

# Strategies to Reduce Energy Use and Emissions from New Buildings in Delta

**For the Corporation of Delta**

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**Sustainable Energy Solutions**

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# 1. Introduction

In 2007, The Corporation of Delta was among the first of B.C. communities to adopt a comprehensive Climate Change Initiative. The Initiative set out a framework and clear commitments to mitigate the effects of climate change and adapt to potential climate variations. Delta's goal is to reduce emissions by 20% by 2015. While efforts will initially focus on civic operations, "getting one's own house in order" is the first step toward promoting action throughout the wider community.

Under the framework of the Climate Change Initiative, Delta has set out its broad intentions with regard to promoting sustainable development. Specifically the Municipality will *"identify ways to reduce greenhouse gas emissions from new development while ensuring other objectives continue to be met such as liveability and affordability in residential areas, business viability and community integration in commercial and mixed use areas, and employment and efficient movement of goods in industrial areas."*

This report aims to identify strategies that Delta can take to reduce energy consumption and associated greenhouse gas (GHG) emissions from new building developments, in accordance with the goal statement above.

Specific attention is given to key strategies that could amend or influence the application of bylaws within Delta, though other strategies are also included where it seemed appropriate.

## 1.1. Structure of the report

The report is structured as follows:

**Chapter 2: Current practices in Delta** – this chapter outlines current bylaws and strategies in Delta and identifies areas that will support and encourage less energy-intensive building development and potential barriers to implementation of more sustainable policies.

**Chapter 3: Tools and best practices** – this chapter highlights key leading edge strategies that are being implemented in other communities in BC.

**Chapter 4: Recommendations** – this chapter highlights the key recommended actions.

**Appendix A: New legal context** – this appendix highlights the additional jurisdiction granted by Bills 10 and 27. This information is also covered in Chapter 3, but is summarized here for ease of reference.

## 2. Current Practices in Delta

The following section documents the review of some of Delta's existing policies, bylaws and initiatives that are most relevant for this project. The documents considered are:

- Official Community Plan
- Zoning Bylaw
- Subdivision and Development Standards Bylaw
- Building and Plumbing Bylaw
- Climate Change Initiative

For each key document, we highlight elements that could help support initiatives to reduce greenhouse gas (GHG) emissions in new buildings, and those elements that are potential barriers. We also offer some recommendations for policy and by-law changes that Delta could consider.

### 1.2. Official Community Plan (OCP)

Delta's Official Community Plan contains several objectives that directly support strategies that could be enacted to reduce energy use and greenhouse gas emissions. Delta will be able to site these OCP policies as support for enacting initiatives in this report. A review of the Ladner Area Plan is also included in this section as it was recently updated.

#### 1.2.1. Supportive elements

Delta's OCP policies that directly support reductions in energy use and GHG emissions include:

##### **Housing and Sustainable Development**

- 2.1.17 Support medium density housing near transportation, jobs, and amenities to promote "complete communities."
- 2.1.18 Promote housing and site design that contains sustainability features, improves energy efficiency, and contributes to the enhancement of neighbourhoods

##### **Energy and Water Consumption**

- 2.4.36 Encourage architects and developers to design and construct energy and water efficient buildings.
- 2.4.37 Encourage efficient transportation modes and settlement patterns to minimize number/length of vehicle trips.

These above policies all stand out as showing that the community of Delta supports initiatives to reduce energy consumption and greenhouse gas emissions through changes to the built environment. The policies support initiatives focused at either neighbourhood development areas or the building site. Having these policies in the OCP is a very helpful indication of community support when considering the leadership opportunities in Chapter 3 such as reducing development cost charges and mandating increased energy performance standards in the building code to encourage greater energy efficiency in buildings.

These OCP policies also support designating new areas in Delta or developing new designations to include more medium/high density areas.

### **Land Use and Built Environment**

- 2.4.41 Continue to include environmental implications as part of the review of development applications and other land use decisions (e.g. changes to zoning).
- 2.4.42 Require development applicants to complete a “sustainability checklist” identifying sustainable planning, site design, and building and servicing measures that are to be included in a proposed project.
- 2.4.43 Continue to implement Policies which concentrate growth, contain urban sprawl, encourage transportation choice, minimize impervious area and locate residential use in proximity to services and transit.
- 2.4.44 Promote awareness of sustainable development through a recognition program, events or other activities.

The Land Use and Built Environment policies can also be referenced as support for the strategies to reduce GHG emissions and to ensure that new initiatives continue to align with the OCP policies. Implementation of several policies are currently being developed at Delta, such as the use of a sustainability checklist to record and evaluate implications of new projects.

### **Trees**

- 2.4.16 Investigate options to protect mature trees, heritage trees and urban forests.
- 2.4.17 Enhance regulations to minimize loss of trees prior to and during development, and ensure replacement with an emphasis on native species.
- 2.4.19 Develop and implement an Urban Forest Management Strategy to consolidate policies regarding tree protection, outline standards for planting and maintenance of trees, address the health of the urban forest, and better integrate tree protection into community planning.
- 2.4.20 Provide information to developers and private landowners about the importance of maintaining healthy, mature trees

Mature trees have built up carbon storage and premature loss of trees can lead to release of emissions contributing to global warming. While accounting for the increase in emissions can be complicated, policies that avoid loss of trees in urban settings can help in climate protection.

### **Existing Development Permit Areas (DPA)**

Schedule E of the OCP shows that Delta has nineteen areas that have been given a designated as Development Permit Areas. As described further in section 3, the BC government has recently granted authority to local governments to use DPAs to establish objectives to promote energy conservation and reduction of greenhouse gas emissions, however this authority is limited in scope (see 3.2.2). Since Delta has these existing DPAs and has experience using development permits under DPA designations, it has an excellent opportunity to begin enacting higher standards in these areas.

### **Ladner Area Plan**

*Policy D.1: Encourage infill housing to renew and upgrade neighbourhoods*

The most supportive element of the amendments to the Ladner Plan are the policies that encourage greater density. The community also appears to value this policy as a means to improve their neighbourhood. The housing guidelines help enable builders to proceed with

smaller infill housing, without the uncertainty or barriers that might have stalled builders in the past.

### 1.2.2. Potential Barriers

We found several potential barriers to more energy efficient development in the Official Community Plan:

#### Limited areas are designated for mixed use

The Future Land Use plan in the OCP shows mixed-use designation in a few areas in North Delta, Ladner, and Tsawwassen. Overall this designation remains a very small portion of total land-use.

In the recently updated Ladner Area Plan, there are very limited areas designated for mixed residential/commercial use. Even with revisions to encourage infill housing, the amendments maintain strong barriers to facilitating increased density. An example of a potentially restrictive policy is :

- Policy D.5: Retain single-family neighbourhoods
  - Retain single-family residential as the predominant housing form outside of the existing and proposed multiple-family areas.

This is a barrier to GHG reductions since mixed-use is a key element for local governments to reduce energy use. According to the recent study, *Energy Efficiency & Buildings – A Resource for BC’s Local Governments*:

“Dense, transit-oriented, mixed-use neighbourhoods are fertile grounds for alternative energy technologies, energy efficient buildings, and location efficient development that lessens automobile dependency.”<sup>1</sup> (Wilson and Zeeg. 2007)

#### Air Quality and Climate Change policies

Delta’s OCP was revised in 2005, prior to Council’s adoption of the Climate Change Initiative. While the OCP currently contains some broad policy statements that address air quality and climate change (listed below), it would be appropriate to reference the Climate Change Initiative and goals within the OCP and to adopt some of the specific elements as policy. The policies in this section of the OCP are:

- 2.4.27 Work with the GVRD and others to mitigate air quality impacts and reduce emissions from sources such as trucks/automobiles, marine vessels, agriculture and other sources.
- 2.4.28 Emphasize for residents, business and industry local actions to maintain and improve air quality (e.g. restrict outdoor burning, encourage lower emission fuel choices and transportation modes) and ensure the municipality leads by example.
- 2.4.29 Participate in senior government programs and initiatives that address climate change impacts and that help municipalities plan for local-scale impacts of climate change.

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<sup>1</sup> Michael Wilson and Taylor Zeeg. 2007. *Energy Efficiency & Buildings A Resource for BC’s Local Governments*. Community Action on Energy and Emissions. [http://www.communityenergy.bc.ca/sites/default/files/Policy\\_Manual\\_final.pdf](http://www.communityenergy.bc.ca/sites/default/files/Policy_Manual_final.pdf)



None of these policies consider the climate change mitigation potential from homes and buildings. There is an excellent opportunity to review and revise these policies, particularly in light of the Delta's recent elevation of its climate change priority (as indicated in the Climate Change Initiative, see below).

