, when investing in energy efficiency it is appropriate to perform a full life cycle cost analysis. A life cycle cost analysis takes into account the energy savings over the life of the project, deferred maintenance and equipment replacement costs, and standard accounting factors such as inflation and discount rates.

In spite of being large financial investments, energy projects are often assessed solely in terms of simple payback (cost divided by annual savings), with expectations that paybacks will be very short. This type of analysis does not reflect the true long-term value of a project. More sophisticated indicators such as net present value (NPV) and internal rate of return (IRR) will more accurately reflect the benefit of the investment. When fully accounted for over their life cycle, projects with simple paybacks as long as 15 to 20 years may still show a positive net present value and be a good investment.

5.1 Energy Retrofits of Existing Facilities

Energy efficiency retrofits of existing buildings are the best way to reduce energy use and greenhouse gas emissions in local government operations. Although some buildings may have had some efficiency upgrades in the past, there is almost always room for improvement. New technologies, increased awareness, and changing energy prices often mean that measures rejected in the past as not being cost-effective are viable today.

The rationale for an energy retrofit can go far beyond just the energy savings. Energy retrofits often introduce new technologies or operating controls that can improve occupant comfort and health. New, energy efficient T8 lighting is a good example of this, providing reduced flicker and hum with improved light quality that can reduce occupant eye strain. Energy retrofits also provide an opportunity to replace aging equipment, and repair or upgrade old systems, while using the energy savings to cover the cost.

5.2 Comprehensive Retrofits

Local governments undertaking energy retrofits tend to seek quick payback measures in order to keep project costs down. Short-term paybacks may look good at first, but they may not provide the best long-term return to the owner. And a "slow and steady" approach of retrofitting one or two buildings a year will have serious implications in terms of the higher energy costs for buildings waiting to be retrofitted. It makes more sense, both financially and operationally, to undertake a comprehensive retrofit of civic facilities. A comprehensive retrofit is a project that examines most or all of an organization's facilities, all utilities (e.g. electricity, gas, water), and both short- and long-payback measures.

Although the initial payback may be longer, a comprehensive retrofit will usually have a better financial return when looked at over the life cycle cost. Life cycle costing treats the retrofit as an investment and considers standard financial investment parameters such as inflation, discount rates, return on investment, and net present value.

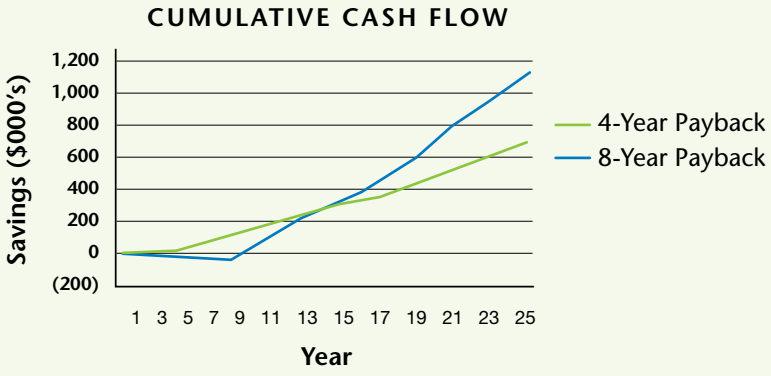
Comprehensive retrofits have additional advantages beyond the financial returns. Because they involve all civic facilities, they result in a coordinated approach throughout. This means consistent lighting and control systems as well as consistent documentation. They may also result in reduced workload for staff, as the project is completed quickly rather than ongoing for years. And the scale of the project will result in lower costs, both in construction capital and engineering design.

Comparison of short-term vs. comprehensive retrofits

The following diagram shows the cumulative cash flow of two energy retrofit projects:

SHORT-TERM
$100,000 cost (financed)
$25,000 annual savings
4-year payback
$331,000 net present value

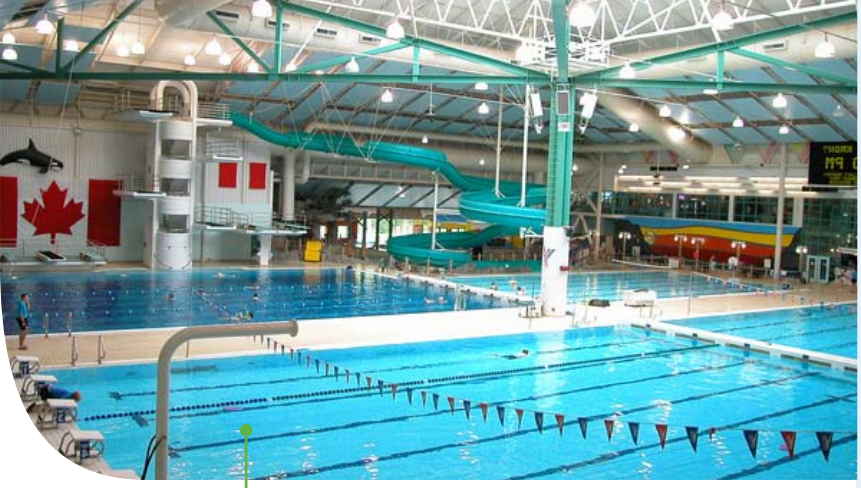
COMPREHENSIVE
$400,000 cost (financed)
$100,000 annual savings
8-year payback
$467,000 net present value



5.3 Implementing Energy Retrofit Projects

Energy efficiency retrofits are usually implemented in a similar manner to other retrofit projects: an initial engineering audit and study, followed by design, construction, and commissioning. A small, single building project may take six months or less to complete, while a major comprehensive retrofit may take several years. Interim funds will need to be made available to cover the cost of the study and design prior to construction financing.

An energy audit is a detailed assessment of the buildings, their equipment and operation, and the utility bills. It will identify potential energy efficiency measures, predicted savings, and estimated installation costs. Energy analysis is a specialized area of expertise, and an engineering firm with experience in this area should be retained. The firm that does the study will sometimes undertake the design and project management of the construction phase as well. The District of Saanich's comprehensive retrofit included the district's largest energy-consuming buildings, such as pools and arenas.



Saanich's comprehensive retrofit included the district's largest energy-consuming buildings, such as pools and arenas.

ENERGY PERFORMANCE CONTRACTING

Energy performance contracting is a method of undertaking comprehensive retrofits that is gaining popularity across North America. Energy performance contracts are turnkey projects, where all aspects of an energy efficiency retrofit are undertaken by an energy services company (ESCO), including energy studies, design, and project management. The most important aspect of an energy performance contract is that the ESCO guarantees both the upfront cost and the future energy savings. This minimizes the risk to the owner of the facilities.

ESCOs have experience in both the energy analysis and construction management side of a retrofit project, and are then well positioned to maximize savings while minimizing costs. As a turnkey service provider, they can help minimize the complexities and workload for staff in managing a large retrofit project. An ESCO will usually cover the upfront cost of the initial energy study, but it should be clear that this study is not "free"; rather, the cost is rolled into the overall project cost once the project proceeds.

An ESCO makes its profit by charging a mark-up, similar to a contractor. There are separate mark-ups to cover the cost of energy studies, design, project management, etc. Generally speaking, hiring an ESCO will cost about the same as procuring these services separately. ESCOs do not as a rule arrange financing for projects (although in some cases they will), because a BC local government can arrange financing through the Municipal Finance Authority at much more favourable rates. But the energy savings will cover all financing costs, so that there is no net cost to the local government.

As part of its comprehensive energy retrofit, the City of Burnaby installed new reflective low-emissivity ceilings at Kensington Arena that save energy, improve lighting and provide a harder ice surface.

City of **Burnaby**

The City of Burnaby was the first BC municipality to undertake a comprehensive energy retrofit using an energy performance contract. After extensive work by finance staff in 2003 to develop a business case, the City went through a process of selecting an energy services company (ESCO) to provide a bundle of energy services, including energy auditing, retrofit plan development, and oversight of the energy retrofits.

The following facility upgrades were underway in 2004 and completed by September 2006:

- High-efficiency lighting
- Water conservation measures
- Building envelope upgrades
- Thermal pool covers
- Automation (control system) upgrades
- High-efficiency boiler and furnace upgrades

Energy savings are guaranteed through an energy performance contract with the ESCO, with a guaranteed annual savings of $450,000. The project achieved additional energy savings of $360,000 during the construction phase, with a commensurate reduction in CO_2 emissions of 1,481 tonnes annually. The $5.6-million project was financed by the City of Burnaby through its capital budget, less incentives from utilities and the federal government.

Burnaby has been very pleased with the results of the project and found that the retrofits have generally been carried out with minimal disruption to employees and those using facilities. The energy-saving measures have generated very positive feedback. For example, the new reflective low-emissivity ceilings at Kensington and Burnaby Lake ice arenas have provided not only energy savings but also an overall 30 percent improvement in lighting levels and a harder ice surface. Local hockey players and ice-skaters are very impressed!

Contact: Long Range Planner, planning@burnaby.ca, 604.294.7420.

District of **Saanich**

The District of Saanich has implemented a Green Building Policy. Key requirements of this policy are as follows:

- Meet a standard of LEED® Silver certification for all new civic facilities or additions larger than 500 square metres.
- Undertake life cycle costing analysis for all projects over 500 square metres.
- Provide additional funding for design and capital cost where the life cycle costing shows a return on investment greater than 10 percent.

Other commitments under the policy relate to renovations, operations, and building community awareness. The first new municipal building constructed under this policy is the Saanich Centennial Library (at Pearkes Arena), which opened in September 2007.

Source: District of Saanich, Green Building Policy #05/219. Available at http://www.saanich.ca/municipal/clerks/bylaws/
Contact: Russ Fuoco, Director of Planning, fuocor@saanich.ca, 250.475.5472.

The Saanich Centennial Library is a LEED® Silver Candidate.

5.4 Civic Building Policies

A civic building policy is one in which a local government commits to constructing all new civic facilities to a certain energy or environmental standard. Such a policy is usually linked to a recognized building standard such as ASHRAE 90.1 or LEED®. A civic building policy may also include criteria for undertaking retrofits of existing facilities.

Often, energy efficient or green features are considered an “extra” and not included in a new building’s construction budget. As such, they are often not installed, even though they may pay back many times over the life of the building. The benefit of a civic building policy is that it brings green building features to the forefront, so they will no longer be considered an extra cost outside the budget. They can be automatically incorporated into future designs, minimizing any additional cost. Discussion on the merits of various green building features can occur during the policy’s implementation and will guide its wording.

A good civic building policy should be flexible, cost-effective, and of sufficiently high standard to achieve the desired results. It is recommended that it reference a recognized standard (such as ASHRAE 90.1 or LEED®), which will achieve these objectives. A policy might also commit the local government to performing life cycle cost assessments of systems outside the scope of these standards and to providing additional funds to cover the capital cost of these systems where they are proven to be cost effective.

5.5 Civic Purchasing Policies

A purchasing policy commits a local government to reducing energy use by buying energy efficient equipment and appliances throughout its operations. Purchasing polices can also address a product's 'embodied energy' (the energy required to manufacture and transport goods) by committing to buying green and/or locally produced goods, or by joining with nearby small communities to coordinate joint shipments of standard supplies. Monies saved by reducing transportation costs could be used to support the purchase of energy efficient equipment. The reasons for having such a policy are similar to those for having a civic building policy. A purchasing policy ensures the local government is making long-term cost-effective purchasing decisions, without requiring an assessment of each item. Such a policy is generally intended to cover smaller equipment where it is impractical to perform a life cycle analysis, rather than major building systems. However, it could include a commitment to life cycle cost analysis on larger systems, similar to a civic building policy.

The easiest way to implement a purchasing policy is to reference Energy Star® (see Section 4.3). Most equipment and appliances are available with an Energy Star® rating, and they are proven, cost-effective technologies. Plus, there are always a sufficient number of Energy Star® manufacturers to provide competitive pricing and product choice.

One area not covered by Energy Star® is vehicles. Natural Resources Canada does rate vehicles through the EnerGuide program, listing the most efficient vehicles in each class. However, a purchasing policy should not restrict decisions to one vehicle, and therefore a policy would be better to reference a percentage of top performing vehicles. For instance, a policy could state: "Any vehicle purchased shall be in the top 15 percent for fuel efficiency in its class." Decisions on vehicles are important enough that it may be worth having a separate vehicle purchasing policy or section, including processes for deciding on vehicle type, guidance regarding vehicle fuel choices, and anti-idling provisions.

A purchasing policy should stipulate that its provisions be stated in all specifications and tender documents for equipment. This ensures that the policy is put into action and makes energy efficiency a requirement up front, rather than an extra after the fact.

City of Vancouver

The City of Vancouver has enacted an Energy Efficiency Purchasing Policy. This policy requires the City to purchase energy efficient equipment, supplies, and appliances wherever possible. The policy references both Energy Star® and NRCan Office of Energy Efficiency guidelines. A list of applicable products is included, but the policy is not limited to those alone. Lastly, the policy requires that the criteria be included in all specifications.

Source: City of Vancouver, Energy Efficiency Purchasing Policy #AF-013-01. Available at http://vancouver.ca/policy_pdf/AF01301.pdf.
Contact: David Ramslie, Manager, Sustainable Development, david.ramslie@vancouver.ca, 604.873.7946.

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CITY OF DAWSON CREEK

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ENERGY CHAMPION

WHY ENERGY EFFICIENCY? WHY BOTHER?

Energy efficiency is very important because of the direct connection between emissions and air and water quality. In a community like Dawson Creek, it is important to manage emissions on a community-wide scale. The negative implications of climate change, air quality, water, and land impacts can all be addressed through effective energy policies. As well, there are the economic benefits from community-owned energy systems, highly skilled jobs, and increased assessments.

Energy efficiency also has implications for broader social issues such as affordability, seeing as how more efficient homes have lower operating costs. This is especially important for people on fixed incomes and also to provide some protection from energy price inflation.

WHAT ARE YOUR MOST SIGNIFICANT ENERGY-RELATED POLICY ACHIEVEMENTS?

- *Green Vehicle Policy.* The City committed to reducing its fleet emissions by 20 percent within 10 years. The policy also provides direction on how to purchase and maintain vehicles in a sustainable way, including an idle-free initiative. As a result of implementing this policy, the City is now acquiring more efficient vehicles, using less fuel and emitting less, while at the same time saving money. Through the GVP the City is attributing a cost to carbon emissions ($15 per tonne) from vehicles we are purchasing as part of the life cycle costing process. The idea is to use that fund to expand and support other energy efficiency projects.
- *A Green Power commitment from Council.* A strategy was developed as part of the City Energy Plan that focuses, in part, on ways to reduce emissions from electricity use within our own operations. This strategy includes energy conservation, development of our own electricity from renewable sources (such as wind and solar), and partnership with green energy producers, when appropriate.

sustainable Dawson Creek BRITISH COLUMBIA

- *Green Buildings Policy.* This policy is modeled on the Green Vehicle Policy, and aims to reduce emissions and lower operating costs from large public facilities. The policy provides an opportunity to address issues such as water use, recycling, janitorial considerations, indoor air quality, etc.

WHAT IS YOUR RECIPE FOR POLICY SUCCESS?

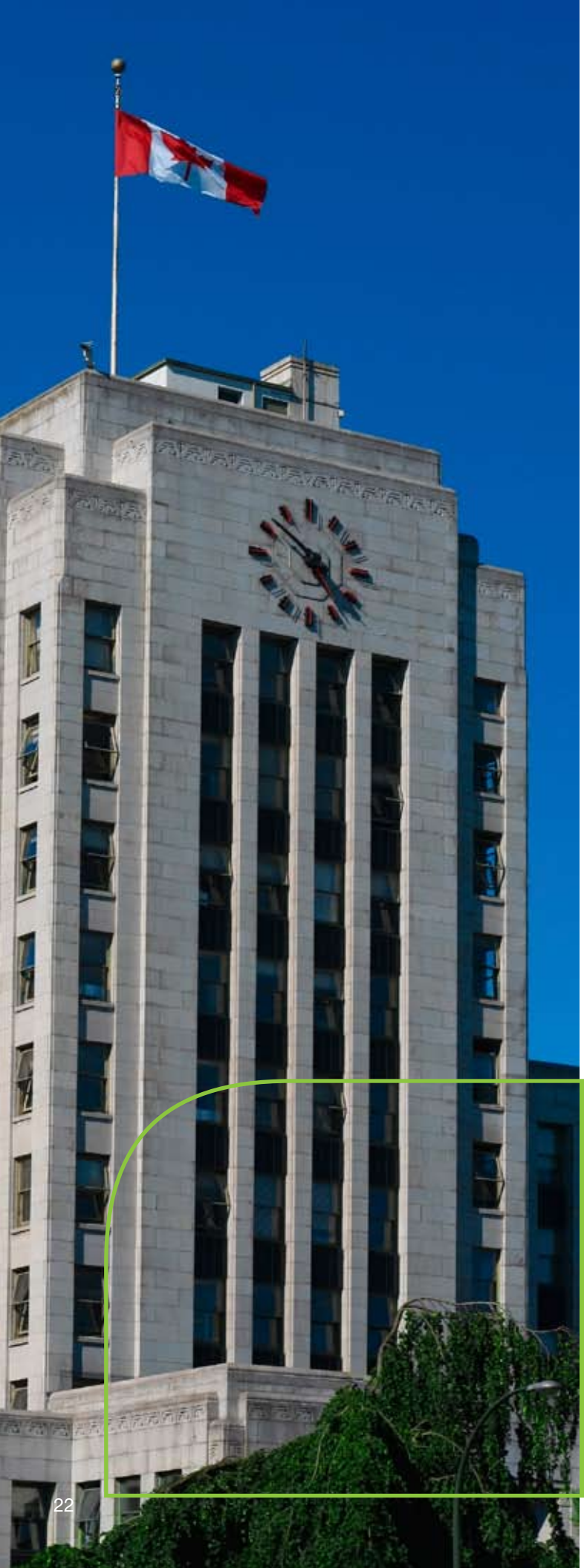
- A very thorough baseline analysis of a municipality's operations, including a review of the economic, social and environmental implications. That information, in our case, provided the basis for future policy development and also raised awareness about the issues.
- Talk about energy efficiency without getting into a political, or religious, discussion about global warming. Mayor and Council, who ultimately adopt the policy, need to see the connection between a proposed policy and the community they represent. This is a case where it pays to act locally and think globally.

WHAT ARE SOME EASY WINS FOR MUNICIPAL POLICY-MAKERS WANTING TO DEVELOP GOOD ENERGY MANAGEMENT POLICIES?

- Energy efficiency is not a traditional area of expertise in the municipal sector. Thus, it is very important to hire the right kind of help. For us it was a case of hiring the best we could afford. Groups such as the Pembina Institute, the Community Energy Association, the BC Sustainable Energy Association, and others are well prepared to help communities develop good energy management policies.
- The baseline mentioned above is a good start and will quickly point to obvious areas that require improvement, but it is specific to each community. Building capacity within the organization will ensure a long-term approach to continuous improvement.

INTERESTING / RELEVANT WEBSITES

www.planningforpeople.ca
www.communityenergy.bc.ca
www.pembina.org



6 • Local Government Policy Tools

As a key point of contact in the development process, local governments have many policy-based tools available to them to influence private-sector development. To assist BC local governments in using these tools, this section aims to:

- Describe the energy policy context within which BC local governments operate,
- Outline the relationship between energy related decisions and local government planning decisions,
- Provide practical examples of energy related policies available to local governments at the land use level, the building and site design level, and the energy-using equipment level.

6.1 Energy Policy Context

In Canada, energy policy jurisdiction is shared between federal and provincial governments, with electric and gas utilities operating under legislative authority granted by their respective provinces. The federal government is responsible for interprovincial and international movement of energy and energy-using equipment. Provincial governments are responsible for energy matters within provincial borders. The electricity and gas markets in British Columbia are regulated by the BC Utilities Commission under the *Utilities Commission Act*.

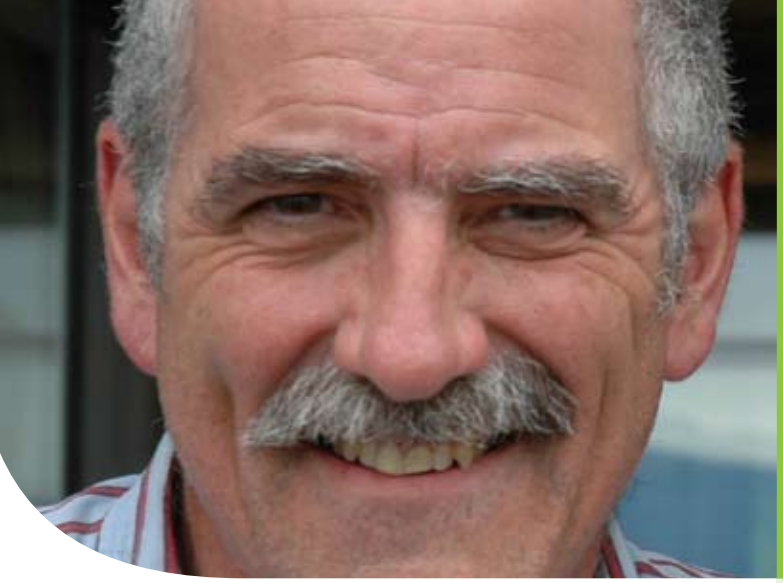
In 2008, the British Columbia Climate Action Plan set out a strategy for cutting greenhouse gas emissions by 33 percent by 2020 and by 80 percent by 2050, relative to 2007 levels. A number of legislative changes and programs were initiated to help meet these targets.

- The *Local Government (Green Communities) Statutes Amendment Act*, also known as Bill 27, was passed by the Province in 2008. The legislation requires local governments to include greenhouse gas emission reduction targets in their Official Community Plans (OCPs) by May 31, 2010 and Regional Growth Strategies (RGSs) by May 31, 2011, along with policies and actions proposed for achieving those targets.
- The Province committed to becoming carbon neutral in its own operations by 2010 and encouraged local governments to share a similar commitment by signing and implementing the Climate Action Charter. Signatory local governments agree to develop strategies and take actions to achieve the following goals:
  - becoming carbon neutral in respect of their operations by 2012 (solid waste facilities regulated under the *Environmental Management Act* are not included in 'operations' for the purposes of the Charter);
  - measuring and reporting on their community's greenhouse gas emissions profile; and
  - creating complete, compact, more energy-efficient rural and urban communities. For example, fostering a built environment that supports a reduction in car dependency and energy use, establishing policies and processes that support fast tracking of green development projects, or adopting zoning practices that encourage land use patterns that increase density and reduce sprawl.

As of 2008, over 130 local governments in BC have signed the Charter. Implementation of the Charter is being supported by a "Green Communities Committee" established by the Province and the Union of BC Municipalities (UBCM).

- In British Columbia, buildings are regulated under the BC Building Code, which is administered by the Ministry of Housing and Social Development. In 2008, the Province "greened" the building code by incorporating energy and water conservation requirements. These new code provisions require small residential buildings to meet a standard of EnerGuide 77 or equivalent, while large commercial, institutional and high-rise residential buildings must meet the ASHRAE 90.1 (2004) standard.
- The BC Energy Efficient Buildings Strategy: More Action, Less Energy, released in May 2008, encourages energy efficiency improvements to communities, homes and businesses and establishes the following energy efficiency targets:
  - Reduce average energy demand per home by 20 percent by 2020;
  - Complete energy conservation plans for all BC communities;
  - Reduce the energy demand of commercial and institutional buildings by nine percent per square metre by 2020;
  - Make public sector buildings carbon neutral by 2010.

The strategy includes funding to support the LiveSmart BC: Efficiency Incentive Program, which provides grants to homes and businesses. For more information on the strategy, please visit: www.energyplan.gov.bc.ca/efficiency/



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ENERGY CHAMPION

WHY ENERGY EFFICIENCY? WHY BOTHER?

I became a grandfather for the first time last year. This makes climate change and energy conservation personal and for me highlights the critical need to leave this earth in better condition than it is now—a tall order. Thinking more locally, Vancouver Island imports most of its energy from the mainland and we have come close to having brownouts from peak electricity demand. We, on this Island, need to reduce the peaks in consumption of electricity and also reduce our overall carbon footprint.

WHAT ARE YOUR MOST SIGNIFICANT ENERGY-RELATED POLICY ACHIEVEMENTS?

- Joining Federation of Canadian Municipality's Partners for Climate Protection Program (1998)
- Adopting a Municipal Green Building Policy requiring LEED® silver/gold for all new municipal buildings (2005)
- Joining the Community Action on Energy Efficiency program and developing a private-sector green building incentive program (2006)

WHAT IS YOUR RECIPE FOR POLICY SUCCESS?

- Clearly identify the barriers to green building or energy efficiency whether they are people, attitudes, legislation, or lack of resources.
- Be strategic. Getting the job done is not always about pushing everyone to agree with the "wisdom" of your ideas.
- Pay attention to timing. Many an excellent initiative has run aground on the shoals of poor timing. However, these days the sea lanes are opening up for relatively clear sailing on climate change initiatives. Now is the time to set sail! (Sailing is carbon neutral too!)

WHAT ARE SOME EASY WINS FOR MUNICIPAL POLICY-MAKERS WANTING TO DEVELOP GOOD ENERGY MANAGEMENT POLICIES?

- Incorporate energy efficiency policies in their Official Community Plans.
- Adopt green building policies for new municipal construction.
- Incorporate a green building/sustainability checklist in rezoning and major development permit procedures.
- Partner with the development industry to craft incentive packages. Developers much prefer incentives to regulation and want to be seen as ahead of the green curve — not behind it.

Saanich

INTERESTING / RELEVANT WEBSITES

www.saanich.ca

6.2 Energy Management & Local Government Policy

In British Columbia, local governments are considered creatures of the Province, meaning all planning and administrative actions are enabled by provincial legislation. With the exception of the City of Vancouver,[5] all local governments operate primarily within the limitations of two statutes: the *Local Government Act* and the *Community Charter*. The *Local Government Act* provides local governments with the powers they require to fulfill their purposes and respond to the different needs and changing circumstances of their communities. The *Community Charter*, a companion statute to the *Local Government Act*, establishes a core of enabling provisions to local governments.

In 2008, these two statutes were amended by the *Local Government (Green Communities) Statutes Amendment Act* or Bill 27. Bill 27 requires local governments to include greenhouse gas emission reduction targets in Official Community Plans (OCPs) by May 31, 2010 and Regional Growth Strategies (RGSs) by May 31, 2011, along with policies and actions proposed for achieving those targets. The legislation enables local governments to encourage development that will reduce greenhouse gas emissions.

Provincial legislation defines the powers of local government with respect to buildings. These powers are in part restricted by Section 9 of the *Community Charter*, which defines a number of spheres of 'concurrent authority,' including 'buildings and other structures.' In areas of concurrent authority, local governments cannot make requirements that differ from provincial regulations covering the same topic, without specific provincial approval to do so. That means local governments cannot directly require buildings to differ from the BC Building Code.