### 1.2.3. Recommendations

In order to address the barriers identified in this section, Delta may wish to consider the following options:

- ❖ Embark on a comprehensive study of the energy and GHG impacts of alternative future land-use development patterns.<sup>2</sup> The results of this study could then be used as a basis for making changes to the land-use designations and policies in Delta's OCP.
- ❖ Update the Climate Change policies in the OCP to better reflect the city's desire to take leadership on climate change actions, as noted in Delta's Climate Change Initiative.
- ❖ Move quickly to implement a sustainability checklist and recognition programs for building and development projects that meet high sustainable development standards.
- ❖ Add requirements for higher energy conservation and greenhouse gas reductions for areas in Development Permit Area designations.
- ❖ Develop financial or other incentives to provide strong motivation for developers and owners to meet these high standards (see Section 3 for examples of incentives)
- ❖ Consider the availability, location and required densities for implementing renewable energy systems. This information could be used to make changes to land use designations and policies in Delta's OCP.
- ❖ Undertake research to help explore the opposition that some community members may have to increased density and mixed-use development. To the extent that the opposition results from lack of knowledge or misunderstanding, develop education outreach on the benefits of this type of development.<sup>3</sup>

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<sup>2</sup> See for example a recent report completed for Salt Spring Island. *The GHG Implications of Different Settlement Patterns on Saltspring Island*. Sustainability Solutions Group and Holland Barrs Planning Group, 2007. <http://www.islandstrust.bc.ca/lrc/ss/pdf/ssocpreviewfinalrptssighgstudyjul2007.pdf>

<sup>3</sup> Communities such as Squamish, Oliver and Maple Ridge have undertaken Smart Growth on the Ground initiatives and would provide excellent examples of alternative development opportunities. "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." (Wilson and Zeeg 2007, see footnote 1).

## 1.3. Zoning Bylaw

### 1.3.1. Supportive elements

Delta's Zoning Bylaw is currently being reviewed and revised by Delta's staff. This revision process could help support initiatives to reduce GHG emissions by providing the opportunity to directly modify some components. If the strategies that Delta chooses to implement require modifications to the Zoning Bylaw, the timing of the current revisions is advantageous. Relatively simple modifications can occur as part of the current revision process. More complex modifications will require more extensive community input.

One of the key goals of the revision process is to increase the user-friendliness of the document. That goal will help support any future interpretation and implementation of all strategies, including those to reduce GHG emissions.

Supportive elements of the Zoning Bylaw are outlined below.

#### **Home Occupations**

Delta's Zoning Bylaw (s.603) allows for home occupations in single family and multiple family residential zones. By allowing home occupations in these zones, Delta is encouraging opportunities for residents to provide services within their communities and avoid the need to commute to work.

#### **Impermeable Area**

Section 607.6 of the Zoning Bylaw requires that for single family zones and duplex zones a maximum of 60% of the lot can be covered by impermeable material. Impermeable area leads to large volumes of storm water being diverted to sewer systems. By ensuring a maximum impermeable area, Delta is working towards minimizing the energy and infrastructure needed to process storm run-off.

#### **Landscaping**

For single family and duplex zones, a minimum of 50% of the front yard must be landscaped (s. 607.7) and for industrial zones, a minimum of 5% of the developed site must be landscaped (s. 805). Landscaping can be used to minimize direct sunlight, thereby reducing the energy requirements of buildings. Landscaping is also an opportunity to plant vegetation that requires little watering, thereby reducing energy and water use.

#### **Parking**

Section 901.5(d) states that small car spaces may be provided if the required parking spaces exceed 30 spaces. If this condition is met 25% of the total required parking may be small car spaces.

### 1.3.2. Potential Barriers

Seven components of the current Zoning Bylaw have been identified as potential barriers to strategies to reduce energy consumption and GHGs. Each of these components is described below.

## Definition of Floor Space Ratio (FSR)

The floor space ratio in the Zoning Bylaw is defined as

“Floor Space Ratio: Means the total area of all floors of all storeys, of all buildings on the site, measured to the exterior faces of the buildings, divided by the total site area.” Part II Interpretations, page 12.

This definition is a barrier to building homes with increased wall thickness, which is one method for increasing energy efficiency and reducing emissions. It could also be a barrier to building homes with renewable energy systems; some of these systems have components that are installed inside and could decrease the amount of living space. Virginia’s Arlington County grants developers an increase of up to 0.25 floor space ratio for buildings designed to LEED standards.<sup>4</sup> While this incentive is intended to serve as a density bonus to developers rather than an exclusion of green building equipment from FSR calculations, it is an example of how FSR can be used to facilitate green development.

To mitigate this barrier, Delta could revise its floor space ratio definition to address this barrier or provide exclusions to the floor space ratio requirements for buildings with attributes that are designed to save energy. FSR calculations could exempt floor area consumed by renewable energy equipment or other green building features. The goal of the bylaw revision would be to allow homes with these attributes to develop the same amount of allowable indoor space as conventionally built homes. It should be noted that some challenges could arise with the application of new guidelines and thought will need to be given to ensure fair application.

## Parking space requirements

The Zoning Bylaw sets out the following requirements for parking in single family dwellings - 2 spaces per dwelling unit plus 1 space per boarder. This requirement is high compared to the City of Surrey, City of Vancouver and City of Burnaby requirements for similar uses, which require 1 space per unit.<sup>5</sup> Having lower parking space requirements can reduce the area dedicated to parking and can facilitate higher densities and encourage use of alternative forms of transportation which in turn can reduce the number of cars per house. It should be noted that section 901.5(d) of the zoning bylaw currently allows for 25% small car spaces if the total required parking is 30 spaces or more.

Commercial parking requirements in Delta do not list any maximum limit for parking spaces. Vancouver has developed maximum parking requirements for downtown office buildings. Seattle, Washington has a maximum limit of one parking space per 1,000 square feet of office space in the downtown area.<sup>6</sup> By comparison, Delta requires a minimum of 1 space for each 37 square meters of gross floor area for offices regardless of their location, or about one parking space per 400 square feet. This is a minimum of 1 space per 400 square feet of office space in Delta, compared to a maximum of 1 space per 1,000 square feet in Seattle. Belmont, Massachusetts, has set out maximum parking designations with no minimum parking

<sup>4</sup> <http://www.arlingtonvirginiausa.com/index.cfm/5637>

<sup>5</sup> <http://www.city.vancouver.bc.ca/commsvcs/bylaws/parking/Sec04.pdf>  
<http://burnaby.ihostez.com/contentengine/launch.asp?ID=303>

<sup>6</sup> <http://www.smartgrowth.state.md.us/pdf/Final%20Parking%20Paper.pdf>

requirements for select areas of the city.<sup>7</sup> Maximum parking designations and relaxed minimum parking requirements (where appropriate alternative transportation options exist) can help discourage automobile use and provide additional incentive for use of alternative modes of transportation.

It is recognized that due to the cost of parking, developments are often built to the minimum parking standards. A review of minimum parking standards could look at specific uses that may have less parking demands in addition to reductions in specific areas such as core commercial areas.

Additionally, some commercial parking requirements may pose additional barriers to the use of sustainable transportation. Section 901.1(c) of the Zoning Bylaw states that “where a building or structure or lot accommodates more than one use, the total parking space requirement for such building, structure or lot shall be the sum of the requirements for each separate use.” This could lead to unnecessary additional parking that may encourage automobile use over alternative modes of transportation. If mixed-use buildings do not support uses that are concurrent, summing parking requirements may result in an overabundance of parking, encouraging automobile travel.

### **Densities that would support district energy systems**

Delta is currently considering investigating opportunities for District Energy in the municipal precinct. Should Delta wish to consider District Energy amendments to the Zoning Bylaw may be required.

An example of Delta’s zoning that allows higher density, is multiple family (Townhouse 40) residential, that has the following density limit.

“Density: The density of any "Townhouse" shall not exceed 40 dwelling units per Net Hectare.”

This density limit could limit the cost-effectiveness of district energy systems.<sup>8</sup> Delta should consider allowing exclusions on the maximum number of unit requirements for developments that install district energy systems. The Canadian District Energy Association notes that “the economic viability of district energy systems relates closely to the energy density of the thermal customers being served.”<sup>9</sup> Depending on heat loads of dwellings and other potential heat loads available for a district energy system, such density may not be adequate to make such a system financially viable. For example, in the U.K., 44 dwelling units per hectare is generally accepted as the minimum for viable district energy systems.<sup>10</sup> Although requirements will undoubtedly vary depending on the specific circumstances of each potential project, the current maximum density allowed in Delta may not be sufficient to encourage the use of district energy.

<sup>7</sup> [http://transtoolkit.mapc.org/Parking/Examples/Belmont\\_Maximums.htm](http://transtoolkit.mapc.org/Parking/Examples/Belmont_Maximums.htm)

<sup>8</sup> The minimum density needed for district energy will depend on energy supply options, evolving costs of equipment and other aspects. The report for Salt Spring Island (see footnote 2) notes that “Email correspondence with Natural Resources Canada indicates that a biomass CHP would be feasible at a minimum density of 55 units per hectare.” The main objective of this exclusion is to ensure that the density minimums in Delta do not impose barriers to innovative developments that would decrease energy consumption.

<sup>9</sup> <http://www.cdea.ca>

<sup>10</sup> Lowe, Marcia. “Shaping Cities: The Environmental and Human Dimensions.” Worldwatch Paper 105. Worldwatch Institute. Washington, DC (1991) as cited in Roseland, Mark. *Toward Sustainable Communities*, Third Edition. New Society Publishers. Gabriola Island, BC (1998).

## Minimum size for dwelling units

Delta's apartment zoning sets the following minimum size for apartments:

"Bachelor Unit"	41 square metres
One bedroom unit	51 square metres
Two bedroom unit	5 square metres
Three or more bedroom unit	78 square metres
"Sleeping Unit, Senior Citizen"	27.5 square metres
"Dwelling Unit, Senior Citizen"	37 square metres

These values could limit density increases that might be considered for some development. The City of Victoria has two mixed-use zones that allow for residences as small as 33 square metres. Victoria is hoping to encourage small-scale mixed-use development in neighborhood commercial zones outside of downtown through zones and other initiatives.<sup>11</sup>

Delta could review its recent development applications and other information to analyze whether allowing smaller minimum sizes for developments could be used to encourage density.

## Increased support for Alternative Housing types

Housing types, such as in-fill housing, secondary suites, coach housing, and flex housing, can be used in a municipality to save energy by providing housing options for community members looking for smaller, more affordable units, often within walking or public transit distance of services. Delta already supports coach housing in its RS9 Infill Residential zone on lots of 330m<sup>2</sup> or greater and also supports smaller lots of 335m<sup>2</sup> and 390m<sup>2</sup> in its RS7 and RS8 zones respectively. The uptake of alternative housing types could be increased by amending zoning to permit smaller lot sizes and allowing alternative housing types as permitted uses. Support for alternative housing such as flex housing or different types of infill housing (i.e. smaller lots) could be implemented through policies in the OCP and then linked to zoning. Delta has a Housing Task Force that is currently looking at initiatives and options for housing types and locations for increased density in order to improve access to housing affordability. The recommendations from the Housing Task Force would help inform potential housing types, densities and locations for alternative housing.

## Lack of specific guidance regarding treatment of distributed energy systems

The Zoning Bylaw currently lacks specific language regarding distributed energy (DE) systems. Difficulties in assessment, permitting and approval of DE systems may arise if specific provisions for these systems are not outlined in the Zoning Bylaw.

Although Delta's Official Community Plan contains language supporting of DE, the Zoning Bylaw may preclude residentially zoned properties from generating electricity. If British

<sup>11</sup> [Commercial Residential Apartment District](#)

City of Victoria Zoning Bylaw No. 80-159 (consolidated to) Part 4.14

[Commercial Residential Apartment Modified](#)

City of Victoria Zoning Bylaw No. 80-159 (consolidated to) Part 4.15

Columbia were to adopt an advanced renewable tariff (a “feed law”) such as the Standard Offer Program in Ontario, the interpretation of “power generation” in the Zoning Bylaw might prevent distributed generating systems in residential areas, such as photovoltaic panels, from connecting to the electricity distribution system. The bylaw describes power generation broadly as “[t]he use of land, buildings or structures for the generation of electricity or other forms of power for distribution to users not on the property.”

In Ontario, the City of Toronto has dealt with similar zoning-related barriers to DE systems by creating a sweeping amendment to the city’s zoning bylaw. The bylaw permits “energy production and distribution using renewable energy devices and co-generation devices on every property, subject to the zone regulations.”<sup>12</sup> It also outlines setback requirements, permitted placement of renewable energy systems, etc.

### **Solar Hot Water**

The Zoning Bylaw may create a barrier to the installation of solar photovoltaic or hot water systems. Section 306 of the Delta zoning bylaw requires that “no part of a building or structure shall be higher than or extend outside the ‘Vertical Building Envelope.’” Although section 306A describes some exemptions to this rule, such as arials and spires, it is not clear whether this exemption would apply to other rooftop mechanical structures such as solar energy systems. Guidance on the interpretation of the bylaw – as was carried out by the City of Toronto with regards to City of Toronto Bylaw 438-86 relating to rooftop mechanical structures – may be sufficient to address this barrier. Explicit inclusion of solar domestic hot water systems in section 306A of the Delta Zoning Bylaw could address this issue.

### **1.3.3. Recommendations**

In order to address the barriers identified in this section, Delta may wish to consider the following options:

- ❖ Amend zones to permit alternative housing types and single family residential on smaller lots.
- ❖ Change definition of floor space ratio to ensure that the implementation of increased energy efficiency and renewable energy systems does not decrease the allowed amount of habitable space.
- ❖ Decrease the requirements for parking spaces.
- ❖ Consider means to ensure that density limits do not impose barriers on district energy systems or other innovate means to reduce energy consumption.
- ❖ Evaluate whether minimum housing and unit sizes are a limit to density or other energy efficiency improvements. If these are a barrier, decrease the minimum sizes or drop this requirement entirely.
- ❖ Explicit inclusion of solar domestic hot water systems in section 306A of the Delta Zoning Bylaw.

<sup>12</sup> City of Toronto. 2008. Renewable Energy Generation and Distribution. [http://www.toronto.ca/building/pdf/renewable\\_energy\\_flyer.pdf](http://www.toronto.ca/building/pdf/renewable_energy_flyer.pdf)

## 1.4. Building/Plumbing Bylaw

Delta's Building/Plumbing Bylaw will likely need to be adapted, depending on which strategies are pursued from Chapter 3. Strategies that might require changes to the Building/Plumbing Bylaw include energy efficiency requirements for new buildings and renewable-readiness mandates for new buildings. Outlined here are recommendations to change specific stand-alone elements.

### Solar Hot Water

Currently, the process for approval of a solar hot water system is unclear and needs to be clarified. The current Building/Plumbing Bylaw, No. 6060, appears to include the installation of solar hot water systems within its definition of construction ("including, without limitation, plumbing systems.") Per the bylaw, a plumbing permit is required for those wishing to install a solar domestic hot water system. Depending on whether a plumbing system would be interpreted as a *structure* under the Building/Plumbing Bylaw, installation of a solar domestic hot water system might also require a building permit. If this were the case, a title search along with site plans prepared by a BC Land Surveyor or Professional Engineer would be required, significantly increasing application costs. If only a plumbing permit is required under the interpretation of the bylaw, the permit fee would most likely be \$50.00 as proscribed for hot water heating systems in Schedule A of the bylaw. Requirements for a boiler diagram and heat loss calculation during the application for a plumbing permit related to hot water heating indicates that the existing plumbing permit application may not be adequate to assess solar domestic hot water systems.

Delta has regulations in the Building/Plumbing Bylaw that allow a building official to request that a registered professional provide design and plan certification if deemed necessary. This provision should be exercised if there are uncertainties regarding solar hot water systems. Approval by a Professional Engineer may provide an opportunity for project proponents to provide reassurance to city inspectors where they may be reluctant or unable to evaluate innovative or unfamiliar solar hot water technologies and system designs. It is important that this provision of an engineer's stamp not be mandatory; requiring an engineer's stamp may create an additional barrier to solar domestic hot water systems. In the long term, a goal could be to amend the Building/Plumbing Bylaw to clarify how non-traditional systems can be permitted.

#### 1.4.1. Recommendations

- ❖ Accept domestic solar hot water systems that have been approved by a Professional Engineer. In the long term amend the Building/Plumbing Bylaw to specify how non-traditional systems can be permitted.

## 1.5. Subdivision and Development Bylaw

Delta's Subdivision and Development Bylaw will likely need to be adapted, depending on which strategies are pursued from Chapter 3. Outlined here are recommendations to change specific stand-alone elements.

### Lighting

Schedule A, Section 10 of the bylaw provides an opportunity for energy conservation. While there is a note in the bylaw that luminaries greater than 150W H.P.S. shall not be used without prior approval of the Director of Engineering, more specific guidelines on efficiency for lighting options might result in improved street lighting efficiency. The New York State Energy Research Development Authority has carried out research on effective energy efficient streetlighting.<sup>13</sup>

### 1.5.1. Recommendations

- ❖ Include more specific guidelines on lighting efficiency in the bylaw.