This section describes policy mechanisms through which it is possible to encourage energy efficiency, greenhouse gas emission reductions, and the use of alternative energy in buildings and developments. An Official Community Plan (OCP) provides policy guidance for a community over a five to ten year period, so including comprehensive language on energy management provides a context for both immediate and future decisions.

[5] The City of Vancouver operates under its own unique enabling legislation known as the Vancouver Charter. Because this statute applies only to the City of Vancouver, planning actions with authority rooted in the Vancouver Charter will not be explored.

6.3 Community Energy Management – A Conceptual Framework

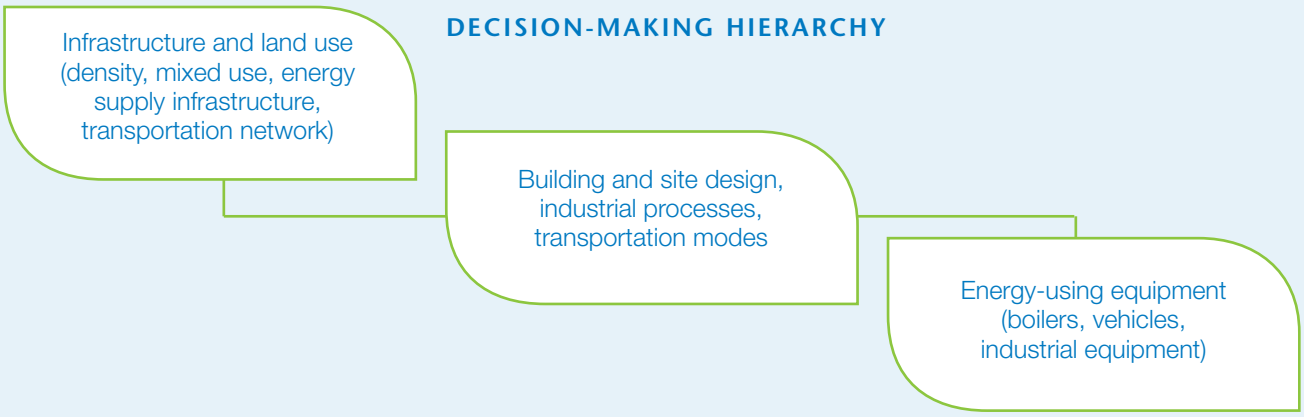
A wide range of policies are available to local governments to influence buildings' energy use. A community energy management conceptual framework provides a rational structure for identifying preferred policies and their overall impact and effectiveness.

Community energy management combines planning concepts with energy management concepts to optimize the overall energy performance of an urban area.

Community energy management is regarded as "consistent with and in many ways a synthesis of a variety of planning initiatives such as *neo-traditional urban design, complete communities and green cities*."[6] These schools of urban planning tend to be motivated more by a concern for local air quality, public amenities, green space, and livability than energy throughput of the urban system. Yet the synergies between community energy management and these planning initiatives are relevant because they align many of the objectives of community energy management with more mainstream planning concepts. Common objectives such as higher density and mixed use are often pursued under the rubric of livability, yet also promise energy-related co-benefits.

Energy-related decisions at the municipal level exist within a decision-making hierarchy, where higher-level decisions have the potential to influence decisions further down the hierarchy, as illustrated.

ENERGY-RELATED DECISION-MAKING HIERARCHY



Land use and infrastructure decisions are at the top of the hierarchy because they have long-term impacts and influence the energy decisions in the two lower levels. Building and site design decisions often directly influence the choice of energy-using equipment for buildings yet are often subject to previously made land use decisions. Energy-using equipment is at the bottom of the hierarchy because these decisions have less impact and tend to be determined by decisions further up the hierarchy.

As an illustration, consider a district heating system. A district heating system is a highly efficient heat and hot water system that connects the hydronic (hot water) or forced air heating systems of buildings to a central, shared boiler. The shared boiler serves as a mini–power plant, displacing the need for individual furnaces or boilers. District heating systems require distribution infrastructure to deliver thermal energy to buildings and are more cost effective

[6] This quote (p. 1066) and the general concept of community energy management is sourced to M. Jaccard, L. Failing, & T. Berry (1997), "From equipment to infrastructure: Community energy management and greenhouse gas emission reduction," *Energy Policy, 25*(13), 1065-1074. The illustrations are based on ideas presented in the article.

in areas with a relatively high and diverse heating load density, usually achieved by higher density residential or mixed use development. Ensuring new buildings are compatible with the district system (i.e. system ready) requires appropriate building and site design controls. The building's heat supply system determines the mechanical and architectural design of the building, which in turn affects equipment decisions at the bottom of the energy decision hierarchy.

There are also three dimensions of the energy-related decision hierarchy: the temporal, spatial and decision-making dimensions, as shown here

Energy-related decision	Dimensions		
	Time	Space	Private/public
Land use and infrastructure	Years to decades	A lot	Public
Building and site design	One to three years	Moderate	Public/private
Energy-using equipment	Less than one year	Little	Private

Land use planning decisions, which have a greater influence over the long term, also take longer to implement, require more space, but importantly are within the realm of local government influence.

Building and site design decisions can be quick wins, require less space and are often the result of a combination of public and private decision-making. Energy-using equipment decisions require relatively little space and time to implement, yet are not usually within the realm of local governments' influence.

The community energy management framework provides a useful conceptual model for thinking about energy-related decisions and their effect on energy consumption. The private-sector policies described are categorized according to the three levels of this conceptual model:

- Infrastructure and land use level
- Building and site design level
- Energy-using equipment level

Before delving into specific policies, it is helpful to discuss the importance of including energy related and greenhouse gas emissions targets and policies in Official Community Plans (OCPs). OCP policies give staff and council the mandate necessary to venture into energy management.

6.4 Greenhouse Gas Emission Reduction Targets, Policies & Actions in Official Community Plans

As mentioned in the previous section, Bill 27 requires local governments to include specific greenhouse gas emission reduction targets in their Official Community Plans (OCPs) by May 31, 2010 and Regional Growth Strategies (RGSs) by May 31, 2011, along with policies and actions proposed for achieving those targets. In regions that have incorporated targets in their regional growth strategies, local targets will be a significant aspect of the regional context statements of member municipalities.

Local government is itself a generator of greenhouse gas emissions so implementation policies and actions may focus on its own practices. With respect to private development, local governments may use development permit area designations (see Section 6.7) to establish objectives to promote energy conservation and the reduction of greenhouse gas emissions and may waive or reduce development cost charges (DCCs) for development with low environmental impact (see Section 6.6). Greater authority has also been granted to vary off-street parking requirements based on activities or circumstances related to the transportation needs associated with the land or building. The requirement for a local government to own a parking facility nearby as a condition has been removed. Local governments may deposit cash in-lieu of off-street parking into a reserve fund for the purposes of providing alternative transportation infrastructure. Local governments must produce an annual report on their off-street parking and alternative transportation reserve funds.

A presentation from staff from the Ministry of Community Development in June, 2008 provides an overview of key aspects of Bill 27. The presentation, and responses to common questions, can be found on the on the Community Energy Association's website, at: www.communityenergy.bc.ca/resources-introduction/bill-27-tatiana-robertson-presentation-to-cea-agm-june-9-2008

Metro Vancouver

Metro Vancouver has endorsed the provincial greenhouse gas emission reduction target and is currently developing policies and actions to reduce greenhouse gas emissions through its Regional Growth Strategy review process. Metro Vancouver released the most recent version of the draft strategy in September, 2008. Greenhouse gas emission reductions are considered throughout the plan; some examples are provided below.

In Section 2: Looking Ahead: Challenges Facing Our Region, Metro Vancouver commits to Reducing Greenhouse Gas Emissions and Adapting to Climate Change, noting that:

> *Land use patterns have direct and long term impacts on the energy we use in our communities, from driving long distances to work, shop and play, to providing costly infrastructure and services over larger areas. Cars and trucks account for about 35 percent of Metro Vancouver's 15.6 megatonnes of greenhouse gas emissions (GHGs). Buildings are the second largest GHG source, accounting for another 31 percent of the region's GHG emissions ...Metro Vancouver has committed to the provincial targets of reducing greenhouse gas emissions by 33 percent by the year 2020 from 2007 levels and by 80 percent by 2050.*

Striving for a low carbon future is a strategic direction in the draft strategy. It notes that: "The promotion of a built form that results in energy-efficient buildings through such methods as district heating, geothermal heating and other renewable sources will also make an important contribution to GHG reductions." Strategy 4.4 of the plan is to "advance a low carbon future for the region." Success will be measured by:

a) tonnes of greenhouse gas emissions by sector and
b) the number of member municipalities incorporating greenhouse gas implications into capital budgets and planning.

Source: Metro Vancouver's Preliminary Draft Regional Growth Strategy, September 30, 2008. Available at: www.metrovancouver.org/planning/development/strategy/Pages/default.aspx. **Contact:** Jeff Carmichael, Sr. Economist, Policy and Planning Department, Jeff.Carmichael@metrovancouver.org, 604.432.6200

The District of Saanich

The District of Saanich's Sustainable Saanich Official Community Plan was adopted in 2008. The OCP has a section devoted to climate change (Section 4.1.1) and Policy 5 in that section states that Saanich will:

> *Implement "Saanich's Carbon Neutral Plan", which involves: establishing a municipal carbon-neutral reserve fund to offset the annual Greenhouse Gas emissions from all municipal operations; and reducing corporate Greenhouse Gas emissions by implementing building, fleet and other operational efficiencies, aiming for a 10 percent reduction by 2010.*

The OCP also notes that a Climate Change and Energy Action Plan will be prepared and that the District's carbon-neutral reserve fund will be used for new greenhouse gas reduction initiatives within Saanich, such as using geothermal or solar energy, and undertaking municipal building retrofits to reduce energy and water consumption. Section 4.2.1 of the OCP (Sustainable Land Use) includes a number of policies related to energy consumption and generation, and building green, including Policy 14, which directs the district to "encourage the use of 'green technologies' in the design of all new buildings" and Policy 21, which directs the district to "utilize new Development Permit authority to encourage water and energy conservation and GHG reduction in new development."

Source: District of Saanich Official Community Plan (2008) Available at www.saanich.ca/business/development/plan/ocp.html. **Contact:** Russ Fuoco, Director of Planning, fuocor@saanich.ca, 250.475.5472

6.5 Energy Management Objectives in Official Community Plans

Although Bill 27 now requires greenhouse gas emission reduction targets in Official Community Plans, many municipalities have already voluntarily included broad energy and/or greenhouse gas emissions management policies in their OCPs.

Broad energy management policies in an OCP establish an important foundation for achieving energy efficiency in a community. Section 884 of the *Local Government Act* states that all bylaws and works undertaken by a council after the adoption of an OCP must be consistent with the plan. Energy management policies in an OCP guide long-range community development, help steer development-specific negotiations, and provide staff with an overall mandate to explore energy management options in civic and private development. OCP policies guide staff and the community for five to ten years, possibly more, and have much longer-lasting impacts on the community's energy use and greenhouse gas emissions. Policy language in the plan should be general enough to accommodate an evolving energy technology sector, yet detailed enough to give staff the confidence to pursue robust energy-related measures and planning from day one.

Effective energy-related objectives in an OCP should:

- **A** Establish the importance of energy to all aspects of the community's social, economic, and environmental well-being
- **B** Establish the importance of demonstrating leadership in sustainable energy
- **C** Emphasize the community's global citizenship (linking local efforts to regional, national, and international energy and emissions policy)
- **D** Articulate the relevance of energy management to land use planning and development control
- **E** Direct future development to existing village/urban centres
- **F** Enable staff to explore energy options, both on the supply side (e.g., a district heating system) and the demand side (e.g. neighbourhood and site design)
- **G** Address the importance of energy efficient municipal buildings and equipment
- **H** Encourage full life cycle cost assessments for all municipal building energy-related decisions (e.g. heating or cooling or systems)
- **I** Encourage collaboration with other orders of government (e.g. regional, provincial, federal) and with utilities to address energy and emissions management
- **J** Establish and support an ongoing energy management committee to advise council and the community on energy-related issues and work with other jurisdictions to explore options

Examples of energy-related policies developed by local governments prior to Bill 27 are provided in the following section. OCPs from different local governments are referenced to provide the reader with a range of approaches and contacts. The best examples of OCP policies that include most or all of the above objectives are the District of Saanich OCP (2008) Climate Change and Built Environment sections (in Section 6.4, above), the City of North Vancouver OCP (2002) Environment section, and the District of Squamish OCP (2007) Energy and Air Emissions section. Sources for all are provided, with contact information.

EXAMPLES OF SUCCESSFUL ENERGY-RELATED OCP OBJECTIVES

A To *establish the importance of energy to all aspects of the community's social, economic and environmental well-being*, the City of Surrey established energy efficiency as a high-level policy in its Official Community Plan (2002). In an effort to Build Complete Communities (Section 2.2C), Surrey endeavours to build energy efficient communities by supporting:

Energy conscious community planning and building design that makes communities more energy efficient, and supports all efforts to promote energy conservation and alternative energy sources which are environmentally friendly and sustainable. (Future Direction, C6)

Source

City of Surrey, Official Community Plan (2002). Available at www.surrey.ca. **Contact:** Mark Allison, Senior Planner, mballison@surrey.ca, 604.591.4594.

B To *establish the importance of demonstrating leadership in sustainable energy*, the City of North Vancouver's Official Community Plan (2002) emphasizes the importance of municipal action on energy management in the Environment section. Energy management goals and objectives are a key component of the City's overall vision of becoming a more sustainable community. This includes the understanding that

...how energy is consumed has significant consequences for the environment and for quality of life. Although energy issues have traditionally been managed at the provincial level, the City of North Vancouver has an opportunity to participate at the local level to reduce the negative impacts of energy usage. (Section 8)

The City's OCP goes further. Energy Planning Objectives (Section 8.5) encourage staff, council and the broad community:

- *To promote energy efficient building design and practices for all development projects and City-owned buildings*
- *To implement Community Energy Systems as a means of providing heat energy for applications such as space heating and domestic hot water provided that it is demonstrated to be economically and technically feasible, and meets the City's sustainability goals and objectives*
- *To collaborate with partners and agencies in the transportation and development fields to jointly achieve energy conservation*
- *To reduce greenhouse gas emissions by measures such as transportation alternatives to the automobile, including increased transit, and a network of walking and cycling paths*
- *To encourage the planning, design and construction of energy efficient neighbourhoods and buildings to minimize greenhouse gas emissions*
- *To minimize the use of non-renewable energy by increasing the use of clean and efficient renewable energy supply systems*
- *To encourage optimization of energy utilized during the full life cycle use of public and private assets, i.e., for the production, transportation and assembly of materials; for the lifetime operation and maintenance of the asset; and for the retirement, re-use and replacement of the asset*

Source

City of North Vancouver, Official Community Plan (2002). Available at www.cnv.org. **Contact:** Suzanne Smith, Planner, SSmith@cnv.org, 604.990.4240.

C To *emphasize the community's global citizenship (linking local efforts to regional, national and international energy and emissions policy)*, the District of Squamish's Official Community Plan[7] (August 2007, draft) includes a stand-alone section on partnerships in its Energy and Air Emissions section (Section 17). Actionable items include the following:

- *17.25. The District will form a committee with an energy management function to coordinate corporate and community-wide energy conservation, energy efficiency, renewable energy, and greenhouse gas reduction activities.*
- *17.26. The District will seek partnerships with BC Hydro, Terasen Gas, independent power producers, the Resort Municipality of Whistler, the Squamish Lillooet Regional District, provincial and federal agencies, and others to foster achieving the energy objectives of the community.*
- *17.27. The District will continue to participate on the Sea to Sky Air Quality Coordinating Committee. It will also work with other municipalities in the Sea to Sky corridor, regional districts, utilities, and other partners on the committee to implement the Sea to Sky Air Quality Management Plan that they collaboratively developed.*

Source

District of Squamish, Official Community Plan (August 2007, draft) available at www.squamish.ca. **Contact:** Sabina FooFat, Planner, sfoofat@squamish.ca,604.815.5017.

[7] The District of Squamish OCP is undergoing review. The final version may differ slightly.

D To *articulate the relevance of energy management to land use planning and development controls*, the District of Squamish includes a stand-alone section in its OCP on energy and air emissions (Section 17). Several specific objectives link energy management with land use, including:

- *Objective 1. Foster the conservation and efficient use of energy and other resources in buildings, vehicles, and infrastructure.*
- *Objective 5. Foster the planning, design, and development of neighbourhoods that support walking, cycling, and transit and other energy-efficient transportation modes.*

The City of Port Coquitlam also links the importance of energy considerations at the land use and site scale in its Official Community Plan (2005). Recognizing the City "has a role in promoting energy efficiency as a component of land use and development planning," and that "the responsible location of land use, site planning, and building design can all contribute to a reduction in energy use" (Utilities and Services, Section 7.9), the OCP directs staff to "Consider energy efficiency principles and practices in land use planning, site planning, and building design." (Policy #9)

Sources

District of Squamish, Official Community Plan (August 2007, draft). **Contact:** Sabina FooFat, Planner, sfoofat@squamish.ca, 604.815.5017.

City of Port Coquitlam, Official Community Plan (2005). Available at www.city.port-coquitlam.bc.ca. **Contact**: Planning Division,Development Services Dept., planning@portcoquitlam.ca, 604.927.5442.

E To *direct future development to existing village/urban centres*, the City of Abbotsford's Official Community Plan encourages infill and mixed-use development. Part 3 of the OCP is organized by policy directions.[8] Policy strategy 5, Strengthen our City Centre, includes the following objectives to guide energy-friendly growth:

- *5.2. Encourage innovative, sensitive infill and redevelopment*
- *5.3. Create a denser, mixed use city centre area*

Each objective features a discussion, a rationale, and specific policies and actions the City can take to achieve the objective.

Source

City of Abbotsford, Official Community Plan (2005). Available at www.abbotsford.ca. **Contact:** Peter Andzans, Community Sustainability Manager, PAndzans@abbotsford.ca, 604.864.5529.

F To *enable staff to explore energy options, both on the supply side (e.g., a district heating system) and the demand side (e.g., neighbourhood and site design)*, the City of North Vancouver includes a wide range of energy-related objectives in its Official Community Plan (Section 8.5, Energy Planning Objectives). See the City of North Vancouver example provided in B, above — in particular the objectives listed that encourage community energy systems, renewable energy supply systems, and energy efficient planning, design and construction.

Other good examples include the Energy and Air Emissions section of the District of Squamish's Official Community Plan, which includes specific policies and supporting policies on community energy planning and district energy; the City of Surrey's OCP Section C, Build Complete Communities; and the Corporation of Delta's OCP Section 2.4, Energy and Water Consumption.

Sources

City of North Vancouver, Official Community Plan (2002). Available at www.cnv.org. **Contact:** Suzanne Smith, Planner, SSmith@cnv.org, 604.990.4240.

District of Squamish, Official Community Plan (August 2007, draft). **Contact:** Sabina FooFat, Planner, sfoofat@squamish.ca, 604.815.5017.

City of Surrey, Official Community Plan (2002). Available at www.surrey.ca. **Contact:** Mark Allison, Senior Planner, mballison@surrey.ca, 604.591.4594.

Corporation of Delta, Official Community Plan (1985). Available at www.deltaviews.com. **Contact:** Thomas Leathem, Deputy Director of Community Planning and Development, tleathem@corp.delta.bc.ca, 604.946.3381.

[8] All policies are rooted in and linked to the City's 2003 Charter of Sustainability, which conveys the message that the City and its citizens are committed to supporting sustainable development principles and provides a framework for all City initiatives. Available at www.abbotsford.ca.

G To *address the importance of energy efficient municipal buildings and equipment*, the Corporation of Delta's Official Community Plan includes a policy to "continue to incorporate energy efficient features into municipal facilities and use environmentally friendly building materials where feasible" (Section 2.4.35).

Though not an OCP objective, the City of Vancouver's Energy Efficiency Purchasing Policy provides staff with clear guidance when purchasing energy-using equipment.

Sources

Corporation of Delta, Official Community Plan (1985). Available at www.deltaviews.com. **Contact:** Thomas Leathem, Deputy Director of Community Planning and Development, tleathem@corp.delta.bc.ca, 604.946.3381.

City of Vancouver, Energy Efficiency Purchasing Policy AF-013-01 (2004). Available at http://vancouver.ca/policy_pdf/AF01301.pdf. **Contact:** David Ramslie, Manager, Sustainable Development, david.ramslie@vancouver.ca, 604.873.7946.

H To *encourage full life cycle cost assessments for all municipal building energy-related decisions (e.g., heating, cooling or water energy systems)*, the City of North Vancouver included an objective in its Official Community Plan to:

...encourage optimization of energy utilized during the full life-cycle use of public and private assets, i.e. for the production, transportation and assembly of materials, for the lifetime operation and maintenance of the asset, and for the retirement, re-use and replacement of the asset. (Section 8.5.7)

As another example, though not an OCP objective, the City of Richmond developed a Sustainable High Performance Building Policy that outlines similar requirements. This policy ensures that all new civic buildings and renovations will be evaluated based on considerations of life cycle costing and initial investment requirements. The policy applies to all civic buildings greater than 20,000 square feet and recommends that they pursue LEED® Gold certification (minimum LEED® Silver). Smaller civic buildings are encouraged to still incorporate the same standards, but not necessarily to LEED® certification.

Sources

City of North Vancouver, Official Community Plan (2002). Available at www.cnv.org. **Contact:** Suzanne Smith, Planner, SSmith@cnv.org, 604.990.4240.

City of Richmond, Sustainable High Performance Building Policy #2004. Available at www.richmond.ca. **Contact:** Gavin Woo, Manager, Plan Review, GWoo@richmond.ca, 604.276.4113.

OCP objectives can set a foundation to advance energy efficient development, such as the newly constructed Quest University Canada campus building in Squamish.

I To *encourage collaboration with other orders of government (e.g., regional, provincial, federal) and with utilities to address energy and emissions management*, the Corporation of Delta's Official Community Plan (1985) directs staff to "participate in senior government programs and initiatives that address climate change impacts and that help municipalities plan for local-scale impacts of climate change" (Schedule A, Section 2.4.29). Ideally, this direction would be expanded to include climate change mitigation and energy management.

The value of linking municipal policy with provincial, federal and even international policy cannot be overstated. Local governments can benefit from policy directions established by higher orders of government that often have entire departments working on energy and emissions management.

The District of Squamish's Official Community Plan (August 2007, draft) also directs staff, council and the broader community to collaborate with a range of external agencies. See under example C, specifically objective 17.26.

Sources

Corporation of Delta, Official Community Plan, Schedule A (1985). Available at www.deltaviews.com. **Contact:** Thomas Leathem, Deputy Director of Community Planning and Development, tleathem@corp.delta.bc.ca, 604.946.3381.

District of Squamish, Official Community Plan (August 2007, draft). **Contact:** Sabina FooFat, Planner, sfoofat@squamish.ca, 604.815.5017.

J To *establish and support an ongoing Energy Management Committee to advise council and the community on energy-related issues and work with other jurisdictions to explore options*, the City of Abbotsford included a policy in its Official Community Plan intended to "provide advice to Council on environmental issues and opportunities" (Section 3, Objective 2.1). Although the Abbotsford example does not specify energy management, it could easily be included as part of a committee's mandate.

Though not a specific OCP objective, the City of New Westminster has established an Energy Management Committee. The committee is composed of a range of representatives from different City departments, plus an external stakeholder from BC Hydro. The committee generally pursues the goal of reducing the costs and environmental impacts associated with energy and resource consumption.

Sources

City of Abbotsford, Official Community Plan (2005). Available at www.abbotsford.ca. **Contact:** Peter Andzans, Community Sustainability Manager, PAndzans@abbotsford.ca, 604.864.5529.

City of New Westminster, Energy Management Committee Terms of Reference. **Contact:** Rod Carle, General Manager, City of New Westminster Electric Utility Commission, rcarle@newwestcity.ca, 604.527.4569.

6.6 Policies at the Infrastructure & Land Use Level

As described in section 6.3, infrastructure and land use policies are at the top of the community energy management decision-making hierarchy. These policies typically set the context for and determine energy-related decisions at the building or site level and the energy-using equipment level.

For example, revising the development cost charges bylaw can encourage growth in designated areas, thereby increasing density, which in turn can help achieve the threshold density to make a district heating system economically viable, or result in the development of building types well suited to geo-exchange heating systems (e.g. multi-family buildings, mixed-use buildings).

Policies at the land use level exist at a variety of scales and typically take from years to decades for their potential to be fully realized. Land use policies include development cost charges, zoning to encourage high density and mixed use, and service area bylaws.

DEVELOPMENT COST CHARGES

The *Local Government Act* (Section 933) allows local governments to levy Development Cost Charges (DCCs) on subdivisions or building permits for new construction to help fund the cost of sewer, water, storm drainage, road, and parkland upgrades needed as a result of new growth. Local governments usually set DCCs for single detached, multi-family, and commercial/industrial uses and are able to vary DCCs by geographic area and building type, which allows local governments to promote smart growth and other energy-efficient land use planning principles. Compact communities, which tend to have lower greenhouse gas emissions, typically have lower infrastructure costs since distances between units is shorter, and sewer, road and other infrastructure costs decrease accordingly. DCCs that reflect the true costs incurred by the local government in servicing development tend to be lower for more compact developments. When this is the case, DCCs encourage more compact development.

Bill 27 expanded local government jurisdiction in relation to DCCs by allowing local governments to offer special consideration to developments that reduce greenhouse gases. Local governments can now use DCCs to encourage greener development by waiving or reducing DCCs for small lot subdivisions designed to result in low greenhouse gas emissions, or any development designed to result in a low environmental impact, including commercial developments. The requirements that must be met in order to receive a DCC reduction must be clearly stated in the DCC bylaw or regulation.

A local government must consider how development designed to result in low environmental impact may affect the capital cost of infrastructure. However, it may still waive or reduce DCCs even if infrastructure cost savings are not quantifiable. The power to grant DCC waivers or reductions is an exception to the general prohibition of assistance to business set out in both the Community Charter (Section 25) and the Local Government Act (Section 182). It is not possible for a municipality to fund exemptions by charging higher DCCs on buildings that do not meet environmental objectives, since DCCs must reflect the costs to the municipality of providing infrastructure to service the development.

A report analyzing the use of DCCs as a smart growth tool is available from West Coast Environmental Law.[9]

[9] "Do Development Cost Charges Encourage Smart Growth and High Performance Building Design?, West Coast Environmental Law (2003), at www.wcel.org. Please note, this report was prepared prior to the establishment of Bill 27.

ZONING TO ENCOURAGE HIGH DENSITY & MIXED USE

The increased density and mixed use achieved through zoning is the foundation for schools of planning such as Smart Growth and New Urbanism. Benefits include increased accessibility to stores and services, minimum density and proximity for viable public transit, increased safety due to more "eyes on the street," contained urban sprawl, more socially vibrant spaces, walkable communities, and increased opportunities to advance energy efficiency in buildings.