## 1.6. Delta's Climate Change Initiative

The Corporation of Delta has developed a unique and progressive Climate Change Initiative (CCI) that has two main goals:

- To reduce greenhouse gas emissions from municipal buildings, fleet vehicles and operations.
- To adapt municipal infrastructure and emergency plans to ensure our community is well prepared for and protected against climate change impacts.<sup>14</sup>

While the CCI primarily outlines GHG reduction targets and actions relating to the Municipality's corporate operations, review of the document was included in the scope of this report as the CCI has a high potential to influence the degree to which new development contributes to achieving greenhouse gas emission reductions. Further, the experience gained by Delta in improving its own operations will be useful in understanding: 1) energy efficiency technologies and practices; and 2) how to design effective strategies with clear objectives and ability to measure progress.

The CCI comprises nine individual plans, including the Building Efficiency Plan and the Sustainable Development Management Plan. These two plans are the focus of the comments below.

### 1.6.1. Supportive elements

#### Clear GHG reduction goals

The Building Efficiency Plan includes the following statement "Delta has set a goal to achieve a 20% overall reduction of GHG emissions by 2015. It is expected that the GHG emissions from civic buildings can achieve a higher percentage. Delta is aiming to reduce its buildings emissions by 30% before 2015 (from 5887 tonnes to 4121 tonnes of CO<sub>2</sub>e before 2015)."

#### Relevant Actions

<sup>13</sup> <http://www.rpi.edu/dept/lrc/nystreet/how-to-officials.pdf>

<sup>14</sup> [http://www.corp.delta.bc.ca/EN/main/residents/771/50845/what\\_delta\\_is\\_doing.html](http://www.corp.delta.bc.ca/EN/main/residents/771/50845/what_delta_is_doing.html)



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The Building Efficiency Plan has three actions: hire an energy efficiency consultant, retrofit existing buildings, consider implementation of Green Building accreditation. Experience gained from these actions will be useful for considering actions in the private sector.

### **Identification of Resources Needed and Potential Source of Funding**

Both the Building Efficiency Plan and the Sustainable Development Management Plan include financial implications and potential funding sources. Identifying these needs and potentials, as the strategies are developed, will be important for future success.

### **1.6.2. Potential Barriers**

Delta has been a leader in climate change mitigation and adaptation strategies. Its Climate Change Initiative is relatively new, and will be refined over time. Additionally, a next step in the broader Initiative is to develop a set of plans for community-wide climate change issues to complement the corporate strategies. With this in mind, several recommendations are made with regard to CCI implementation.

### **1.6.3. Recommendations**

- ❖ *Communication of numeric goals* – Each plan under the CCI framework should ideally have clear emission reduction goals. Currently, the Building Efficiency Plan contains a reduction goal but the Sustainable Development Management Plan does not. Since the 20% overall reduction by 2015 covers all of Delta’s corporate activities, the goals should be repeated throughout. The inclusion of numeric goals will allow for future evaluation of progress. Numeric goals, and progress to achieving them, should also be more clearly profiled on Delta’s website.
- ❖ *Lack of timeline for next steps and evaluation plans* – While the plans provide succinct summaries of actions in 2008, there should be a direct source for obtaining updates on implementation. The website could be used more effectively to update the community on progress. It is necessary for Delta to be considering climate change strategies as part of a long term approach to management. Therefore integrating evaluation processes into the plans is also recommended. A minor improvement would be to include publication dates on the plans.

# 3. Tools and Best Practices

Several communities in BC have been active in reducing the energy use from new buildings. This section describes the strategies that have been or will be adopted by leaders in BC. The selected strategies are mostly those that are legal tools available to Delta to implement.

## 1.7. Tools and Best Practices

### 1.7.1. Development Cost Charges (DCCs)

Under the *Local Government Act*, section 933, local governments have the authority to levy development cost charges to cover the costs of delivering infrastructure and services (water, sewer, storm drainage, roads and parkland) to new developments. Recent amendments to the *Local Government Act* under the *Local Government (Green Communities) Statutes Amendment Act, 2008* (Bill 27) have granted the authority to local governments to waive DCCs for the following purposes:

- (a) not-for-profit rental housing, including supportive living housing;
- (b) for-profit affordable rental housing;
- (c) a subdivision of small lots that is designed to result in low greenhouse gas emissions;
- (d) a development that is designed to result in a low environmental impact.<sup>15</sup>

Bill 27 also stipulates that subject to the enactment of a bylaw, DCCs may not be levied on residential units less than 27 square metres (312 square feet).<sup>16</sup>

When using this exemption, it is important that the local government consider the reduction in costs associated with less energy and water intensive building, increased density and proximity to existing infrastructure. In effect, many “green” developments will actually cost the local government less in terms of services provided, therefore making DCC reductions or exemptions potentially revenue neutral. Reduced need for local water delivery and wastewater treatment services can decrease infrastructure costs if considered in the initial phase of development.<sup>17</sup> Further savings can be realized through high performance buildings in infrastructure avoidance (ie. lower water consumption allowing deferral of upgrades to capacity of water source treatment facilities).<sup>18</sup> A report by Coriolis Consulting for West Coast Environmental Law reviewing DCCs in BC notes that savings could “easily be in excess of \$5,000 per residential unit in many

<sup>15</sup> *Local Government Act*, s.933 [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_28.htm#section933](http://www.qp.gov.bc.ca/statreg/stat/1/96323_28.htm#section933)

<sup>16</sup> *Local Government (Green Communities) Statutes Amendment Act, 2008*, s.25 [http://www.leg.bc.ca/38th4th/1st\\_read/gov27-1.htm](http://www.leg.bc.ca/38th4th/1st_read/gov27-1.htm)

<sup>17</sup> <http://www.usgbc.org/Docs/News/News477.pdf>

<sup>18</sup> [http://www.wcel.org/wcelpub/2003/14083\\_summary.pdf](http://www.wcel.org/wcelpub/2003/14083_summary.pdf)

communities.”<sup>19</sup> One report compiled for Delaware’s Office of State Planning Coordination surveyed 19 studies on the relationship between development type and infrastructure costs.<sup>20</sup> On average, the studies found a 26.8% savings in sewer costs when compact development was pursued over business-as-usual. The average savings for water infrastructure was 25.3%, and a 32.6% average savings was realized for road costs (maintenance and new construction) in a compact development pattern.

The City of Kelowna’s DCC regime provides an example of how DCCs can encourage more compact patterns of development.<sup>21</sup> The DCCs distinguish between different areas of the city for various charges, and charges also vary by density. West Coast Environmental Law notes that the charges for a 1.4 FSR apartment project comprised of 1,000 square foot units would be \$7,605 per unit in the City Centre, while charges would total \$13,097 per unit in the South Mission area.<sup>22</sup> Some costs, such as commercial drainage charges, are tied directly to density (site area).

The Growth Management section of Kelowna’s Official Community Plan states that the City of Kelowna will “[e]nsure the Development Cost Charge (DCC) system accurately reflects major off-site costs of development projects and the demand placed on the infrastructure by different types, sizes, and locations of residential units.”<sup>23</sup>

To date, only one municipality has chosen to exercise this new authority in relation to high performance buildings, and only for a particular development: the City of Victoria has exempted Dockside Green from DCCs for sewage treatment and disposal, as the project has an on-site wastewater treatment plant.<sup>24</sup> Municipalities in BC have reduced or waived DCCs for other reasons. In 2007, as part of an urban revitalization effort and exercising DCC authority available prior to Bill 27, Surrey offered DCC reductions of up to 60% for multi-family properties in North Surrey’s city centre.<sup>25</sup>

Further information on the jurisdiction of local governments to use DCCs to encourage green development, and the treatment of DCCs in the *Local Government Act*, can be found in The Green Buildings Guide, a report by West Coast Environmental Law.<sup>26</sup>

<sup>19</sup> <http://www.wcel.org/wcelpub/2003/14083.pdf>

<sup>20</sup> [http://www.ipa.udel.edu/alumni/04/mix/Benefits\\_of\\_Compact\\_Develop.pdf](http://www.ipa.udel.edu/alumni/04/mix/Benefits_of_Compact_Develop.pdf)

<sup>21</sup> <http://www.kelowna.ca/CM/Page1329.aspx>

<sup>22</sup> <http://www.wcel.org/issues/urban/sbg/Part7/dcc/Kelowna.htm>

<sup>23</sup> City of Kelowna. 2006. *Kelowna 2020 – Official Community Plan*, S5.1

<sup>24</sup> <http://www.wcel.org/wcelpub/2006/14252.pdf>

<sup>25</sup> <http://www.canada.com/theprovince/news/money/story.html?id=9a12b1de-6097-41d4-aa7e-f06a2629df72>