Promoting mixed-use, higher-density development through zoning can establish the necessary conditions for alternative energy supply technologies such as district energy systems and geo-exchange energy systems. Zoning determines land use and density, so while it can create the conditions for a desired land use mix and density, it cannot guarantee the developer will build to the allowable density. It is a good idea to engage a specialist to assess the likelihood of developers building to the allowable density and to determine the optimal land use for a technically, economically viable sustainable energy system. Examples of such studies include the following:

- **City of Vancouver, Southeast False Creek Phase 1 Energy Options Study (2002).** This series of documents was prepared by Compass Resource Management Ltd. (in association with Holland Barrs Planning Group, Busby & Associates Architects, and Pottinger Gaherty Environmental Consultants) for the City of Vancouver to provide strategic opportunities for energy efficiency and to utilize local energy supplies within the Southeast False Creek site. Available at www.city.vancouver.bc.ca/commsvcs/southeast/documents/index.htm#eos.

- **City of Vancouver, Southeast False Creek Neighbourhood Energy Utility.** These documents provide an overview of two energy supply options available for the Neighbourhood Energy Utility (NEU) – sewer heat recovery and biomass – and current NEU activities, milestones and design implications. Available at www.city.vancouver.bc.ca/commsvcs/southeast/documents/index.htm#neu.

- **Salt Spring Island, Energy Consumption at "Build-out" Study (2007).** Islands Trust, Salt Spring Island contracted Sustainability Solutions Group and Holland Barrs Planning Group to assess the impacts of different build-out land use patterns on greenhouse gas emissions. This study was part of a broader review of Salt Spring Island's Official Community Plan. The study includes a discussion of district energy systems. Available from the Salt Spring Office, Islands Trust, ssiinfo@islandstrust.bc.ca, 250.537.9144.

- **Metro Vancouver's Sustainable Energy Technology and Resource Assessment for Greater Vancouver (2005).** Metro Vancouver commissioned Compass Resource Management Ltd. (in association with M.K. Jaccard & Associates) to conduct a technical and resource assessment of geo-exchange, sewer heat recovery, and passive solar thermal technology. Although the report does not focus on zoning, the findings demonstrate the strong link between infrastructure, land use and building types, and economically viable sustainable energy technologies. Available at www.metrovancouver.org/about/publications/Pages/default.aspx.

Another useful resource for examples of zoning can be found in the Smart Growth on the Ground (SGOG)[10] Concept Plans for Maple Ridge, Squamish and Greater Oliver. These Concept Plans are not zoning bylaws; however, they are useful examples that other municipalities can draw from when revising their zoning bylaws.

The Squamish and Maple Ridge plans include background information and targets for mixed use, higher density, core commercial to residential transition zones, and district energy systems. Relevant sections of each plan include the following:

- District of Squamish. See targets 3, 15 and 17 in Appendix 2 (www.sgog.bc.ca/uplo/SqCPAppendix2.pdf). Supporting Technical Documents for Targets are available at www.sgog.bc.ca/content.asp?contentID=135.
- District of Maple Ridge. A new high-density downtown zoning district was created. Details at www.sgog.bc.ca/content.asp?contentID=126.

[10] Smart Growth on the Ground is an innovative program to change the way development is done in British Columbia, by creating real, built examples of Smart Growth. This program helps BC communities to prepare more sustainable neighbourhood plans — including land use, transportation, urban design, and building design plans. Extensive follow-up ensures that the plans become reality. SGOG is a partnership of the Design Centre for Sustainability at UBC, the Real Estate Institute of BC, and Smart Growth BC. Together these three organizations work with a select group of BC communities.

SERVICE AREA BYLAW

Section 210 of the *Community Charter* establishes the authority to create a local area service and Section 8(2) of the *Community Charter* enables local governments to provide and charge for any service that the council considers necessary or desirable, either directly or through another public authority, person, or organization. Consequently, local governments may provide local energy services, such as heating via a district energy system or through solar hot water systems for individual buildings, and charge for their use. A service area could encompass part or all of the community. A more detailed discussion of the use of local area service charges (often referred to as local improvement charges or LICs) can be found in Section 6.7.

Under these provisions, a service area bylaw can be used to establish service areas for particular types of energy services (e.g. a hydronic district heating system) and to require buildings within the service area to connect to the energy source.

City of North Vancouver

The City of North Vancouver established a bylaw to create a district heating service area for Lower Lonsdale, which required that all new or retrofitted buildings over a certain size be connected to and use the system. A wholly owned subsidiary, Lonsdale Energy Corporation (LEC), was incorporated in 2003 to operate the system. The council acts as the tariff setter, regulating the rates charged by LEC. In February 2007, the City established a service area bylaw to introduce a second system, to be served by LEC, in the expanding Central Lonsdale neighbourhood.

Source: City of North Vancouver, Hydronic Heat Energy Service Bylaw 2004, no. 7575. To view the bylaw, visit www.cnv.org/c//apps/Bylaws/ and enter 7575 in the bylaw search engine. **Contact:** Suzanne Smith, Planner, SSmith@cnv.org, 604.990.4240.

6.7 Policies at the Building & Site Level

In the community energy management decision-making hierarchy presented in Section 6.3, building and site-level policies (in the middle of the hierarchy) influence building and/or site-specific factors, which are lower down in the hierarchy. In terms of the timing, these policies will typically result in energy efficiency benefits at completion of construction (i.e. right away). Examples of policies at this level include sustainability checklists, development permit area guidelines, and revitalization tax exemption bylaws.

SUSTAINABILITY CHECKLISTS FOR DEVELOPMENT PERMITS & REZONING

Developers can be required to complete a sustainability or smart growth checklist as part of the development permit or rezoning application processes. The checklist might include, for example, questions about the sustainable energy features incorporated into the new development. None of the measures on the checklist is compulsory; the aim of the checklist is to highlight local government sustainability and clean energy objectives, and to educate developers about the potential for including energy efficiency measures or renewable energy technologies in new buildings.

In addition to using checklists as a purely educational tool, Councils can use such checklists in combination with other policies, as a tool when considering approvals of rezoning or the issuance of development permits, for example, or to help judge the performance of development proposals. A checklist should ideally be established through a Council resolution, and need not involve changes to any bylaws. A checklist should align with OCP policies, effectively translating those OCP policies into development practices on the ground.

The examples below provide links to development checklists in use in BC. All explore multiple aspects of sustainability, including social, economic, and environmental components, and all are linked to relevant goals and visions expressed in the OCP. Checklist approaches can differ: some use a points-based approach; others use a pass/fail approach; and others use a narrative yes/no or Q&A approach to draw out qualitative information on sustainability features. Points-based approaches are helpful in that they are measurable and therefore easier to evaluate. In Kamloops, the North Shore Neighbourhood Plan includes a development checklist linked on a points system to a series of development incentives, such as density bonuses and expedited approvals.

The development permit/rezoning checklist may not be the best tool to guide single-family dwelling development. Although theoretically a DPA could be established to cover an entire community, development permit areas are rarely established for low density single family areas and these areas generally receive fewer applications for rezoning. To overcome this challenge, the City of New Westminster developed an additional checklist for single-family dwellings that is used at the building permit application stage. (See following example.)

City of New Westminster

a) Smart Growth Development Checklist

All applicants for rezoning and development permits in the City of New Westminster are required to complete a Smart Growth Development Checklist.

Key attributes

- Brings attention to Smart Growth principles when considering future development. Staff and council are more likely to look favourably upon rezoning applications that incorporate the areas of interest outlined in the checklist.
- New Westminster's development permit area guidelines are very general, so the checklist helps staff get into more detail.
- The checklist is explicitly linked to broader sustainability objectives identified in the OCP.
- The checklist is not a pass/fail testing instrument.
- The checklist's scope is broader than energy efficiency.
- Section 6 directly addresses energy efficiency and air quality.

Submission and review process

- The checklist is submitted as part of the pre-application process or as part of the proponent's design review materials.
- Staff provide comments on the initial submission and give it back to the proponent.
- The checklist and supplementary material are resubmitted, addressing staff comments, with the proponent's formal application for permit or rezoning.
- The checklist is forwarded to the Advisory Planning Commission and Design Panel, and attached to staff's report to council.

Source: City of New Westminster, Smart Growth Development Checklist. See Appendix B of this manual. Also available at www.newwestcity.ca.
Contact: Rod Carle, General Manager, City of New Westminster Electric Utility Commission, rcarle@newwestcity.ca, 604.527.4569. Alternatively: City of New Westminster Planning Department, 604.527.4532

b) Smart Growth Development Checklist for Single Family Dwellings

Following development of the development permit/rezoning checklist, staff at the City of New Westminster also developed a checklist for single-family dwelling development, the Smart Growth Development Checklist for Your Home.

The single-family dwelling checklist is introduced to applicants applying for a building permit. They are encouraged, but not required, to complete it. The challenge with this approach is that by the time the proponent is applying for a building permit, their plans are nearly finalized and it is hard to introduce new concepts at this point.

Most people considering renovating, subdividing, building, or developing single-family dwellings first inquire at the planning department about how to proceed. This first point of contact is an ideal opportunity to introduce the single-family dwelling checklist.

It is important to ensure there is strong interdepartmental communication with such a tool. Planning, engineering, and building services should collaborate to get builders to consider the checklist. Other ways to introduce the checklist to builders include press releases, the City website, and information packages available at the planning department counter.

Source: City of New Westminster, Smart Growth Development Checklist for Your Home
Contact: Rod Carle, General Manager, City of New Westminster Electric Utility Commission, rcarle@newwestcity.ca, 604.527.4569. Alternatively: City of New Westminster Planning Department, 604.527.4532

City of Port Coquitlam

All applicants for rezoning and development permits in the City of Port Coquitlam are required to complete a Sustainability Checklist.

Key attributes

- The checklist is explicitly linked to the broader sustainability objectives identified in the Official Community Plan and Corporate Strategic Plan.
- The checklist's scope is broader than energy efficiency.
- Section 4c is specific to construction and design, including provisions for energy efficiency.
- The checklist employs a scorecard approach rather than a pass/fail approach.
- Criteria for different sections are weighted differently to emphasize their level of importance.
- Supplementary information is required, including the completion of the LEED-NC® 1.0 Project Checklist, available at www.cagbc.org.

Submission and review process

- Proponents submit the checklist and supplementary information as part of the rezoning and/or development permit application.
- Staff review the checklist and discuss further with the proponent. Following that, staff prepare a final checklist and submit it to the Community and Economic Development Committee and Council, as part of the application process.

Source: City of Port Coquitlam, Sustainability Checklist. See Appendix A of this manual. Also available at www.city.port-coquitlam.bc.ca.
Contact: Kim Fowler, Director of Development Services, fowlerk@portcoquitlam.ca, 604.927.5432.

Other Examples of Sustainability Checklists

Town of Gibsons www.gibsons.ca/

City of Kamloops www.kamloops.ca

City of Kelowna www.kelowna.ca

District of Saanich www.gov.saanich.bc.ca

City of Vernon www.vernon.ca

DEVELOPMENT PERMIT AREA GUIDELINES

Development Permit Area (DPA) powers (under Section 919.1 of the *Local Government Act*), were historically restricted to requirements respecting landscaping, siting of buildings and other structures, and the form and exterior design of buildings and other structures. However, Bill 27 expanded local governments' authority to establish DPA requirements with respect to energy conservation and greenhouse gas reductions. Local governments may now establish DPAs for the purpose of promoting energy conservation and reducing greenhouse gas emissions, and within these areas, as a development permit condition specified in development permit guidelines, require specific features in the development, or machinery, equipment, and systems external to buildings and other structures.

Local governments may be able to use these expanded powers to mandate particular types of renewable energy systems that can be located onsite. It may also be possible to establish a DPA that requires a proportion of a development's energy needs to be met with renewable energy. For example, in the London Boroughs of Merton and Croydon in the United Kingdom, planning bylaws adopted in 2003 required residential developments with 10 or more units and all other developments with floor space above 1,000 m^2 to reduce CO_2 emissions by 10 percent through the use of onsite renewable energy sources. The policy, known as the 'Merton Rule,' has now been adopted by dozens of local governments in the UK, catalyzing market take-off for small-scale renewable energy.

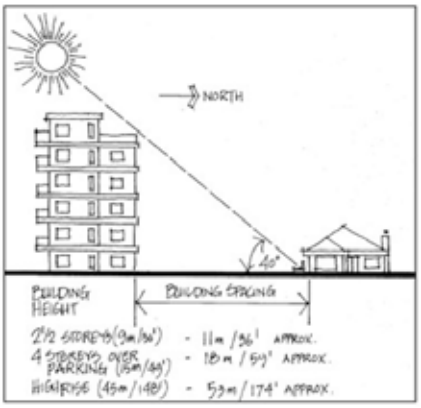
Although Bill 27 expanded the scope of DPA's as a tool for energy conservation, it was possible to use DPA guidelines prior to the enactment of the Bill to improve energy efficiency in buildings. DPA requirements for landscaping, siting, and form have been used to promote passive solar heating. As described in more detail below, both the City of Richmond and District of Saanich have used DPA guidelines to enhance passive solar gain and natural ventilation. It is also possible to direct the placement and type of trees and other vegetation in proximity to buildings and other structures within a DPA, thus allowing local governments to guarantee access to sunlight for buildings that do include solar energy features and to use vegetation to help mitigate temperature extremes and reduce surfaces that absorb heat.