<sup>26</sup> <http://www.wcel.org/wcelpub/2006/14252.pdf>

*Implications for Delta*

Potential energy savings	<ul style="list-style-type: none"> <li>• High: Depends on level of low impact construction required to achieve DCC reductions</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>• The average savings for water infrastructure can be up to 25.3%, and a 32.6% average savings can be realized for road costs (maintenance and new construction) in a compact development pattern</li> </ul>
Timing	<ul style="list-style-type: none"> <li>• Long term - would require additional research and analysis</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Amendment to the DCC bylaw to include categories of development that provide low environmental impact and associated DCC reductions</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>• Could be a significant financial incentive for developers</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• Few municipalities have implemented DCC reductions for low environmental impact development.</li> <li>• Certification of low environmental impact construction through recognized programs (ex. LEED) typically is complete post occupancy. DCC's are paid before subdivision or at the building permit stage</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• Eligible developments will need to demonstrate criteria for low environmental impact DCC reduction are met.</li> <li>• Municipality must prepare a yearly report on the amount of DCC's received, expenditures, reserve fund balances and any waivers or reductions. DCC reductions would need to be accounted for within this report</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Establish criteria to determine development with low environmental impact</li> <li>• Assess and quantify the reduction in costs of providing services to low environmental impact development for Delta</li> <li>• Establish categories for DCC reductions corresponding to varying levels of low environmental impact development</li> </ul>

### 1.7.2. Development Permit Area Guidelines

Under the *Local Government Act*, local governments have the authority to designate development permit areas (DPAs) in which developers must obtain development permits before subdividing land, or constructing or altering buildings or land. Previously, jurisdiction for this provision did not include measures for the reduction of energy, water or GHGs. The new *Local Government (Green Communities) Statutes Amendment Act, 2008*, amends the *Local Government Act*, s.919 to grant further authority to designate DPAs for the purposes of:

- Establishment of objectives to promote energy conservation;
- Establishment of objectives to promote water conservation;
- Establishment of objectives to promote the reduction of greenhouse gas emissions.<sup>27</sup>

However, the scope of this authority only extends to:

- Landscaping, including restrictions on the type and placement of trees and other vegetation in proximity to the buildings and other structures;
- Siting of buildings and other structures;
- Form and exterior design of buildings and other structures;
- Specific features in the development; and
- Machinery, equipment and systems external to buildings and other structures.<sup>28</sup>

The narrow scope of this authority makes attaining significant energy reductions through DPAs challenging. Some reductions could be found through solutions like the following:

- Building orientation to capture passive heating;
- Tree placement for shade;
- Xeriscaping for low water use.

A fact sheet from Colorado State University notes that optimizing landscaping to modify the climate around a dwelling can reduce heating bills by up to 25% and cooling bills by more than 50% in warm climates.<sup>29</sup> Shading air conditioners through landscaping can improve their efficiency by up to 10%.<sup>30</sup> Other research suggests that savings in cooling from shade trees alone can range from 25 to more than 80% in more extreme climates.<sup>31</sup> However, requiring shade trees in developments may also impact heating costs and reduce the feasibility of solar water heating systems due to reduced insolation. Some modeling for the California climate provides indications of best practices for energy-efficient landscaping features. Similar modeling could be undertaken for Delta's climate. Winter windbreaks are another landscaping feature that can also provide significant energy conservation opportunities. Properly placed evergreens can provide

<sup>27</sup> *Local Government Act, s.919* [http://www.qp.gov.bc.ca/statreg/stat/l/96323\\_28.htm#section919.1](http://www.qp.gov.bc.ca/statreg/stat/l/96323_28.htm#section919.1)

<sup>28</sup> Curran, Deb. 2008. Summary of New Climate Change Legislation that Effects Local Governments. University of Victoria Environmental Law Centre.

<sup>29</sup> <http://www.ext.colostate.edu/pubs/Garden/07225.html>

<sup>30</sup> [http://apps1.eere.energy.gov/consumer/your\\_home/landscaping/index.cfm/mytopic=11940](http://apps1.eere.energy.gov/consumer/your_home/landscaping/index.cfm/mytopic=11940)

<sup>31</sup> <http://joa.isa-arbor.com/request.asp?JournalID=1&ArticleID=2704&Type=2>

energy savings of up to 23% in the winter compared to exposed buildings, according to a research by the Texas Agricultural Extension Service.<sup>32</sup>

Further energy savings can be realized by specifying building orientation in DPAs. The U.S. Department of Energy estimates that passive solar building design can reduce heating requirements by as much as 50%,<sup>33</sup> although only a fraction of this is attributable to building orientation alone. In its green building builders, consumers and realtor primer, Building Environmental Science and Technology indicates that building orientation and window placement can reduce winter heating requirements by 20 to 35%, and can also reduce summer cooling load.<sup>34</sup>

Most examples of xeriscaping requirements or recommendations in BC occur in Official Community Plans, which may provide another avenue for encouraging specific landscaping practices. The City of Merritt's OCP includes a provision to encourage xeriscaping or the use of drought tolerant native plant species in landscaping.<sup>35</sup> Secondary plans or area plans may also provide guidance on land use and design principles. West Coast Environmental Law cites as an example of this, the City of Surrey's neighbourhood concept plans that incorporate the watershed's Integrated Stormwater Management Plan design guidelines.<sup>36</sup>

#### *Case Study: District of Saanich*

The District of Saanich is currently in the process of considering amendments its DPA guidelines to incorporate the new jurisdiction granted under Bill 27.

Contact: Russ Fuoco, fuocor@saanich.ca, 250-475-5472 or Sharon Vandansky 604-475-5494 x 3409

#### ***Implications for Delta***

Potential energy savings	<ul style="list-style-type: none"> <li>Moderate - the scope of authority for DPA's extends primarily to landscaping and building siting</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>Administrative</li> </ul>
Timing	<ul style="list-style-type: none"> <li>Medium term – would require amendments to development permit areas and guidelines (DPA's)</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>Amend existing DPA's and/or develop new DPA's in the Official Community Plan</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>Existing DPA's exist that include relevant guidelines and</li> </ul>

<sup>32</sup> <http://aggie-horticulture.tamu.edu/extension/homelandscape/energy/energy.html>

<sup>33</sup> [http://www.eere.energy.gov/buildings/highperformance/technologies.html#passive\\_solar](http://www.eere.energy.gov/buildings/highperformance/technologies.html#passive_solar)

<sup>34</sup> <http://www.energybuilder.com/greenbld.htm>

<sup>35</sup> <http://merritt.fileprosite.com/contentengine/launch.asp?ID=1>

<sup>36</sup> <http://www.wcel.org/wcelpub/2007/14255.pdf>

	<p>could be amended to include additional guidelines</p> <ul style="list-style-type: none"> <li>• Development permits areas are commonly used in Delta</li> <li>• Examples of DP guidelines related to landscaping and building siting for energy efficiency and water conservation are readily available</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• Additional processing time for DP applications.</li> <li>• Additional approvals and requirements for development in new DPA's</li> <li>• There are no existing DPA's for industrial areas in Delta and few for single family residential areas</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• New DPA's would increase the permit requirements for development</li> <li>• Extent of review for existing DP applications could increase</li> <li>• Additional information requirements for submissions</li> <li>• Staff training</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Identify appropriate landscaping and building orientation guidelines that achieve water and energy conservation and GHG reductions</li> <li>• Consider modeling to determine potential energy savings from different building orientation and landscaping options</li> </ul>

### 1.7.3. Revitalization tax exemption by law

Section 226 of the *Community Charter* grants the authority to local government to exempt property from municipal property value taxes for the purposes of revitalization.<sup>37</sup> Revitalization can include objectives aimed at increasing the environmental performance of buildings (such as a requirement for solar panel installation) in the area and the area specified for revitalization can range from a small area to the entire municipality.<sup>38</sup>

#### *Case study: Maple Ridge*

Maple Ridge has enacted a Revitalization Tax Exemption (RTE) program with two goals: to revitalize a specific section of its downtown core and to increase the development of LEED certified buildings. The RTE program has two levels of tax exemption to address the two goals of the program:

1. Higher density residential development has an exemption period of two years – year one is a 100% exemption and year two is a 50% exemption.

<sup>37</sup> British Columbia Community Charter [http://www.qp.gov.bc.ca/statreg/stat/c/03026\\_07.htm#section226](http://www.qp.gov.bc.ca/statreg/stat/c/03026_07.htm#section226)

<sup>38</sup> BC Ministry of Community Services. January 2008. Revitalization Tax Exemptions: A Primer on the Provisions in the Community Charter.

2. LEED certification of silver, gold or platinum has an exemption period of four years – year one 100%, year two 75%, year three 50% and year four 25%.

The tax exemption accrues to the owner of the building. During construction, the developer may therefore receive the tax break for any tax years in which they are the sole owner. However, once purchased, all tax exemptions do accrue to the owner. While the tax exemption can be used as a marketing tool by the developer, there is little direct financial benefit for the developer directly.

Initial decreases in tax revenues during the exemption years are anticipated to be recouped over time as a result of the higher residential densities. Maple Ridge currently has one project in this program.

For more information contact: [lbenson@mapleridge.ca](mailto:lbenson@mapleridge.ca), 604-466-4338

### *Implications for Delta*

Potential energy savings	<ul style="list-style-type: none"> <li>High – depends on level of energy efficiency required for tax exemption and uptake of program</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>Low – would result in lower tax collection rates, unless coupled with increased density</li> </ul>
Timing	<ul style="list-style-type: none"> <li>Medium term – would require developing and initiating a tax exemption program</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>Develop a revitalization tax exemption bylaw</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>Could be a significant financial incentive for developers</li> <li>The onus could be on the developer to show completion of energy efficient development to qualify for a tax exemption</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>Delta has no previous experience administering a tax exemption</li> <li>Would need to clearly define exemption criteria and set criteria such that exemptions are granted for exceptional projects</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>Council approvals would be required for tax exemption approval</li> <li>Applicant would have to provide proof that energy efficiency criteria have been met (e.g. LEED certification)</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>Identify area or types of properties eligible for tax exemption</li> <li>Establish criteria for tax exemption and value of tax exemption</li> </ul>



### 1.7.4. Service area bylaw

Under sections 8(2) and 210 of the *Community Charter*, local governments have the authority to provide any service that the Council considers necessary or desirable and charge local taxes to the impacted parcels to pay for the service.<sup>39</sup> Local governments can use this authority to establish green energy systems and require buildings in the service area to connect to the system.<sup>40</sup>

#### *Case Study: City of North Vancouver*

North Vancouver created a district heating service area in lower Lonsdale. Lonsdale Energy Corporation, a wholly owned subsidiary, was incorporated in 2003 to operate the system.

For more information contact Suzanne Smith: SSmith@cnv.org, 604-990-4240

Potential energy savings	<ul style="list-style-type: none"> <li>• High – depends upon service that is provided</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>• High – municipality would bare upfront capital costs</li> </ul>
Timing	<ul style="list-style-type: none"> <li>• Long term – significant research and analysis to develop a service area and initiate a program to administer the service</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Establish a service and develop a service area bylaw</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>• Opportunity for large scale implementation of the service</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• Significant research in establishing a service area</li> <li>• Significant capital investment to establish a service</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• Delta to administer the service.</li> <li>• Cost of service to be determined for users of the service</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Research and analyze appropriate service and area it would encompass</li> <li>• Assess environmental impacts and cost of providing the service</li> <li>• Assess willingness of individuals to be included within the service area</li> </ul>

<sup>39</sup> BC Community Charter [http://www.qp.gov.bc.ca/statreg/stat/c/03026\\_02.htm#section8](http://www.qp.gov.bc.ca/statreg/stat/c/03026_02.htm#section8)

<sup>40</sup> Fraser Basin Council and Community Energy Association, 2007. *Energy Efficiency in Buildings: A Resource for Local Governments*. <http://www.communityenergy.bc.ca/resources-introduction/energy-efficiency-buildings-a-resource-for-bcs-local-governments>

### 1.7.5. Green roofs

#### *Environmental Impacts of Green Roofs*

The main environmental benefits of green roofs come in the form of energy conservation from reduced heating and cooling loads, mitigation of the urban heat island effect, and stormwater retention. A green roof's environmental impact depends on the type of roof and its composition and insulating properties. A National Research Council of Canada (NRC) study found that a test green roof in Ottawa reduced 95% of heat gain and 26% of heat loss compared to a reference roof over a 22-month period.<sup>41</sup>

In another test project, the NRC, in partnership with British Columbia Institute of Technology, developed a test green roof in the City of Vancouver.<sup>42</sup> Over a 30-day period, the green roof retained 67% of the more than 100mm of rain that fell. Total heat flow through the green roofs over the 30 day test period was more than 70% below that of the reference roof.

Generally, benefits of green roofs tend to be more pronounced in reducing cooling loads during spring and summer months, although research indicates that heating loads are also generally reduced during colder months.

Green roofs can be and have been installed on most building types in Canada, including commercial, institutional, and both multi- and single family residential structures.<sup>43</sup> Research by BC landscape architect Goya Ngan notes that most green roof construction in Canada to date has been voluntary. Her research suggests that incentives for green roofs are an effective driver of green roof development. Incentives in Germany have helped to increase total green roof area from 0.6 million square meters in 1983 to more than 13.5 million in 2001.<sup>44</sup>

A number of regulatory options exist to require green roof construction. For a full description of each of these options, see *Regulatory Options for Promoting Green Roofs in British Columbia*.<sup>45</sup>

- Section 909 of the *Local Government Act* gives local governments the authority to regulate landscaping for the purpose of preserving, protecting, restoring and enhancing the natural environment.<sup>46</sup>
- Section 907 grants authority to local governments to require the disposal of storm water from paved and roof areas.<sup>47</sup>
- Development Permit Areas and Density Bonusing can also be used to encourage green roofs

<sup>41</sup> <http://irc.nrc-cnrc.gc.ca/pubs/fulltext/nrcc46412/nrcc46412.pdf>

<sup>42</sup> <http://irc.nrc-cnrc.gc.ca/pubs/fulltext/nrcc48203/nrcc48203.pdf>

<sup>43</sup> <http://commons.bcit.ca/greenroof/case.html>

<sup>44</sup> Ngan, Goya. 2004. *Green Roof Policies*. <http://www.gnla.ca/assets/Policy%20report.pdf>

<sup>45</sup> Buholzer, B. and R. Wark. 2006. *Regulatory Options for Promoting Green Roofs in British Columbia*

<sup>46</sup> *Local Government Act, s.909* [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_28.htm#section909](http://www.qp.gov.bc.ca/statreg/stat/1/96323_28.htm#section909)

<sup>47</sup> *Local Government Act, s.907* [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_28.htm#section907](http://www.qp.gov.bc.ca/statreg/stat/1/96323_28.htm#section907)

*Case Study: Port Coquitlam*

Port Coquitlam has enacted a green roof bylaw for buildings of 52,000 sq ft and over and a complimentary density bonusing policy for which green roofs qualify. To date only one building has been started that fell within the size requirements of this bylaw and it was granted a variance.

For more information contact: Kim Fowler, [fowlerk@portcoquitlam.ca](mailto:fowlerk@portcoquitlam.ca), 604-927-5432

*Case Study: City of Vancouver*

The City of Vancouver has set a target for 25% of buildings to be designed to carry plant life in the city's Southeast False Creek Policy Statement.<sup>48</sup>

For more information contact: Sean Pander, [sean\\_pander@city.vancouver.bc.ca](mailto:sean_pander@city.vancouver.bc.ca)

***Implications for Delta***

Potential energy savings	<ul style="list-style-type: none"> <li>High – depends on roof construction</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>Administrative</li> </ul>
Timing	<ul style="list-style-type: none"> <li>Short term – would require establishing requirements for green roofs</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>Amend the Delta Zoning Bylaw or incorporate guidelines that encourage green roofs in existing or new development permit area guidelines</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>Mandatory green roof construction would lead to more green roofs</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>Green roofs can be a significant financial investment</li> <li>On-going maintenance of green roofs would need to be monitored</li> <li>Insurance costs can be high</li> <li>May not be appropriate for all types of buildings</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>Green roofs to be reviewed as part of building permit application.</li> <li>Additional submission information may be required as part of building permit application (e.g. third party certification).</li> <li></li> </ul>
Next steps	<ul style="list-style-type: none"> <li>Determine criteria for requiring a green roof ex. size of building and land use</li> </ul>

<sup>48</sup> City of Vancouver. 2000. Southeast False Creek Policy Statement.  
<http://www.city.vancouver.bc.ca/commsvcs/southeast/policystatement/sefcpolicy1999.htm>

### 1.7.6. Density Bonusing

Section 904 of the *Local Government Act* provides authority to local governments to provide additional density to developers when certain conditions are met.<sup>49</sup> These conditions have been interpreted to include energy efficiency measures and green building design requirements, as in the example of North Vancouver below.<sup>50</sup> Density bonusing measures can be indicated in an OCP, but must eventually be specified in the Zoning Bylaw.