Example – City of Richmond

The City of Richmond's development permit guidelines include provisions for solar access and operable windows, suggesting the intent was to increase passive solar gains and natural ventilation. The multi-family building guidelines (Section 9.3.2) encourage:

- Sunlight access — minimum 75 percent of dwellings and open spaces receive direct sunlight every day of the year
- Minimum north-south spacing
- Orient windows to the south in order to maximize solar gain
- Operable windows

Source: City of Richmond, Development Permit Guidelines in the Official Community Plan (1999). Available at www.richmond.ca.
Contact: Gavin Woo, Manager, Plan Review, GWoo@richmond.ca, 604.276.4113.



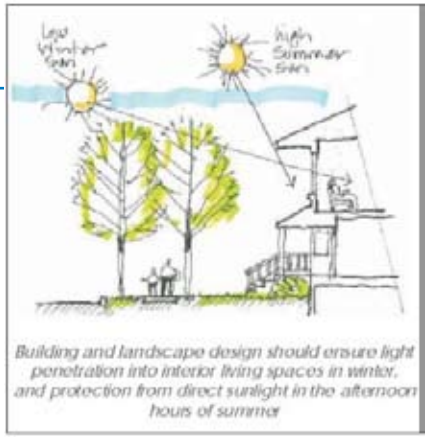
Development permit guidelines can include provisions for sunlight access to increase passive solar gains and to enhance livability.

Example – District of Saanich

Saanich is revising its DPA guidelines to include energy efficiency provisions, among other things. The new guidelines are still in draft format but include three pages of guidelines and schematics covering energy efficiency, shading, natural ventilation, and building orientation. The guidelines are expected to be complete in late 2009.

Contact: Russ Fuoco, Director of Planning, fuocor@saanich.ca, 250.475.5472.

An excellent additional resource for identifying passive solar and natural ventilation guidelines is the Canada Mortgage and Housing Corporation publication *Tap the Sun: Passive Solar Techniques and Home Designs*. Available at www.cmhc-schl.gc.ca.



Example of a draft development permit guildeline from the District of Saanich.

GREEN BUILDINGS IN COMPREHENSIVE DEVELOPMENT ZONING

Comprehensive development zones (CDZs), described in Section 903 of *Local Government Act*, are a common approach for the redevelopment of sites with few owners, enabling the site development to be tailored in a more detailed way than through other zoning bylaws. There are usually no zoning restrictions in a CDZ. Instead, the landowner's development plan becomes the de facto zoning bylaw. Comprehensive development zoning creates flexibility in planning, and provides space for the local government to negotiate with the developer to encourage energy efficiency measures or renewable energy system. CDZs are often used for large redevelopment sites.

Good examples of the way in which comprehensive development zoning can be used are the Dockside Green development in the City of Victoria and the Westhills development in the City of Langford. In both these cases, the local government worked with developers to identify opportunities to meet local sustainability objectives, while also meeting the business needs of the developer. This flexibility was made possible through designation of the areas as CDZs.

Example – Comprehensive development zoning at Dockside Green

For decades, Victoria's Dockside district represented 21-acres of vacant and environmentally damaged lands on the city's harbour front. In 2001, the city took an unusual approach in deciding to redevelop the site, using comprehensive development zoning to enable flexibility in site design. The municipality assembled the knowledge and experience required for a project of significant scale and scope, and used triple bottom line (economic, environmental, social) criteria to evaluate development bids. The City awarded the project to VanCity and Windmill Developments—a partnership of two companies with a longstanding commitment to sustainability.

Dockside Green is committed to achieving Platinum certification, the highest level under the Canadian LEED® program on all buildings with some minor exceptions, such as restaurant and pub facilities. There are currently only a few LEED® Platinum buildings in the world. The developers of Dockside Green are applying an integrated approach to design - working with the whole site as opposed to a single building - to realize economies of scale and to develop higher performing green buildings. The Dockside Green development will include a leading-edge biomass-fuelled district heating system, providing heat and hot water to the anticipated 2,500 residents, as well as utilize sewer heat recovery, solar, and wind technologies.

For more information:
www.victoria.ca/cityhall/currentprojects_dockside.shtml

Example — City of Langford

The City of Langford's Westhills development is a mixed-use neighbourhood with approximately 6,000 residential units and commercial and civic buildings. All commercial and multi-family residential buildings are required to be LEED® certified. All residential buildings that do not fall within LEED® certification will be required to be built to a Built Green™ standard. Westhills is officially registered as a LEED-ND® (New Development) pilot project under the US Green Building Council (USGBC) pilot program. The USGBC has a large number of pilot projects, a small number of which are in Canada.

Source: City of Langford, Official Community Plan. Available at www.cityoflangford.ca.
Contact: Matthew Baldwin, City Planner, mbaldwin@cityoflangford.ca, 250.474.6919

BUILDING ENERGY PERFORMANCE STANDARD THROUGH REZONING & PHASED DEVELOPMENT AGREEMENTS

Council can adopt a rezoning policy that encourages developments that incorporate energy efficiency measures. Any development that requires a rezoning must be approved by Council, which can consider benefits to the community as part of its decision. While the OCP lays out general expectations of the community, Council can also adopt a rezoning policy, which provides a clear statement of attributes that Council will seek in making rezoning decisions. It is important to note that a rezoning policy cannot set requirements for rezoning, because Councilors are required to approach rezoning hearings with an 'open mind.' However, if a development does not meet stated expectations of Council, it is unlikely to be recommended by staff or approved by Council.

A variation of a rezoning policy is to use a checklist (similar to the development permit checklist) to score rezoning applications. This would be less rigid than a rezoning policy, but would help staff and Council to judge the benefits of the project.

The power to use phased development agreements was introduced into the *Local Government Act* in 2007 (Section 905.1). The concept of entering into agreements with developers to provide community amenities was made explicitly lawful in this legislation. Terms and conditions in phased development agreements may include the development of particular features or amenities, the phasing or timing of the development, or inclusion of covenants. In exchange, the local government offers guarantees that the provisions of a zoning bylaw will remain unchanged for the area for the duration of the agreement.

For the developer, the benefit is clear: the developer receives a guarantee that a particular parcel of land will not be rezoned such that the planned development becomes impossible. For the local government, being able to 'lock in' zoning and bind a future council to that zoning (previously not possible) provides local governments with a flexible tool that enables legitimate negotiation for the provision of desired amenities and features, such as passive solar design strategies or renewable energy systems, especially in larger development proposals. Because phased development agreements are new, this power has not yet been used to promote energy efficiency.

A phased development agreement must be approved in a bylaw, and a public hearing is required. Note that these provisions complement those in Section 904 of the *Local Government Act* (Zoning for Amenities and Affordable Housing); they do not replace them.

Example – Municipality of Bowen Island

In 2007, Bowen Island Municipality established a Green Buildings Policy (No. 01-07) for single family residential uses whereby applicants for rezoning are strongly encouraged to achieve Built Green Gold and EnerGuide 80 standards.

Source: Municipality of Bowen Island, Green Building Standards for Residential Re-zoning, Policy #01-07 (2007). Available at www.bimbc.ca/files/policies.
Contact: Jason Smith, Planner, jsmith@bimbc.ca, 604.947.6980

BUILDING PERMIT INCENTIVE PROGRAMS

Local governments may wish to consider reducing permit fees for energy efficient buildings, using their power to set and vary fees authorized by the *Community Charter*. Permit fees must not exceed the cost of processing permit applications. Regular permit fees cannot be increased to offset the fee reduction offered and funds to accommodate reductions must be found from other sources. Care should be taken to ensure that the incentive program does not infringe upon the *Community Charter's* general prohibition against assistance to business. A legal opinion could be sought to ensure that the fee bylaw complies with the law surrounding the charging of fees.

Although a permit fee reduction is in effect no different from a direct incentive, it can be more visible to developers, who might not seek out a grant program but who are obliged to apply for a permit. It can also be linked to an expedited approval process. Local governments can prioritize building permit applications for buildings constructed to a particular green building standard or that connect to a utility such as a district heating system. If the expedited process leads to significantly faster approvals, this approach can create a major incentive for developers, for whom time spent in the application process is a significant cost. This policy has been used in conjunction with a 'triple bottom line' sustainability checklist by the City of Port Coquitlam, and is being used by the District of Saanich and the City of Kamloops.

Example – District of Saanich

The District of Saanich is using this approach to encourage energy efficiency in single family homes. Homes built to a Built Green Bronze standard will receive a 10 percent rebate on the building permit, while Built Green Silver buildings get 20 percent and Built Green Gold buildings get a 30 percent rebate. This rebate plan was developed and implemented prior to the 2008 updates to the BC Building Code.

The municipality gives priority processing and pays for a contractor to serve as an energy adviser, directing builders to available technologies and incentives and assisting them with incentive applications.

Source: District of Saanich, Green Building Rebate Program. Information available at www.gov.saanich.bc.ca/business/development//greenbuilding/greenbuilding.html. **Contact:** Russ Fuoco, Director of Planning, fuocor@saanich.ca, 250.475.5472.

TAX EXEMPTION BYLAW FOR GREEN BUILDINGS

A revitalization tax exemption (RTE) bylaw provides a financial incentive for developers to build in a specified area of the municipality and/or to a specified building standard. Environmental revitalization, including energy efficiency, is listed by the Province as being within the intent of the legislation.

The powers of tax exemption were strengthened in 2007, allowing local governments greater flexibility to use tax exemptions to encourage particular forms of revitalization, including environmental revitalization. In particular, the restriction of tax exemptions to areas designated as 'revitalization areas' has been removed. Tax exemptions can represent a significant amount of money, and may be an attractive proposition to the owner. The Ministry of Community Development has a guide on the use of revitalization tax exemptions providing further details on the use of this tool. Local governments could also use the tax exemption power to promote green buildings or energy efficiency retrofits on existing buildings (e.g. properties that install solar panels or solar hot water heaters), or other multi-building or neighbourhood-scale initiatives (e.g. heat pump or heat recovery system). Long-term lower energy costs can also help achieve local government revitalization objectives.

The following is an excerpt from "Revitalization Tax Exemptions: A Primer on the Provisions in the Community Charter" (Ministry of Community Development, 2007, page 2):[11]

> *Section 226 of the Community Charter provides authority to exempt property from municipal property value taxes. To use this authority, a Council must establish a revitalization program (with defined reasons for and objectives of the program), enter into agreements with property owners, and then exempt their property from taxation once all specified conditions of the program and the agreement have been met. Exemptions may apply to the value of land or improvements, or both. Councils are free to specify, within their revitalization programs, the amounts and extent of tax exemptions available.*
>
> *Revitalization tax exemptions are limited to municipal property value taxes (Section 197(1)(a) of the Community Charter only) and do not extend to school and other property taxes, such as parcel taxes. An exemption may be granted for up to 10 years.*
>
> *The authority to provide a revitalization tax exemption is not subject to section 25 of the Community Charter (prohibition against assistance to business). Section 396E of the Vancouver Charter also provides the City of Vancouver with authority to provide revitalization tax exemptions.*

Example – District of Maple Ridge

The District of Maple Ridge offers a property tax exemption for high-rise residential development that occurs within the pre-designated revitalization area (created by bylaw). Residential development that meets basic criteria is eligible for a two-year tax exemption. Developments that are LEED® Silver, Gold or Platinum qualify for a four-year tax exemption. The revitalization tax exemption reduces property taxes (municipal taxes only) in the year following the tax certificate issuance. The District also monitors for compliance and cancels the certificate if necessary.

Source: District of Maple Ridge, Revitalization Tax Exemption Bylaw (2006). Available at www.mapleridge.ca. **Contact:** Laura Benson, Policy Analyst, lbenson@mapleridge.ca, 604.466.4338.

District of Maple Ridge Property Tax Exemptions for Designated High-Rise Residential

Year	Basic Exemption	Green Exemption
1	100%	100%
2	50%	75%
3	0%	50%
4	0%	25%

[11] Available at www.cserv.gov.bc.ca/lgd/gov_structure/library/community_charter_revital_tax_exemptions.pdf.

Density bonusing may permit higher-density development among energy efficient buildings and can introduce developers to certification such as LEED®.

DENSITY BONUSING

Section 904 of the *Local Government Act* allows local governments to exchange density for amenities. This means that a developer may be allowed to build to achieve more units than what is normally permitted in the zone (via increased floor space ratio, site coverage, or number of buildings per parcel) in exchange for the provision of amenities such as recreation centres, public squares, pedestrian or bicycle paths. This tool could be used to promote a renewable energy system that serves as a community amenity. However, it is more likely that density bonuses could be used to promote green buildings in general, with building energy efficiency seen as part of a broader package of green measures. The BC Office of Housing and Construction Standards has produced some guidance on the use of density bonuses, and drafted a model bylaw, available at: www.housing.gov.bc.ca/housing/BONUSDN/

For the innovative UniverCity development at Simon Fraser University, the City of Burnaby offers a 10 percent increase in density where 50 percent or more of energy required for the buildings is produced on-site.

Example – SFU UniverCity Community Trust

SFU Community Trust (SFU CT) is responsible for managing the development of the UniverCity Community at Simon Fraser University (www.univercity.ca), a unique development in the City of Burnaby. SFU CT does not hold regulatory power, but works in collaboration with the City of Burnaby to develop policies and guidelines that meet the objectives of SFU CT.