#### *Case Study: City of North Vancouver*

North Vancouver has included the option to provide bonus density for high efficiency/green building designs in its OCP. North Vancouver's OCP reads as follows:

“As an incentive to achieve public benefits or amenities, City Council may consider providing density bonuses, density transfers or gross floor area exclusions. Such incentives may only be approved through a Zoning Amendment process with a Public Hearing. Density transfers require a registered covenant on all affected properties confirming that the transfer has occurred. The following additional density factors may be considered:

#### 5.12.5 Environmental Considerations

For the enhancement of the environment through natural habitat enhancement/preservation or high efficiency (“green”) building designs, Council may consider a density bonus, floor area exclusion or density transfer.”<sup>51</sup>

For more information contact: Suzanne Smith, SSmith@cnv.org, 604-990-4240

#### *Implications for Delta*

Potential energy savings	<ul style="list-style-type: none"> <li>High – depends on level of energy efficiency required for density bonus and demand for density</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>Administrative</li> </ul>
Timing	<ul style="list-style-type: none"> <li>Medium term – would require establishing policy in the Official Community Plan and regulations in the Delta Zoning Bylaw for density bonusing for energy efficient construction</li> </ul>

<sup>49</sup> *Local Government Act*, [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_28.htm#section904](http://www.qp.gov.bc.ca/statreg/stat/1/96323_28.htm#section904)

<sup>50</sup> West Coast Environmental Law. Smart Bylaws Guide. <http://www.wcel.org/issues/urban/sbg/Part3/compact/densitybonus/>

<sup>51</sup> North Vancouver Official Community Plan Bylaw, 2002, No.7425

Mechanism	<ul style="list-style-type: none"> <li>Amend the Official Community Plan and Delta Zoning Bylaw</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>Could be a significant financial incentive for developers</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>May be difficult to ensure all energy efficient features are implemented after construction</li> <li>Increasing density would need to be sensitive to the surrounding community context</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>Applicants would have to indicate how conditions for density bonus will be met</li> <li>Density bonus to be reviewed with development application</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>Establish criteria for development eligible for density bonus</li> <li>Establish appropriate density bonus</li> </ul>

### 1.7.7. Local Improvement Charges (LICs)

Local Improvement Charges (LICs) have long been used by municipalities to help cover the costs of infrastructure improvements (roads, sidewalks, etc.) deemed to benefit a specific neighbourhood. The benefiting landowners are assessed the LIC on their property taxes until their share of the improvements have been paid for.

The main advantage of using an LIC program over alternative methods of financing energy efficiency improvements and renewable energy projects is that it associates the repayment of the cost of the projects with the building property rather than with the current building owner. This means that permanent improvements that have long payback periods are more attractive to home and building owners because both their costs and benefits are passed on to new owners. In the case of new buildings, it allows the additional cost of building to the highest levels of efficiency (e.g., LEED Gold or R2000) to be shared by all owners of the building over time.<sup>52</sup> The local government provides the initial capital investment for the improvements.

#### *Case Study: Dawson Creek*

While Dawson Creek has not yet implemented LICs for energy efficiency improvements, the City is currently developing a model bylaw to frame the application of LICs in this way. This research will address key questions including improvement, ownership, monitoring and maintenance. The City will then embark upon a pilot project to test the model bylaw. The pilot project is expected to be launched in the fall of 2008.

For more information, contact: Emanuel Machado, [emachado@dawsoncreek.ca](mailto:emachado@dawsoncreek.ca), 250-784-3661

Potential energy	<ul style="list-style-type: none"> <li>High – depends on the type and scale of improvements</li> </ul>
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<sup>52</sup> For more information see the Pembina Institute report: *Using Local Improvement Charges to Finance Energy Efficiency Improvements*, available at <http://www.pembina.org/pub/170>

savings	
Potential cost implications	<ul style="list-style-type: none"> <li>• High – municipality provides initial capital investment, to be returned during the payback period</li> </ul>
Timing	<ul style="list-style-type: none"> <li>• Medium term - research and analysis to determine local improvement costs for energy efficiency improvements</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Options will be identified through Dawson Creek study</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>• Opportunity to implement large scale improvements</li> <li>• Costs of the improvements are borne by the building owners over time</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• Significant research in establishing appropriate improvements and affected areas</li> <li>• Significant capital investment to implement improvements</li> <li>• Additional administration responsibilities for Delta</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• Delta to administer the implementation of improvements and charge to users</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Research and analyze appropriate energy efficiency improvements</li> <li>• Assess environmental impacts and costs of providing local energy efficiency improvements</li> </ul>

### 1.7.8. Building Construction Bylaws

The *Housing Statutes Amendment Act, 2008*, amends the *Local Government Act* to grant authority to local government to enact bylaws regulating building construction for the purposes of:

- (a) the provision of access to a building or other structure, or to part of a building or other structure, for a person with disabilities;
- (b) the conservation of energy or water;
- (c) the reduction of greenhouse gas emissions;
- (d) the health, safety or protection of persons or property.<sup>53</sup>

However, in order to enact bylaws that exceed the requirements of the Building Code, local governments must apply for concurrent jurisdiction with the Ministry of Community Development.<sup>54</sup>

<sup>53</sup> *Local Government Act* [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_23.htm#section694](http://www.qp.gov.bc.ca/statreg/stat/1/96323_23.htm#section694)

<sup>54</sup> Curran, D. 2008. Summary of New Climate Change Legislation that Effects Local Governments. University of Victoria Environmental Law Centre.

***Implications for Delta***

Potential energy savings	<ul style="list-style-type: none"> <li>• High - depends upon regulations</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>• Administrative</li> </ul>
Timing	<ul style="list-style-type: none"> <li>• Long-term – would require development of energy efficient regulations and provincial approvals</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Develop energy efficiency regulations that exceed the requirements in the BC Building Code. Apply for approval from the Ministry of Community Development through <i>the Housing Statutes Amendment Act</i></li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>• Would provide a regulatory tool to require mandatory energy efficient features</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• Provincial approval could be a complex, time intensive process with no guarantee of success</li> <li>• A review of the BC Building Code to develop a Green Code is in progress. Amendments should not duplicate this work</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• Supplementary information would be required as part of permit applications</li> <li>• Could increase extent and timing of building permit reviews and approvals</li> <li>• Potential staff training required</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Research and develop energy efficiency regulations</li> </ul>

**1.7.9. Permitting**

By implementing preferential permitting processes, local governments can provide incentives to developers to choose greener options. Two main options are currently being used in other communities: fast tracking and rebates.

*Permit fast tracking:* permits are processed more quickly for buildings that meet certain green standards. This incentive tends to work best where there is a high demand for new development.

*Permit rebates:* rebates to the cost of permits are offered to developers who meet certain green standards.

***Case study: District of Saanich***

The District of Saanich has implemented both a fast tracking and rebate program for building permits. The first step in the program is an optional free one hour consultation with City Green consultants. If the builder/developer decides to proceed with a green building, they can meet one of three green standards. The rebate structure for residential development is as follows:

- 30% for Built Green (BG) gold, Power Smart (PS) gold, Energuide 80, R-2000

- 20% for BG silver, PS silver
- 10% for BG bronze

Developers must provide audit results on completed buildings to claim their rebates. Saanich provides a rebate on the costs of the audits.

Saanich offers a voucher for the consultation with City Green to each developer seeking a building permit application. Since the programs inception in 2007, 84 developers have taken vouchers for home building or renovating, 24 have had consultations and 4 buildings have been constructed which qualified for the rebate program. Saanich anticipates a significant increase in the number of qualified buildings in the coming year.

The initial rebates were financed through a grant from the Community Action on Energy and Emissions (CAEE).

For more information contact: Russ Fuoco, fuocor@saanich.ca, 250-475-5472

### *Implications for Delta*

Potential energy savings	<ul style="list-style-type: none"> <li>• High – depends on uptake and green standards</li> </ul>
Potential cost implications	<ul style="list-style-type: none"> <li>• Moderate – would result in lower permit fees collected</li> </ul>
Timing	<ul style="list-style-type: none"> <li>• Short term – would require establishing conditions for fast tracking or rebates for permits that incorporate energy efficient construction</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Council endorsement of a fast tracking and/or rebate program</li> </ul>
Potential benefits	<ul style="list-style-type: none"> <li>• Would reduce extra costs associated with implementing energy efficient construction practices</li> <li>• A rebate provided after proof of certification would ensure that energy efficient features are constructed</li> <li>• Proof of certification by a recognized body may eliminate need for additional inspections by Delta staff</li> </ul>
Potential challenges	<ul style="list-style-type: none"> <li>• May require additional financial resources from Delta.</li> <li>• Uptake may be slow unless there is a perceived benefit by the builder/building owner</li> <li>• Fast tracking may be hard to monitor or quantify</li> <li>• Conventional home builder may face additional delays in permit processing</li> </ul>
Processing impacts	<ul style="list-style-type: none"> <li>• Would require administration of rebates or fast tracking</li> </ul>
Next steps	<ul style="list-style-type: none"> <li>• Establish energy efficient construction eligible for incentive (e.x. LEED, Built Green certification).</li> <li>• Determine rebate amount or fast tracking conditions.</li> <li>• Establish information required for incentive ex. proof of certification</li> </ul>





## 1.8. Summary of tools and best practices

Table 3 summarizes the selected best practices strategies. The table indicates which strategies are most likely to be applicable to residential (Res), commercial (Com) and industrial (Ind) developments in Delta. The *potential for energy reductions* column indicates an estimate based on best case scenario energy savings. The *ease of implementation* column indicates an estimate based on cost, additional necessary research and implications for delta staff.