In 2008, SFU CT developed a green building bonus, in conjunction with the City of Burnaby, for features that exceed the minimum green building requirements. In order to receive the bonus density, the applicant will be required to have verification by an approved green building consultant or SFU CT–approved alternate with LEED® or other green building experience. The consultant will submit verification through a clearly defined three-phase verification procedure (preliminary permit approval, building permit and occupancy permit). The green building requirements set out mandatory sustainable building elements that must be met as a condition of City of Burnaby zoning, but as administered and verified by SFU CT.The green building bonus allows up to an additional 10 percent density for green building features in excess of the requirements, as administered by SFU CT and approved by the City of Burnaby. The bonus is granted for:

- Enhanced stormwater management – 5 percent Floor Area Ration (FAR) Bonus for enhanced stormwater management systems
- Enhanced energy efficiency – 5 percent FAR Bonus for buildings that are the equivalent to 23 percent better than ASHRAE 90.1 (for buildings with a common corridor, typically Part 3 buildings) and meet or exceed EnerGuide 80 and/or R2000 (for buildings without a common corridor, typically Part 9 buildings).
- Alternative energy systems – 10 percent FAR Bonus for installing a renewable or ultra-high efficiency energy system to meet a minimum of 50 percent of building energy loads, including space heating and domestic hot water

Other Examples of Density Bonusing

There are several examples of local government using the density bonusing tool for such things as affordable housing, employee suites, child care, parking, parks, and cycle paths. Examples are available at West Coast Environmental Law's Smart Growth Bylaws Guide – Table of Bylaws, available at www.wcel.org/issues/urban/sbg/bylaws. It may be possible to use existing examples as a foundation for a green building density bonus regime.

Source: See Appendix B in this manual. UniverCity East Neighborhood Plan, Part Four: Development Guidelines and Requirements, pp. 78–79. April 2002, revised May 2007.
Contact: Dale Mikkelsen, Manager, Planning & Sustainability, SFU UniverCity Trust, mikkelsen@univercity.ca, 604.268.6649.

REVIEW BUILDING-RELATED BYLAWS FOR BARRIERS TO ENERGY EFFICIENCY

Building-related bylaws can have unintended disincentives that inhibit energy efficiency and present real or perceived barriers to the deployment of sustainable energy technologies such as geo-exchange. In some cases, the real or perceived barrier to energy efficiency is due to justifiable reasons, such as ensuring the mechanical equipment provides adequate space heating. In other cases there may be ways to ensure due diligence while removing any potentially inhibiting barriers.

Example – Kelowna

An example of a possible barrier to greater deployment of geo-exchange energy systems is in the City of Kelowna's Geo-Thermal Heating Systems Bulletin. Geo-exchange energy systems — sometimes referred to as ground source heat pump systems — are an efficient way of providing buildings with space heating and cooling, and hot water. The City of Kelowna's Geo-Thermal Heating Systems Bulletin states that all systems "must either be designed by a Professional Engineer or be supplied with a backup heating system capable of supplying the entire heating needs."

Some geo-exchange installers claimed the engineering design requirement or the 100 percent auxiliary backup system makes the geo-exchange energy systems cost-prohibitive. They claim the additional upfront costs increase the life cycle cost of the system to a point where the system is no longer competitive with a conventional system. Several engineers and energy analysts felt the engineering design or 100 percent auxiliary heating requirement posed a legitimate barrier to the deployment of more geo-exchange systems in Kelowna.

Plumbing and gas inspection services department staff may be justified in requiring some assurance that geo-exchange systems are capable of providing the heating comfort requirements established in the BC Building Code. Municipal-level staff are unlikely to have expertise in geo-exchange systems, so may lack the confidence that the system can provide adequate heat. Yet when issuing a building permit under designated authority from the Province, municipal staff must be sure the system provides the necessary heat or could be held liable for issuing a permit for a substandard building.

As a partial solution, the City of Kelowna approved the use of an interlock system from the heat pump to a natural gas fireplace, as an auxiliary heat source, for use when the outdoor temperature falls below -17˚ Celsius during heating periods. This partially addresses the auxiliary heat source requirement barrier.

Contact: John Hailstones, Plumbing and Gas Supervisor, jhailstones@kelowna.ca, 250.469.8592.

Another potential solution to this possible barrier is offered by the Canadian GeoExchange Coalition (CGC). The CGC's Global Quality GeoExchange™ Program® now offers the first comprehensive geo-exchange quality assurance mechanism in Canada. Completing the CGC training forms part of the first industry accreditation and certification mechanism. The accreditation mechanism requires that participants agree to the CGC Code of Conduct, carry professional liability and workmanship insurance, have completed a certain number of successful supervised installations, and be generally in good standing in the industry.

If the CGC program is to the satisfaction of local government staff and solicitors, local governments could consider reviewing their applicable bylaws, policies, or bulletins to exempt accredited designers/installers from building and/or heating system requirements that might be barriers to geo-exchange installations.

More information on the Canadian GeoExchange Coalition's training and accreditation program is available at www.geo-exchange.ca.

LOCAL IMPROVEMENT OR LOCAL AREA SERVICE CHARGE

A local improvement charge (LIC) (referred to as a local area service charge in BC) , is a financing mechanism that allows local governments to cover capital costs of specific improvements to a site, neighbourhood or building, then recover those costs through property taxes of the owner(s) that benefit from the improvement. LICs are added as an item in the property tax bill, and are usually used to fund improvements that are of public benefit but are highly specific to a local area, such as road paving or sidewalk construction. In BC, local area service charges are authorized under section 210 of the *Community Charter*. The *Charter* states that local area services may be used to provide services that are of 'particular benefit to part of the municipality.'

The use of service area bylaws to support district energy and land use planning is discussed in Section 6.6 of this guide. However, the purpose of this section is to explore the use of LICs to support energy-efficiency improvements on private property.

With the exception of the Yukon, LICs have not been used to finance energy improvements on private property anywhere in Canada to date. However, a 2007 legal opinion obtained by the District of Central Saanich[12] stated that BC local governments may have legislative authority to use LICs for improvements to private property as long as the benefit of those improvements extends to the public. The opinion notes that, in the case of improvements on private property, implementation and administration of the improvements can be complicated and several issues will need to be addressed by the local government; such issues include the right to ongoing permission to enter the property, insurance against damages during installation, questions around ownership of the improvement, and ongoing maintenance of the improvement. The legal opinion should be reviewed in its entirety for full understanding. It is available at www.communityenergy.bc.ca/sites/default/files/LIC%20Legal%20Opinion.pdf.

The use of LICs to support energy efficiency on private property may be appropriate in cases where these improvements would provide immediate local environmental or health benefits. This might include areas that suffer poor air quality from the use of inefficient wood-burning fireplaces and stoves. An LIC-funded program to provide alternative or renewable sources of heat (such as an efficient-stove change-out program, or solar hot-water heating program) could provide direct local air quality benefits, as well as reducing the community's energy use and greenhouse gas emissions.

The Pembina Institute conducted a national scoping exercise of LICs in its report *Using Local Improvement Charges to Finance Energy Efficiency Improvements: Applicability across Canada* (2005). The report features a section on legislative authority for LICs, including provisions under the Community Charter and Vancouver Charter (see Appendix 2 of the report, Provincial Regulations Governing LICs, page 38).

Source: Pembina Institute, *Using Local Improvement Charges to Finance Energy Efficiency Improvements: Applicability Across Canada* (2005). Available at www.pembina.org/pub/197.
Contact: Matt Horne, Senior Energy Analyst, Pembina Institute, matth@pembina.org, 604.874.8558.

Port Moody's Public Saftey Building (pictured) is supplied by a geothermal heating system.

[12] Please note, a legal opinion does not have the same level of validity as a court decision.

6.8 Policies at the Energy-Using Equipment Level

Policy tools at this lowest level of the community energy management decision-making hierarchy are limited to energy-using equipment (e.g. furnaces). Generally speaking, local governments have limited control over such things as appliances and lighting. However, they do have some control over the sizing of heating equipment through the heating and building permit process.

HEAT LOSS CALCULATION FOR BUILDING/HEATING PERMIT

Local governments deliver and enforce the BC Building Code. As per the 2006 BC Building Code, Section 9.33.5.1(1), a local government may include a requirement for a heat loss calculation in its municipal building bylaw. A heat loss calculation ensures the building's heating equipment meets the actual heating requirements of the structure and avoids installation of 'oversized' furnace or hydronic equipment. If the bylaw will be applied to the renovation of existing buildings as well as the construction of new buildings, care should be taken that these measures do not discourage energy retrofits.

Local governments can leverage the heat loss calculation policy tool to inform building owners about other areas where energy efficiency can be improved. Building permit departments can recommend that permit applicants acquire their heat loss calculations through an EnerGuide audit. In addition to the heat loss calculation, EnerGuide audits provide energy efficiency recommendations in a number of areas. Builders may pursue some of the other recommendations in the EnerGuide audits, resulting in unintended energy-related benefits.

Example – City of Burnaby

Prior to the installation of any heating system in single- or two-family dwellings or townhouses or in multi-family units that have individual, self-contained heating systems for each unit, the City of Burnaby requires contractors to apply for and obtain heating system permits from the City's building department. A heating system permit is required for a building permit.

In the case of hydronic (hot water) heating systems, applicants are required to provide an appliance selection worksheet and a heat loss summary worksheet (among other things).

If a forced air heating system is to be installed, applicants are required to provide an appliance selection worksheet, a heat loss summary worksheet, a supply air duct summary, and a return air duct summary as well as adhere to specified guidelines.

Source: City of Burnaby, Heating System Permits. Available at www.city.burnaby.bc.ca.

Contact: City of Burnaby Building Department, 604.294.7130.

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ENERGY CHAMPION

WHY ENERGY EFFICIENCY? WHY BOTHER?

Energy efficiency is becoming more critical given the global challenges of climate change and 'peak oil.' Improving energy efficiency will not only reduce the environmental impacts of energy consumption, but will also save users money, for energy prices are only going to rise over the coming years.

WHAT ARE YOUR MOST SIGNIFICANT ENERGY-RELATED POLICY ACHIEVEMENTS?

- Residential Green Building Policy
- Civic Facilities Green Building Policy
- Green Buildings Strategy for Surplus Lands

WHAT IS YOUR RECIPE FOR POLICY SUCCESS?

- Engage council and key actors from the beginning of the policy development process.
- Focus on areas where you can actually influence change and use this as a device to educate the wider community.
- Keep the policy simple and focused.

WHAT ARE SOME EASY WINS FOR MUNICIPAL POLICY-MAKERS WANTING TO DEVELOP GOOD ENERGY MANAGEMENT POLICIES?

- Start with changing the operations of the municipality itself.
- Establish a baseline of energy use. This is an extremely useful tool to help focus on the areas that need the most attention.
- Tap into the network of communities that are taking action on energy management.

INTERESTING / RELEVANT WEBSITES

www.bimbc.ca

BOWEN ISLAND MUNICIPALITY

7 • Conclusions

This manual has provided an overview of the policy context and the tools available to local governments to pursue energy efficiency initiatives. Local governments have direct control over greenhouse gas emissions through their own buildings and vehicle fleets and can influence up to half of Canada's greenhouse gas emissions.[13] In British Columbia, residential and commercial buildings — those building types local governments have the most influence over — account for 23 percent of all energy consumed[14] and 12 percent of BC's greenhouse gas emissions.[15]

Local governments can make a major contribution to emissions abatement by implementing policies and initiatives to encourage or require the construction of high performance buildings. As of 2009, many local governments have focused on retrofitting civic buildings and incorporating energy efficiency into their new civic building stock. To accelerate energy conservation at the broader community level, local governments have also begun to initiate policy-driven changes.

Current building standards and rating systems provide a foundation for local governments to build upon. Basic energy efficiency standards exist for commercial, institutional and residential buildings as well as equipment. Official standards can be implemented and/or augmented through incorporating energy efficiency and greenhouse gas emission reduction targets, objectives, and policies into Official Community Plans. Integrating energy efficiency into an Official Community Plan sets the foundation for developing more specific energy efficiency policies.

Local governments can use policy tools at three decision-making levels: infrastructure and land use, building and site, and energy end-use equipment. Policies at the building and site level have been the most widely used by local governments to promote energy efficient buildings.

Recent legislative and program changes to promote energy efficient buildings and communities in BC provide a significant opportunity for local and First Nation government to mandate and promote higher energy efficient building standards.

[13] Source: The Federation of Canadian Municipalities Partners for Climate Protection program, www.sustainablecommunities.fcm.ca/partners-for-climate-protection/

[14] Source: BC's Energy Efficient Buildings Strategy: More Action, Less Energy, www.energyplan.gov.bc.ca/efficiency/

[15] Source: BC's Climate Action Plan, www.livesmartbc.ca/government/plan.html

CITY OF PORT COQUITLAM

SUSTAINABILITY CHECKLIST

FOR REZONING & DEVELOPMENT PERMIT APPLICATIONS

Our Vision

Port Coquitlam will aspire to be a complete community, unique because of its small town atmosphere, its strong sense of pride and where:

- Citizens have a collective sense of belonging, and contribute to the quality of life in the community.
- The community celebrates a vibrant culture and heritage.
- The environment is nurtured for present and future generations.
- A dynamic economy contributes to prosperity and the opportunity to work close to home.
- Planned development strengthens the character of the community, helping to create safe and affordable neighbourhoods.

– Port Coquitlam Official Community Plan (OCP), 2005

Using Triple Bottom Line Assessment to Achieve Sustainability Goals

The City of Port Coquitlam is committed to fiscally, socially and environmentally responsible land use development. Sustainable development integrates the three systems that support us – the economy, the environment and our society. Each of these systems must be functioning and healthy for us to survive and enjoy a high quality of life. To be sustainable, we must understand how these systems interact, and make sure our activities do not compromise the ability of any of the systems to function currently and in the future.

Sustainability: *To improve the social, environmental and economic well being of the community through good planning and land use management (OCP, 2005)*

New development is essential to achieve a complete community in which to live, work and play. The location, composition, density, and design of new development projects can have an immense, cumulative impact on our community's ability to: sustain a healthy economy and reasonable cost of living; to provide effective and accessible public services; to secure adequate choice and opportunity for present and future generations of residents; to protect our environment; and to ensure we all continue to enjoy a high quality of life.

Developers and their consultants are important partners in maintaining and improving our community's high quality of life. By providing sustainability criteria at the earliest development stage, the City enables developers and their consultants to create the most sustainable project possible. The Sustainability Checklist provides a comprehensive assessment of a development project's contribution to sustainability by balanced scoring of environmental, economic and social criteria. The balanced scoring of 1/3 environmental, 1/3 economic and 1/3 social is called triple bottom line assessment.

Please note, in total, the checklist describes an *ideal* – it is highly unlikely that any one project will earn maximum points in all sections, and no pass/fail standard has been set. Different types of development will result in a range of scores, and some sections may not be applicable to all development, which will be noted in the assessment. The checklist assessment will indicate how well a proposed application performs relative to the sustainability and complete community goals contained in our OCP and Corporate Strategic Plan, and help identify any areas where improvement is desirable and possible. It will inform decisions in the development approval process as to how well a proposed development achieves community sustainability.

Instructions

All Rezoning and Development Permit applicants are required to complete the Sustainability Checklist, as follows:

1. **Self-Scoring** – Applicants are to review and complete the checklist, as an initial assessment. The criteria are weighted differently so the maximum score for each criterion reflects its importance to sustainability goals. To calculate the score, multiply the points for a given answer by the criteria's weight and enter it into the designated TBL column. The first page divides the weighting score into 50% for the economic and social columns. The second page directs the scores to be placed in the unshaded column.
2. **Supplementary Information** – Statistical data indicated by an asterisk (*) is to be provided (e.g. the number of permanent employees, floor area ratio, property tax base increase) as well as a completed copy of the LEED Canada-NC 1.0 Project Checklist or best practice checklist for each application. Consultation with City staff may be of assistance in estimating this data. If needed, provide any additional description of how the proposed development incorporates the sustainability criteria.
3. **Submit Application** – Submit the completed checklist, data and supplementary information as part of the rezoning or development permit application.
4. **Final Assessment** – City staff will review the checklist and discuss with the applicant. Following the consultation with the applicant, a final checklist will be completed by staff for review by the Community and Economic Development Committee and Council, as part of the application process.

Other Resource Materials

- Official Community Plan – www.portcoquitlam.ca
- 2002 Strategic Plan – www.portcoquitlam.ca
- Zoning Bylaw – available at City Hall
- Downtown Plan – available at City Hall
- Canada Green Building Council website – www.cagbc.org
- SmartGrowthBC website – www.smartgrowth.bc.ca

For more information, contact:
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CITY OF PORT COQUITLAM

Sustainability Checklist

Rezoning and Development Permit Applications

	Points	Wt	Total	Soc	Env	Eco
1. Land Use						
• Mix of uses provided or uses consistent with OCP • Adds to the diversity of uses within an existing neighbourhood, such as employment, housing, retail, civic, educational, cultural, recreational	None – 0 Poor – 1 Good - 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)
2. Housing						
• Offers or adds a mix of housing types, sizes and tenure, including special needs[1] • Provides units with a wide-range of pricing options that will be sold or leased	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%))
• Provides subsidized or rental housing[2]	No – 0 Yes - 5	1	/5	(50%)		(50%)
3. Community character and design						
a) Design • Building design follows required architectural style and demonstrates innovation • Building orientation towards open space, views and/or daylight • Treatment of façade breaks down massing and articulates depth, verticality & street edge • Scale and massing of buildings relate to neighbourhood structures • Provides crime prevention through environmental design • Incorporates enhanced durability/longevity of construction materials.	None – 0 Poor – 1 Good - 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%)
b) Public Space • Creates or enhances community spaces, such as plazas, squares, parks & streets • Strong connections to adjacent natural features, parks and open space • Builds or improves pedestrian amenities, such as sidewalks, transit shelters, bike racks and connections to civic, cultural, school and retail/service uses	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%)
c) Density & Infill • Maximizes FAR or dwelling unit/acre density[1] • Results in infill/redevelopment and enhanced community fabric[2]	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)
d) Transportation • Accessible by multiple modes of transport, emphasizing public transit including future planned • Parking does not visually dominate the street view & allows easy, safe pedestrian building access • Interconnected road system with direct street connections, short block lengths, no cul-de-sacs • Provides traffic speed & demand management	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)

	Points	Wt	Total	*Soc*	*Env*	*Eco*
4. Environmental Protection & Enhancement						
a) Lands • Does not intrude on ALR or designated open lands • Protects riparian areas and other designated environmentally sensitive areas • Provides for native species habitat restoration/improvement • Redevelops environmentally contaminated site	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10			
b) Servicing • Does not require extension of existing municipal infrastructure (e.g. roads, water and sewer) • Located in existing commercial and transportation nodes	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5			
c) Construction/Design • Provides LEED certification (certified, silver, gold, platinum) or accepted green building best practices (e.g. Built Green BC, Green Globes)[3]	None – 0 Certified – 2 Silver – 3 Gold – 4 Platinum - 5	4	/20			
5. Social Equity						
• Contains elements of community pride and local character, such as public art • Provides affordable space for needed community services • Conducts public consultation, including documenting concerns & providing project visuals	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10			
6. Economic Development						
a) Employment • Provides permanent employment opportunities[1] • Increases community opportunities for training, education, entertainment or recreation	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5			
b) Diversification and Enhancement • Net increase to property tax base[1] • Promotes diversification of the local economy via business type and size • Improves opportunities for new and existing businesses, including eco-industrial and value-added • Developer demonstrates experience with similar projects	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5			
TRIPLE BOTTOM LINE SUMMARY			Social/Environmental/Economic	/35 (%)	/35 (%)	/35 (%)
			Application Total	/105 (%)		

[1] Per the instructions, please provide statistical data for these indicators, such as floor area ratio, estimated number of employees, number of housing types, sizes and tenures.

[2] Subsidized Housing encompasses all types of housing for which some type of subsidy or rental assistance is provided, including public, non-profit and co-operative housing, as well as rent supplements for people living in private market housing. It also includes emergency housing and short-term shelters.
Enhanced community fabric includes multiculturalism, mobility accessibility, integration with neighbourhoods and crime prevention through environmental design.

[3] Please provide a copy of the green building checklist chosen. For example:LEED Canada-NC 1.0 Project Checklist can be obtained at: http://www.cagbc.org/uploads/LEED%20Canada-NC%20Project%20Checklist.xls
Green Globes at: http://www.greenglobes.com/design/Green_Globes_Design_Summary.pdf

Green Building Bonus

This section identifies green building elements that exceed the minimum requirements, but are strongly encouraged in order to fulfill environmental and sustainable design goals of UniverCity.

Where these elements are incorporated in building design, construction, and commissioning, the floor area ratio may increase to a maximum of 10% of the permitted FAR of the site. As this is an "optional" green building component not required as a component of the zoning bylaw, a Letter of Credit (LOC) will be taken by SFU CT to ensure compliance, for release upon issuance of Occupancy Permit. The LOC will be calculated to equal 50% of the added value of the 10% density increase based on the land value of this density as determined by the price per square foot agreed upon in the Lease Agreement between SFU CT and the Applicant.

Verification:

In order to receive bonus density, the applicant shall have an approved green building consultant or SFU CT approved alternate with LEED® or other green building experience, submit verification to SFU CT of design prior to PPA Submission to receive approval of bonus density. This will be again verified by SFU CT at issuance of Occupancy Permit to ensure compliance and release of Letter of Credit. The specific verification is identified within each bonus. SFU CT provides approval to the City of Burnaby Planning and Building Department through formal letter of compliance with supporting proof.

Three (3) elements are available for increased density:

7.1. Enhanced Stormwater Management – 5% FAR Bonus.

Design and install an enhanced Stormwater Management system that utilises multiple measures of stormwater control systems (green roofs, interflow zones, detention trenches, cisterns, etc) in order to exceed the minimum UniverCity stormwater requirements for both storage and flow rates by a minimum of 10% as shown through water balance model calculations. If green roofs are chosen as the sole technology, an increase in density of 1.0sq.ft. will be granted for every 3sq.ft. of green roof installed up to a maximum density increase of no greater than 5%. Preference will be given to systems that demonstrate stormwater management by managing it in visually attractive systems.

- PPA: Provision by proponent of Water Balance Model and calculations showing enhanced reduction in storage and flow.
- Occupancy Permit: Provision by proponent of construction drawings and documentation showing installation of approved system.

7.2. Enhanced energy efficiency – 5% FAR Bonus.

Buildings with a common corridor (typically Part 3 Buildings) shall perform no less than 15% better than the minimum building energy requirement in Section 1.3.1, or a total of 35% better than MNECB for the building type (or a minimum of 23% better than ASHRAE 90.1, 2001), including the provision of modeling results for verification.

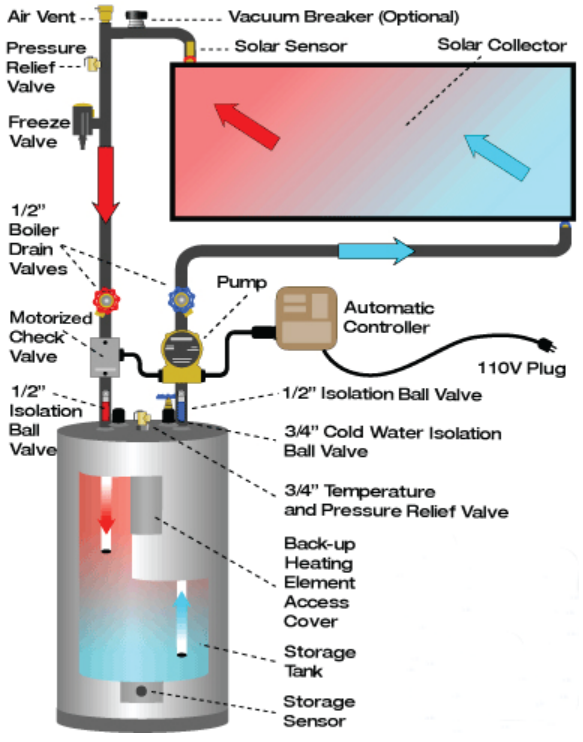
For buildings without a common corridor (typically Part 9 Buildings), the base requirement meet or exceed EnerGuide 80 and/or R2000, including the provision of modeling results for verification. Ensure that when low temperature hydronic district heating systems are installed, that they shall work within operating temperatures specified by SFU CT, including rough-in and/or stub-outs/ connections for future integration.

- PPA: Provision by proponent of building energy modeling showing reduction.
- Occupancy Permit: Provision by proponent of as-built energy model simulation/test.

7.3. Alternative energy systems – 10% FAR Bonus.

Design and install a renewable or ultra-high efficiency energy system to meet a minimum of 50% of building energy loads, including space heating and domestic hot water. All additional building energy loads shall be met through Ultra High Efficiency boilers. Specifications of the system shall be provided by the consulting mechanical engineer.

- PPA: Provision by proponent of building energy modeling showing provision of 50% of building load by proposed system, and associated PPA level working drawings.
- Occupancy Permit: Provision by proponent of as-built energy model showing capacity of installed alternative system and provision of final construction drawings and documentation.



Additional Sources of Information

THE BC CLIMATE ACTION TOOLKIT

As noted on the website, the toolkit was developed by the Green Communities Committee, a partnership between the Province of BC and the Union of BC Municipalities (UBCM). It provides the latest news, best practices, practical advice, information, and strategic guidance to help BC local governments successfully reduce greenhouse gas emissions and, at the same time, strengthen their communities. A living site, the BC Climate Action Toolkit will grow and change with users' needs and feedback. The toolkit's goal is to inspire action in BC's diverse local governments to rapidly advance deep emission reductions in corporate operations and community-wide activity by drawing upon a wealth of relevant, topical resources available to local BC governments.

The toolkit is available at: www.toolkit.bc.ca

COMMUNITY ENERGY & EMISSIONS PLANNING: A GUIDE FOR BC LOCAL GOVERNMENTS

As noted on the website, this planning guide was developed by the Community Energy Association, in partnership with the Province of BC, to support local government elected officials and staff as they undertake community energy and emission planning processes. The guide describes the purpose and content of a community energy and emissions plan, its benefits, and how to go about creating one. The guide includes practical tips, examples from BC communities, and links to more detailed information.

The guide is available at:
www.toolkit.bc.ca/sites/default/files/CEA_PlanningGuide_LR_v3.pdf

A GUIDE TO GREEN CHOICES: IDEAS & PRACTICAL ADVICE FOR LAND USE DECISIONS IN BC COMMUNITIES

As noted on the website, to help local governments continue the extensive work they have already done in fostering green communities, the Ministry of Community Development has developed *A Guide to Green Choices* to provide practical advice and ideas in making land use decisions. The Guide is expected to work in tandem with many other programs and projects already underway, including *Living Water Smart* and the *BC Climate Action Plan*. Many of the ideas proposed in the Guide are eligible for funding through various provincial government programs including: Towns for Tomorrow; LocalMotion; the LiveSmart Green Cities Awards; and, the Canada-UBCM Agreement on the Transfer of Federal Gas Tax Revenues. In addition to the funding programs, the Guide is also linked with the BC Climate Action Toolkit. The guide is structured around seven major issues that BC local governments face in their work to advise green land use decisions.

The guide is available at:
www.cd.gov.bc.ca/lgd/planning/greenchoices.htm

caee.ca

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