Table 1 explains the ranking of estimates of energy savings and Table 2 explains the rankings of ease of implementation.

Table 1 – Energy savings potential metric

Rank	Explanation
Low	Little potential for energy savings, either because the strategy does not address energy use well and / or uptake / implementation is anticipated to be low.
Moderate	Potential for some energy savings either because the strategy is moderately effective and / or uptake / implementation is expected to be moderate.
High	High potential for energy savings because the strategy is highly effective and / or uptake / implementation is expected to be high.

Table 2 – Ease of implementation metric

Rank	Explanation
Easy	Will require simple policy change and little additional staff time to implement. Low costs for Delta.
Moderate	Will require moderate policy change and some staff time to implement. Some cost to Delta.
Difficult	Will require extensive policy change and significant staff time to implement. Significant cost to Delta.

Table 3 – Summary of tools and best practices

<b>Strategy</b>	<b>Res</b>	<b>Com</b>	<b>Ind</b>	<b>Potential for energy reductions</b>	<b>Ease of implementation</b>
DCCs	Y (MF)	Y	Y	High	Moderate
Development Permit Areas	Y	Y	Y	Moderate	Easy
Revitalization Tax Exemption	Y (MF)	Y	Y	High	Moderate
Service Area Bylaw	Y	Y	Y	High	Difficult
Green Roof Bylaw		Y	Y	High	Moderate
Density Bonusing	Y			High	Easy
Local Improvement Charges	Y	Y	Y	High	Difficult
Building Construction Bylaws	Y	Y	Y	High	Difficult
Permitting Processes	Y	Y	Y	High	Easy

# 4. Recommendations

Below are summarized the recommendations from Chapter 2. These recommendations address specific components of Delta's existing policy documents and bylaws. In addition to these, it is recommended that Delta consider the strategies laid out in Chapter 3. These strategies will also likely have an impact on the recommendations listed here.

## OCP

- ❖ Embark on a comprehensive study of the energy and GHG impacts of alternative future land-use development patterns. The results of this study could then be used as a basis for making changes to the land-use designations and policies in Delta's OCP.
- ❖ Update the Climate Change policies in the OCP to better reflect the city's desire to take leadership on climate change actions, as noted in Delta's Climate Change Initiative.
- ❖ Move quickly to implement a sustainability checklist and recognition programs for building and development projects that meet high sustainable development standards.
- ❖ Add requirements for higher energy conservation and greenhouse gas reductions for areas in Development Permit Area designations.
- ❖ Develop financial or other incentives to provide strong motivation for developers and owners to meet these high standards (see Section 3 for examples of incentives)
- ❖ Consider the availability, location and required densities for implementing renewable energy systems. This information could be used to make changes to land use designations and policies in Delta's OCP.
- ❖ Undertake research to help explore the opposition that some community members may have to increased density and mixed-use development. To the extent that the opposition results from lack of knowledge or misunderstanding, develop education outreach on the benefits of this type of development.

## Zoning Bylaw

- ❖ Amend zones to permit alternative housing types and single family residential on smaller lots.
- ❖ Change definition of floor space ratio to ensure that the implementation of increased energy efficiency and renewable energy systems does not decrease the allowed amount of habitable space
- ❖ Decrease the requirements for parking spaces
- ❖ Consider means to ensure that density limits do not impose barriers on district energy systems or other innovate means to reduce energy consumption
- ❖ Evaluate whether minimum housing and unit sizes are a limit to density or other energy efficiency improvements. If these are a barrier, decrease the minimum sizes or drop this requirement entirely.

- ❖ Explicit inclusion of solar domestic hot water systems in section 306A of the Delta zoning bylaw

#### Building and Plumbing Bylaw

- ❖ Accept domestic solar hot water systems that have been approved by a Professional Engineer. In the long term amend the Building/Plumbing bylaw to specify how non-traditional systems can be permitted.

#### Subdivision and Development Bylaw

- ❖ Include more specific guidelines on lighting efficiency in the bylaw.

#### CCI

- ❖ Communication of numeric goals – Each plan under the CCI framework should ideally have clear emission reduction goals.
- ❖ Lack of timeline for next steps and evaluation plans – While the plans provide succinct summaries of actions in 2008, there should be a direct source for obtaining updates on implementation.

# Appendix A – Current Legal Context

This appendix outlines the changes to local government authority granted by the *Housing Statutes Amendment Act* and the *Local Government (Green Communities) Statutes Amendment Act* that are relevant to new building development in Delta. The information provided in this chapter is also included in Chapter 3, but summarized here for reference.

## Housing Statutes Amendments Act, 2008 (Bill 10)

### Building bylaws

The *Housing Statutes Amendment Act, 2008*, amends the *Local Government Act* to grant authority to local government to enact bylaws regulating building construction for the purposes of:

- (a) the provision of access to a building or other structure, or to part of a building or other structure, for a person with disabilities;
- (b) the conservation of energy or water;
- (c) the reduction of greenhouse gas emissions;
- (d) the health, safety or protection of persons or property.<sup>55</sup>

However, in order to enact bylaws that exceed the requirements of the Building Code, local governments must apply for concurrent jurisdiction with the Ministry of Community Development.<sup>56</sup>

## Local Government (Green Communities) Statutes Amendment Act, 2008 (Bill 27)

### Development Permit Areas (DPAs)

The new *Local Government (Green Communities) Statutes Amendment Act, 2008*, amends the *Local Government Act*, s.919 to grant authority to designate DPAs for the purposes of:

- Establishment of objectives to promote energy conservation;
- Establishment of objectives to promote water conservation;
- Establishment of objectives to promote the reduction of greenhouse gas emissions.<sup>57</sup>

<sup>55</sup> *Local Government Act* [http://www.qp.gov.bc.ca/statreg/stat/1/96323\\_23.htm#section694](http://www.qp.gov.bc.ca/statreg/stat/1/96323_23.htm#section694)

<sup>56</sup> Curran, D. 2008. Summary of New Climate Change Legislation that Effects Local Governments. University of Victoria Environmental Law Centre.

However, the scope of this authority only extends to:

- Landscaping, including restrictions on the type and placement of trees and other vegetation in proximity to the buildings and other structures;
- Siting of buildings and other structures;
- Form and exterior design of buildings and other structures;
- Specific features in the development; and
- Machinery, equipment and systems external to buildings and other structures.<sup>58</sup>

### **Development Cost Charges (DCCs)**

Recent amendments to the *Local Government Act* under the *Local Government (Green Communities) Statutes Amendment Act, 2008* (Bill 27) have granted the authority to local governments to waive DCCs for the following purposes:

- (a) not-for-profit rental housing, including supportive living housing;
- (b) for-profit affordable rental housing;
- (c) a subdivision of small lots that is designed to result in low greenhouse gas emissions;
- (d) a development that is designed to result in a low environmental impact.<sup>59</sup>

Bill 27 also stipulates that subject to the enactment of a bylaw, DCCs may not be levied on residential units less than 27 square metres (312 square feet).<sup>60</sup>

### **Greenhouse Gas (GHG) reduction targets**

The *Local Government (Green Communities) Statutes Amendments Act* amends the *Local Government Act* to require all Official Community Plans and Regional Growth Strategies to set GHG reduction targets and identify policies and actions that will enable the community to reach these targets.<sup>61</sup> All subsequent bylaws must be in accordance with these targets.

<sup>57</sup> *Local Government Act, s.919* [http://www.qp.gov.bc.ca/statreg/stat/l/96323\\_28.htm#section919.1](http://www.qp.gov.bc.ca/statreg/stat/l/96323_28.htm#section919.1)

<sup>58</sup> Curran, Deb. 2008. Summary of New Climate Change Legislation that Effects Local Governments. University of Victoria Environmental Law Centre.

<sup>59</sup> *Local Government Act, s.933* [http://www.qp.gov.bc.ca/statreg/stat/l/96323\\_28.htm#section933](http://www.qp.gov.bc.ca/statreg/stat/l/96323_28.htm#section933)

<sup>60</sup> *Local Government (Green Communities) Statutes Amendment Act, 2008, s.25*  
[http://www.leg.bc.ca/38th4th/1st\\_read/gov27-1.htm](http://www.leg.bc.ca/38th4th/1st_read/gov27-1.htm)

<sup>61</sup> *Local Government Act, s.877* [http://www.qp.gov.bc.ca/statreg/stat/l/96323\\_28.htm#section877](http://www.qp.gov.bc.ca/statreg/stat/l/96323_28.htm#section877)